MASTER THESIS

LOCALIZATION OF DESIGN: THE EFFECTS OF COUNTRY SPECIFIC GRAPHICAL WEB DESIGN ELEMENTS ON THE EVALUATION OF HOMEPAGES

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Summary

Purpose: In today's ever expanding digital world which knows no regional boundaries or time constraints, web designer have the difficult task to provide us with websites that need to be efficient and effective in this global environment. For web designers, coping with this challenge has put forward the dilemma of either standardizing or localizing web sites. Previous studies have shown that local customs in web design exist. However no systematic study has been done on the effects of these local designs on user preference. This study therefore investigates the effect of country specific graphical web design elements on the user's evaluation of homepages.

Method: Two studies were conducted to answer whether local design had an influence on the evaluation of homepages. First, a content analysis of in total 90 websites, from three countries (South-Korea, The Netherlands, and The United States) and within three domains (news, education, and government), was conducted to explore differences in the use of graphical web design elements. Second, a user experiment was conducted to explore the effects of the country specific graphical web design elements found in the content analysis. In total 65 Western European participants evaluated ten stimuli of which nine either resembled Korean, Dutch or American design. The evaluation consisted of a questionnaire on the visual appeal, perceived ease of use, and familiarity of the homepages and a plus-minus usability study with concurrent think aloud protocol.

Result: In the comparative content analysis, twelve out of the twenty-two graphical design elements were statistically different. Which indicate there are differences in the design of websites between the three countries used. These differences were incorporated in the stimuli used in the second study. The findings of the second study show that country specific graphical web design elements have an influence on the evaluation of homepages. The Western European participants evaluated the American homepages as statistically more appealing and perceived them as easier to use than both the Dutch and Korean homepages. Furthermore, the Dutch homepages were perceived as statistically easier to use than the Korean homepages. Last, both the Dutch as well as the American homepages were evaluated to be statistically more familiar that the Korean homepages. Additionally, a high correlation was found between all three determinants of the user evaluation. The data of the plus minus usability study showed that less interesting and homepages with fewer images were appreciated less, and also that color vibrancy plays an important role in the appreciation of a website.

Conclusions: There is an effect of country specific web design on the evaluation of users. Western users note a difference in the design of Eastern and Western design and are more appreciative of designs that mimic western standards. Therefore, web site designers can increase the visual appeal and perceived ease of use by using the appropriate set of country specific graphical web design elements. This study therefore supports the claim that localizing website is a good strategy to cope with the challenge of building efficient and effective websites.

1.

Introduction

Over the past decades the internet has grown immensely, becoming the most popular medium of communication around the world (Dong & Lee, 2008). From desktops computers to mobile phones, it has nested itself in every aspect of our daily lives and due to its omnipresence and the capability to interact in real time it has changed the way we live and work (Kim & Martinez, 2009). Therefore, geographical considerations and time constraints are no longer a major obstruction in conducting business globally (Robbins & Stylianou, 2003). For web designers this provides a challenge, as messages need to be efficient and effective globally within a twenty-four hour economy.

To overcome the challenge of accommodating messages to the international users, an effective web design needs to address the different preferences that people from different geographical locations have. Levitt (1983) proposed two options to address this obstacle, either standardize or localize the system. Others scholars have proposed adaptations on these two solutions, for instance Day (as cited in Fraterneli & Tisi, 2008) split localization up into two different groups. However, here the dichotomous scale of localization versus standardization will be the regarded as the preferred scale when studying messages intended for an international audience.

Even though it is almost thirty years ago that Levitt put forward the dilemma “only recently have studies included performance criteria and several have demonstrated that an adaptation strategy is more effective” (De Mooij & Hofstede, 2010, p.85). Unfortunately, no performance criteria have been used in the field of Human Computer Interaction, thus no such arguments can be made in this field. It would thus

be of interest to study the effects country specific adaptations have on the evaluation of web pages. Even more while in many recent studies it has been documented that both the content and the design of websites are different between countries and/or cultures (Cyr & Trevor-Smith, 2004; H. Kim, Coyle, & Gould, 2009; Zhao, Massey, Murphy, & Liu, 2003).

This study will address this gap in knowledge and explore the effects of country specific graphical web design elements on the evaluation of homepages. Therefore, the research question of this study is:

"What are the effects of country specific graphical web design elements on the evaluation of homepages?"

Graphical design elements are chosen over content elements as we believe that design can be assessed without any specific pre-requisites such as for instance language. We believe that the speed of evaluation of the visual design of a website, as shown in recent publications (Lindgaard, Fernandes, Dudek, & Browñ, 2006; Tractinsky, Cokhavi, Kirschenbaum, & Sharfi, 2006; Van Der Geest & Van Dongelen, 2009), further illustrates that design rather than content is a good first contender for an explorative study of the effects of country specific web design elements.

Here, a two stage model is used to investigate the effects of country-specific design elements. First, a content analysis of in total ninety homepages from South Korea, The Netherlands, and The United States will determine which graphical web design elements are country-specific. Thereafter, a user experiment will determine the effects of these country specific web design elements on the evaluation of participants on visual appeal, perceived ease of use and familiarity.

The contribution of this paper will be in both the insight it provides in the need to localize design as in the methodology used to determine the effects of country specific web design elements. By studying the evaluation of localized web design, an empirical argument, either for or against localization, can be made. Furthermore, this paper contributes to the literature as it provides a methodology to validate country specific web design elements found through a comparative content analysis, while, in addition to

the content analysis, these country-specific elements are studied to analyze their effects on users. The latter provides an answer to whether the users notice and/or appreciate these differences.

2.

Theoretical framework

In 1983 Levitt stated that the world was becoming more and more alike due to all the technological advances, even in spite of our firmly ingrained cultural differences. The author goes on to say that, to have systems be effective in various cultures, either standardizing or localizing is the option to cope with these technological changes. Since Levitt's (1983) publication about the dilemma, the cultural communication field has also been kept busy studying effective ways to design for cross cultural systems (Aslam, 2006; Cyr & Trevor-Smith, 2004; De Mooij & Hofstede, 2010; Kondratova & Goldfarb, 2006). Research into cultural differences has ranged from studies on the most effective message in advertising (Okazaki & Mueller, 2007) to developing a cultural universal color palette for web design (Kondratova & Goldfarb, 2006, 2009). In the field of Human Computer Interaction (HCI), recent studies have documented country specific elements within websites. However, little empirical research has been done on the influence these differences have on the evaluation of these websites.

First, here a broader perspective on the user experience in web design is advocated. User satisfaction has mainly been considered as stemming from great usability in the field of Human Computer Interaction (Hassenzahl, Beu, & Burmester, 2001). Therefore, the focus traditionally has been on the efficiency and effectiveness of applications (Lavie & Tractinsky, 2004; G. Lindgaard & Dudek, 2003). By doing so it has neglected other relevant aspects of design such as visual appeal (Lavie & Tractinsky, 2004; Lee & Koubek, 2010). Lindgaard & Dudek (2003) propose that user satisfaction is not merely influenced by usability but is also influenced by emotion, expectation, aesthetics and likeability. Such qualities seem to be important for users but are not all directly connected to the performance of the user

with the system. Not just usability but visual appeal, expectation, likeability and emotion are all elements that have an influence on the user and the user satisfaction.

Today, the increased interest in user satisfaction in web design has heightened the need to study the influence of localization on user satisfaction. Here the focus will be on the influence the differences in the use of graphical elements in homepages between countries have on the selected dimensions of user satisfaction. Graphical design rather than content is chosen even though both are considered to be important characteristics of websites (Huizingh, 2000; Robbins & Stylianou, 2003). In line with Faiola and Matei (2005),we believe that, when culturally adapting websites, the less formal dimensions and thus the design elements are more critical to investigate. For instance, Fogg, Soohoo, and Danielson (2003) found that nearly half of their respondents assessed credibility of websites on overall visual design. In similar vein, Lindgaard et al., (2006) show that websites are reliably judged within 50ms. This indicates the ease of which visual design is assessed and the importance of the overall design of the website, as it is judged within milliseconds. The influence of this immediate evaluation has not been established, thus only speculations can be made as to whether users choose to use a website after their immediate evaluation. However, when this is the case visual appeal should be studied intensively. This in combination with the heightened interest in localization is the reason the influence of localization of design elements on user satisfaction is studied here.

3.

Study overview

In the field of Human Computer Interaction, the literature on localization of design has mainly emphasized investigation of cultural markers, a termed coined by Barber and Badre (1998). The authors state that cultural markers are prevailing interface design elements within a given culture. As mentioned earlier, several studies have sought and found these cultural markers through content analysis (Callahan, 2005; Cyr & Trevor-Smith, 2004; Kim & Martinez, 2009; I. Kim & Kuljis, 2007). Even though content analysis is a well-established method in cross cultural research, due to its limitations of merely describing existing phenomena, it does not demonstrate what is effective with users (Baack & Singh, 2007; Taylor, 2005).

In this study a two-staged model is used to determine whether the use of country specific elements have an effect on homepage evaluation.

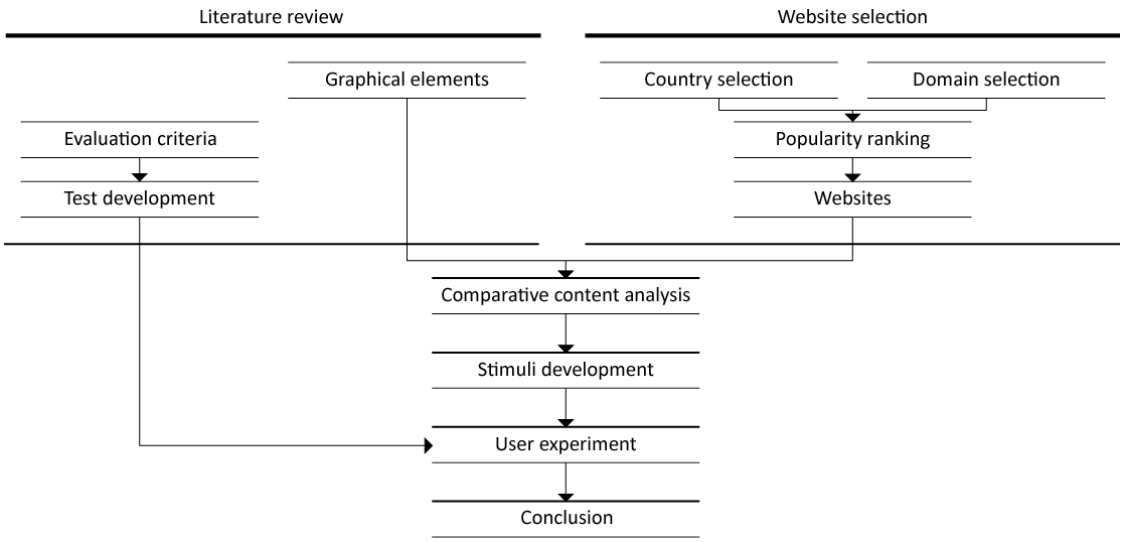


Figure 3-1. Scheme of identifying the effects of localization on the evaluation of homepages

First, a comparative content analysis is used to identify country-specific graphical design elements. Second, an experiment is used to determine the effect country-specific graphical design elements have on the evaluation of homepages. Several steps need to be taken to both find the country specific markers and also to evaluate if country-specific design elements have an effect on user's evaluation. In figure 3-1 we can see an adaptation of the model that was used by Fraterneli and Tisi (2008) to find culturability guidelines. The model consists of seven steps. The first three steps are necessary to find country specific design elements, these steps will be discussed in part I. The last four steps are necessary to determine whether country specific design element have an influence on the user evaluation, these steps will be discussed in part II.

In part I, the first steps will provide the websites necessary for the content analysis. The second step will provide the graphical design elements that are analyzed in the content analysis. The third step is the comparative content analysis, which will demonstrate which graphical design elements are used significantly more in a specific country.

Part II will start with the fourth step, which is the selection of evaluation criteria to measure which elements of user experience are used to determine whether country specific elements have an influence on the user evaluation. The fifth step is to develop stimuli that we can be used to test whether the differences found in the content analysis have an effect on the user evaluation. The sixth step is to carry out a user based test to evaluate the influence of country specific design elements on the evaluation of the user. This will be done through both a 17 item questionnaire and as a plus minus usability study with a concurrent think aloud protocol. The former will give quantitative scores where the latter will be used to explore the participants' choices in the questionnaire. The final step is to analyze the result of the user experiment and to evaluate the influence of country specific design elements.

Part I:

Country specific design elements

Introduction

Part I will provide a detailed description of the steps taken to find country specific design elements. This is crucial for the second part of this study as this will be the input for the stimuli used in the user experiment. However, the selection and operationalization of the graphical elements used in the comparative content analysis itself is also crucial, not doing this properly will not provide the information necessary to identify country specific design element or will make the content analysis excruciatingly difficult and/or time consuming. Therefore, the selection of graphical elements is based on related work on country and cultural differences in web design.

As mentioned earlier, this study will focus on design rather than on content. Even though, web design deals with creating fully functional websites that are built to deliver information and/or provide access to tasks that are meaningful and have value to both the user and to the web site owner (MacDonald, 2003). Consistent with past research here websites are split into content and design as is done by Robbins and Stylianou (2003) and Huizingh (2000). Here the content of a website is the information presented on the website and the design is the presentation of aforementioned content. Although, design is not merely concerned with the visual design of a website, it for instance also encompasses the interaction design or the information architecture of the website, here we are merely interested in the visual design of websites. Figure I-1 provides a visual representation of how the categories and graphical elements relate to web design in this study.

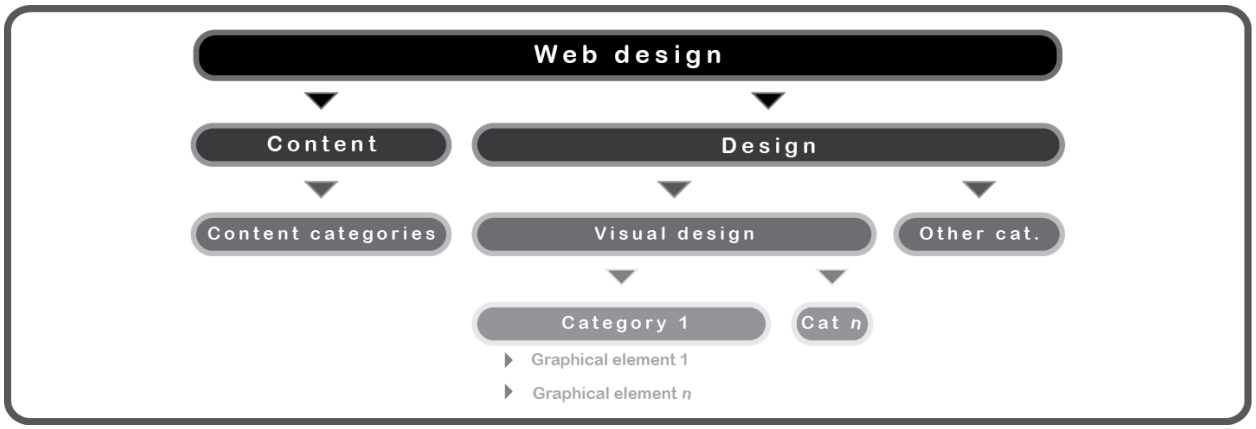


Figure I-1. Schema from web design to graphical elements

To get a grasp of what visual design is and out of which graphical elements it constitutes of, the following chapters will discuss these questions. However, first the selection of website used in the comparative content analysis will be discussed. Then the overview of the relevant literature on web design will be provided. This will provide insight into the field of cross cultural and cross country research on graphical design elements of websites. From these graphical design elements, categories and graphical elements are selected for use in our comparative content analysis. These graphical elements will be discussed and an operationalization of both the categories as well as the graphical elements is provided. Thereafter, the comparative content analysis will be discussed as well as its results. Last this section will provide an overview of the country specific design elements that will be used in the user experiment in part II.

4.

Selection of websites

Our focusing is not predicting preferable use of design elements. Instead, we are merely exploring differences in the use of graphical elements between countries. By selecting websites for our comparative content analysis we are framing our research and thereby making it manageable. The obstacle of determining an appropriate selection of websites for a content analysis has been addressed by several other studies. This because of the growing interest in cross-cultural design in the field of human computer interaction (Lindgaard, Litwinska, & Dudek, 2008; Marcus & Gould, 2000). Even though we are not searching for cross-cultural but cross-country differences, here the relevant literature is used to find an appropriate selection of website. In this study no explanation is sought for these differences within a cultural framework as for instance is done by Cyr, Head and Larios (2010) in their study on colour appeal in website design within and across cultures.

Here, a three country comparison is used, while a two country analysis, which seems to be the norm, greatly decreases the studies generalizability. Furthermore, Steenkamp (2001) suggest that sampling on a national level, when cultural factors are not part of the theoretical framework, is sufficient to generalize one's finding. Content analysis typically show a comparison between Anglo-Saxon and Asian websites, here we chose to start with a comparison between South Korea and the Netherlands. These countries represent very distinct cultures as determined by Hofstede (1980). However, both countries have an extremely high level of broadband internet penetration. The Netherlands is ranked as the number one country in fixed-broadband subscriptions per 100 inhabitants, with South Korea being fourth, being the first country outside of Europe (ITU, 2011). Furthermore, the same data shows that South Korea has the

most active mobile internet subscriptions per 100 inhabitants. This paired with high level of economic development in both countries leads us to believe that websites in these countries are both well developed. Therefore, a comparison between these countries seems fit to find country-specific design elements. However, as mentioned earlier, using three countries benefits the generalizability. Consequently, the United States was added as a benchmark, as this country is often used in cross-cultural research. The United States also has a high broadband internet penetration and is also economically well developed.

Together with the selection of the countries, three website domains were chosen to compare the countries homepages. In this study , News & media, Government and Education were chosen from the eight domains used in Barber and Badre (1998). For a better comparison this has been made more specific and therefore, newspaper, municipality and university websites were chosen. Three domains were selected to increase generalizability while comparing websites from too many domains may lead to see effects that are not country-specific but merely domain-specific. The domains were chosen while we believe that websites from these domains are well developed, are in the native language and are targeted towards their own citizens. In case of the university websites, the native versions of the websites were used instead of the more internationally oriented English versions.

In total 90 websites were selected, respectively 30 from each country. Within these 30 websites, 10 came from each domain. All the websites corresponded to being in the top ten on the following criteria. The homepages of the newspapers were selected on their papers equivalent circulation figures. The municipality websites were chosen on their number of inhabitants. The university websites were chosen on their ranking on Top Universities.com. For a more detailed overview of the websites used and the sources of choice see appendix A.

5.

Graphical web design elements in a global setting

This section will provide insight into the graphical elements used for the comparative content analysis. These graphical elements were divided into several categories to get a better grasp of the graphical elements as a whole and their relation to the evaluation of the user. The categories were determined after reviewing the literature , which led to an adapted version of the visual attributes classification used in Juric, Kim and Kuljis (2003).

Due to the diverse interests in past research on country and cultural differences in web design, no consensus has yet been reached on which categories and what elements should be included in a comparative content analysis. Therefore, several classifications of web design elements were studied to review what would suit our research needs. As the primary focus of this study is on visual design, the categories used in other research were divided over a scale, ranging from design to content. When the design categories of the various content analyses were aggregated we found that the division of visual attributes used by Juric, et al., (2003) was almost congruent with the division of visual design we came up with. Were Juric, et al., (2003) divide web design into three larger categories, visual attributes, audio visual attributes and language attributes, here visual design of websites is divided into four categories, spatial organization, text design, color and multimedia. In comparison to the study of juric et al., (2003) it is advocated that when leaving out sound as an attribute, the two categories visual and audiovisual attributes can be combined into one single category, visual attributes. Therefore, here the category images

as used by Juric, et al., (2003) is called multimedia, while in addition to images, we believe video, animation are all factors that are part of the visual design of a website and can be seen as one category.

Furthermore, this study uses spatial organization instead of lay-out as we believe that lay-out does not properly describe the category as it does not encompass all the graphical design elements that are necessary to arrange the content of a website.

Last, the category of text has been renamed to text design, this merely has been done for clarification purposes, to point out that solely the design of the text is of interest and not the text itself. Therefore, thus again the four categories used here are spatial organization, text design, color and multimedia.

This chapter will provide insight into the categories. First, per category a description of the category will be provided. This will provide some insight into what the categories encompasses to get a good grip on what is included in each category. Also the graphical elements that were either deemed as important by us or were shown to be significantly different in the literature review will be discussed. Furthermore it will provide insight into the graphical elements used in our comparative content analysis. For a better more detailed description of which graphical elements were taken up in this study and the justification of this choice, see appendix B. Last, this section will provide the operationalization of the graphical elements used in the comparative content analysis.

5.1 Spatial organization

Spatial organization refers to the arrangement of content and design elements. It provides the visitor with "a contextual and structural model for understanding and accessing information" (Cyr & Trevor-Smith, 2004, p. 1200). Therefore, spatial organization is closely linked to information architecture which concerns itself with "the structural design of an information space to facilitate task completion and intuitive access to content" (Rosenfeld & Morville, 2002, p. 4). However, spatial organization is concerned with single web pages whereas information architecture also transcends the boundaries of a

single page. Spatial organization does however provide structural models to understand and access information. Spatial organization thus concerns itself with the arrangement of the web site element to suit the needs of both the visitor as well as the website owner.

Alongside providing these structural models, spatial organization is also connected to the laws of perceptual organization from the Gestalt psychology. The Gestalt psychology provides insight into the principles that are utilized to show association between content. By using the Gestalt psychology designers make apparent that some elements are associated with each other. This makes the searching for information less strenuous as not everything has to be read thoroughly. Due to this association web visitors estimate whether the information will be close to their current point of focus and then make a judgment to search in the vicinity of their focus or scan further.

In this study spatial organization is constitutes out of the following topics:

- Orientation of the webpage
- Lay-out of the webpage
- Placement of specific content units

Here we will provide an overview of the relevant literature on spatial organization in cross country research.

5.1.1 Orientation of the webpage

The orientation of the webpage concerns itself with the reading direction of the webpage, page alignment, and the dimensions of the website in general and therefore thus whether the website is horizontally or vertically orientated.

According to Barbre and Badre (1998), the presentation of information and thus orientation of the website has immediate implication for the usability of the website. In their study on culturally specific design elements, they saw that the reading direction of Middle Eastern websites was mostly from right to left as opposed to the left to right reading direction used in most other geographical locations. Unlike Barber and Badre (1998), reading direction will not be assessed in our study. Within the three countries

used in this study the presentation of information is most commonly from left to right. However, we do believe the reading direction should be considered when localizing a website, still the element is of no specific use in the comparison of graphical elements within the selected countries.

Nevertheless, page alignment, which is closely related to reading direction, is incorporated in this study. Page alignment, as used here, is concerned with the placement of the container[1] of the website within the browser. However, instead of the dichotomous scale of left to right or right to left of reading direction, page alignment has a trichotomous scale. A page can be aligned on the left, in the center, or on the right within the browser. Although it is hypothesized that there is a link between reading direction and page alignment, the page alignment will be less obvious than reading direction. Therefore, it is of interested to see whether there is a difference in the use of this graphical element.

Horizontal versus vertical orientation, another component of orientation, which is concerned with the height to width ratio of the website, has previously been studied in a cross-cultural setting. In a study on cultural similarities in the design of university websites containing 160 website divided over 8 countries, Callahan (2005) observed that Japanese websites were predominantly vertically orientated in contrast to Austrian, Danish and Ecuadorian websites which preferred horizontal page design. A limitation to the findings of a difference in orientation is that Callahan's study uses one coder for the complete number of web pages and an additional coder for merely ten procent of the websites. Even though overall initial agreement was 85.1% this is something to be cautious of when interpreting the results provided by the study. Juric et al. (2003) also observed differences in the orientation of websites. In their study to identify cultural markers making use of 40 websites half from Korea and half from the United Kingdom, they observed that Korean websites were predominantly horizontally orientated and that UK websites were predominantly vertically orientated. Juric, et al. (2003) did not provide statistically significant differences but stated that the element is a strong candidates to be a cultural markers and that their study can serve as a basis for further exploration. Therefore, we incorporate horizontal versus vertically orientation in our study to explore the implications of orientation as a graphical element.

[1] The container of the website is the "visual box" in which the content of the webpage is placed.

5.1.2 Lay-out of the homepage

The lay-out of a webpage concerns itself with the grouping and number of content units, for instance, whether these are symmetrically aligned or the number of columns used to divide the content units. The lay-out of the homepage is most connected with the grouping principles of the Gestalt psychology. Proximity, similarity, uniform connectedness, good continuation, common fate, symmetry and closure (Schiffman, 2000 (source from Hsiao & chou (2006))) are all the grouping principles that help divide the homepage into comprehensible sections of information.

Symmetry, the Gestalt grouping principles that is easiest to operationalize in context of web design deals with the reflective symmetry of a homepage. Symmetry has been studied by Callahan (2005), in the author's study on cultural similarities in the design of university websites, also explored the use of symmetry. Callahan (2005) observed that symmetry was not a cultural marker, on the contrary, Danish and Swedish websites even seemed to avoid symmetry, which in turn can perhaps be seen as "Scandinavian design" and thus a cultural marker. However, the graphical element is taken up in our study, even though previous studies did not find a significant differences in symmetry.

Content units, which in web design is related to the Gestalt principles of perceptual organization, with a connection to the grouping principles of proximity and similarity, are units on a website that are visually grouped together to form an informative block. A news article or commercial areas with several banners are examples of content units. Because of different viewing patterns found by Dong & Lee (2008), the number of content units is of interest. The authors found that Korean web users employed a different viewing pattern when looking at a webpage compared to American users. Specifically, Korean users scanned the whole web page and showed non-linear scanning patterns in contrast to American users, who use a sequential reading pattern to read from the center to the periphery of the page. To see whether this difference in scanning also contributes to differences in the number of content units, we wanted to incorporate this graphical element in our study. However, due to difficulties in agreeing on the amount of content units on a homepage, this element has been left out of the comparative content analysis.

5.1.3 Placement of specific content units

Other than the placement of these content units, spatial organization also concerns itself with the function of these content units, where they are situated on the web page and how they are aligned. Menu placement, and menu orientation are among those content units which are of interest when exploring cross-country differences. Menu placement for instance seems to be significantly different across cultures (Cyr & Trevor-Smith, 2004; Juric, et al., 2003; Kim & Martinez, 2009; H. Kim, et al., 2009; I. Kim & Kuljis, 2007). For instance, in their comparison of German, Japanese, and United States web sites characteristics of in total 90 websites, Cyr and Trevor-Smith (2004) found that Japanese websites had statistically less menus on the left compared to the other two countries. Kim and Martinez (2009), found that the website of Ford had more menus on the right on its European websites than it did in the other country clusters. Furthermore, Asian Pacific sites had more menus on the left for the same Ford website. Due to these contradicting conclusions drawn by the aforementioned authors, these findings raise an interest in the placement of the menu on web pages. Also of interest is where the logo and the most prominent image of the website are positioned as we believe the consensus of where to place these on the homepage might differ between the countries. Therefore, the placement of the specific content units is incorporated as graphical element in this study.

5.2 Text design

The category text design deals with the visual design of the text on a website. With the introduction of the computer, the internet and the rapid dissemination of these vessels of information, the volume of material that we read from screen has increased (M. C. Dyson, 2004) . Publishing itself has moved from the print shop to the desktop. The relative ease of manipulating text with desktop publishing software has made text design independent from the colossal cumbersome mechanical machines used to create documents in the past (Brumberger, 2003). The ease with which documents can be created has made information on the web widespread and easy to access. This change has created a new challenge in that words are not enough

to convince readers to start and, maybe even more important, continue to read information. Therefore, presentation of text on screen has become an integral part of web design as well.

Since its conception, the internet has evolved from the type driven medium it once was. However, remarkable little research has been done on text design for web pages or the inherent impact of text design for displays on visual appeal. An explanation for the limited amount of research is the suggestion that the knowledge of design for print can be translate to screen (M. C. Dyson, 2004). From early on, the assumption, of translating knowledge of print design to web design, has been questioned by for instance (Kolers, Duchnicky, & Ferguson, 1981) whom stated that no complete inference can be made from the old to the new media.

Another problem for text design for screens is the rapid evolvement of screens and their possibilities (Nebeling, Matulic, & Norrie, 2011) .Whereas it seems, in ancient history, the screens were primarily black and green, nowadays there are screens that emulate the characteristics of paper, screens that can be rolled up or screen that are over 30 inches in diameter. The latter displays bring a whole new set of problems to text design, e.g. non-scalable elements which lead to an increased amount of unused screen real estate and unnecessary scrolling (Nebeling, et al., 2011). Therefore, research done on reading from screens may have questionable validity due to the fast changing screen landscape.

Due to the limited amount of research, this paper will use both screen design and paper design references to determine the graphical elements in this research. We use the term text design to express the design choices that are concerned with the visual design and presence of text on a website. This ranges from the font of the headline to the amount of text on a website. Text design as used here concerns itself with the following topics:

- Textual presence
- Typography

Here we will provide an overview of the relevant literature on spatial organization in cross country research.

5.2.1 Textual presence

Textual presence concerns itself with the amount of text on a web page. Textual presence has not been studied extensively in an international comparative study. However, we consider textual presence a factor that might be of essence when localizing a web page. Similar to content areas, textual presence might correlate with the holistic versus analytical cognition as presented by Nisbett et al. (2001). Here the holistic minded people used a scanning pattern to explore web page, consequently they had less difficulties dealing with more information on a web page. Therefore, it is presumed that they are also capable of dealing with more text on a web page. To see whether difference in web page scanning also contributes to differences in the text to image ratio, this graphical element is included in our study.

5.2.2 Typography

Typography concerns itself with the selection of typefaces, point size, line length, line spacing, tracking, kerning, and color of text. Within the localization research, typography has never been a well studied topic. Even within the entire field of human computer interaction typography has not played an important role. Dyson (2001) state that "empirical research on reading from screen has spanned more than 20 years, but progress in developing a sound body of knowledge on the effects of text formats is slow". Similarly Nielsen states that extensive research has been done into the effect of various typographical variables on reading of printed material, but that this is not the case with for information presented on screen.

Without being studied extensively typography is an important part of web design, it facilitates searchability and readability of web pages, it can enhance speed of reading and in line with Dyson (2004) it can alter visual appeal. To see whether difference in typography also contributes to differences in visual appeal this graphical element is taken up in our research.

Link typography is the same as typography, however instead of normal text it concerns hyperlinks. Links are a vital part of websites and the visual design of hyperlinks often uses the colors used in the color scheme of the rest of the website. Links also function as a breadcrumb to users to find the

information they are looking for and thus are of essence in usability design. Therefore, it is interesting to see whether there are country specific elements within the link typography.

Hyperlink colors was shown not to differ significantly according to Kim and Kuljis(2007), although Cyr and Trevor-Smith(2004) found that Japanese sites used the most visual cues when a link has been visited. However, as we know that we are going to use images in our experiment we will not take in account visited links while we will be unable to incorporate these in our experiment as merely static images will be used.

5.3 Color

Color is part of how we perceive the world, it helps us distinguish objects, it alerts us when necessary and it is another factor that has to be considered when designing a website. Here of interest is to see whether differences in the use of color can be distinguished within the selected websites. Choices in colors for a website are usually limited to the corporate color scheme. However, when no such thing exists, color associations, for instance the association of blue with water, can be used to develop a color congruent website (Alberts & van der Geest, 2011).

However, different color associations are developed within various contexts, which makes understanding color responses more complicated (Grossman & Wisenblit, 1999). For instance green which is associated with the permission to continue in traffic which is good, and within some fruits such as bananas or tomatoes it's associated with unripe, which is bad.

Valdez & Mehrabian (1994) have demonstrated that within context, colors influence emotions. Bottomley and Doyle (2006) showed that the appropriate choice of color can bring inherent and immediate value to a brand, while the logos used in their study were valued to be more appropriate when the right color was chosen. Alberts & Van der Geest (2011) demonstrate that color has an influence on trustworthiness. However, the authors note that within some context, the color scheme might be more important than in another context.

Therefore, the conclusion is drawn that color can elicit emotional responses and also influence perception of websites, but it is dependent of context. Researchers suggest that our emotional reactions to color have an evolutionary origin, however, context and the association of color within that context are also believed to be learned as stated by Grossman & Wisenbilt (1999). Culture can therefore play an important role in how color is perceived and appreciated as is shown in Aslam (2006) in his review of the psychological and socio-cultural associations and meanings of color in a cross-cultural marketing perspective. Color can thus be an important factor when designing websites.

The existing literature on website color which takes geographical location / culture in account is presented here. Here we divide color up into the following two categories:

- Color scheme
- Background color

5.3.1 Color scheme

The color scheme of a website is used to distinguish the most prominent colors on the website. With color scheme, we are looking for differences in the use of colors on websites in general. In their study for an international color palette for cross cultural websites, Kondratova and Goldfarb (2006) suggest the use of a palette of ten colors to globalize the website. Although Kondratova and Goldfarb (2006) suggest the use of an international color palette, they also provide some colors that could be used to localize for specific countries. Thus suggesting that not all colors are appreciated equally in different countries.Specific colors were also found by Badre and Badre (1998). The authors observed that Israeli and Lebanese websites made heavy use of the color green. Furthermore, Barber and Badre (1998) observed that governmental websites mostly used the color of their national flag. The exceptions were Brazilian websites, which used very bright colors as opposed to the colors of the national flag.

Callahan (2005) observed that Danish websites predominantly used a color scheme which was dominated by shades of blue. The authors studied cultural differences and similarities in the design of university web sites. Furthermore, in their study Greek websites appeared to have two dominant color

schemes, various shades of blues, of which some were related to nautical themes, and the other scheme were various shades of brown. The Greek sites also used toned down colors. Similarly, Japanese sites used a lot of pastel colors in their websites, where Ecuadorian sites used rather bright colors.

Callahan(2005) also observed that Malaysian websites also used vivid colors and also used a large number of colors. Kim and Martinez (2009) observed that Yahoo used the smallest number of colors on their European websites, in their study on differences in visual content of parent and local websites for U.S. brands. Cyr and Trevor-Smith(2004) also found that German websites used a limited range of colors such as shades of blue and purple, as well as white.

Even though we assume the color scheme of a website to be very important, due to the small sample size of 90 website believe that we cannot make an accurate estimate of what the preferred color scheme within the countries is and therefore it is not incorporated as a graphical element in this study. However, the main color used on the website is taken in as a graphical element.

5.3.2 Background.

The background of a website might not always be the most prominent visual cue but it's one of the most studied visual cues when it comes to color. Several studies showed that white is the most predominant choice throughout all cultures / countries (Callahan, 2005; Cyr & Trevor-Smith, 2004; I. Kim & Kuljis, 2007). However, Callahan (2005) found that Japanese websites use pastel colors, when white was not selected as the background color. Juric et al.'s (2003) observed that most of the observed Korean web sites in their study used a white background, whereas a variety of background colors, including blue, red, green, orange, and black, was characteristic of British web sites. This shows that several studies have found that background can be a marker of international differences, and hence we will examine whether this still holds true and whether the domain has an influence on it, therefore background color is included as a graphical element in our research. Furthermore, we also include the background of the container of the web site as this might also be different. Last, we also include whether the background is an image or that it is a flat color, as today, backgrounds can also be images.

5.4 Multimedia

From being a text orientated medium, website have evolved into a mix of print and television. Multimedia therefore plays an important role in web design. Currently, when looking at websites, one is presented with a surplus of images, videos, graphics, and other multimedia. Today, the choice of content is not merely what to write, but the selection of pictures, or even videos, that accompany the text has become essential as well. Content has become much more visual and thereby changing how we design websites. With the completion of the development of HTML5 in sight, one can see that multimedia is becoming so crucial to web design that even the mark-up language is changing to facilitate the use of multimedia on the web.

From a research point of view, multimedia is hard to categorize as either content or visual design. The distinction can be difficult while some elements are immersed in the design of the website and thus more static of nature making them more design than content. On the other hand, other elements could be characterized as content, for instance a news photos, as these are more dynamic of nature while these can change as the news changes.

However, as with colors, multimedia can elicit an enormous amount of emotions of which appeal is one as for instance is shown in the study of Cyr, Head, Larios, & Pan (2009) in their study on the effects of human images in web design. They also show that these human images also lead to different responses in different countries. Similar to this observation, Riegelsberger & Sasse(2002) claim that the use of an image and / or other rich media can elicit different affective responses. Therefore, one needs to be very careful when selecting these. We have tried to avoid getting into the implicit meaning of the multimedia and merely describing the elements in size, number of use and which medium is used.

We use the following categorization of multimedia

- Images
- Animation
- Video
- Logo

The following sections provide an overview of these categories.

5.4.1 Images

Here the text to image ratio is taken into consideration. In their search to find cultural markers, Barber and Badre(1998) noticed that Lebanese websites were mainly text based. In their search for cultural manifestations, Kim and Kuljis(2007) found that Korean sites use a lot more images than websites from the USA. However, this proved to be difficult to assess properly and therefore the text to image ratio was chosen to measure the presence of images on a homepage.

5.4.2 Animation

In contrast to images here the interest does not lie in the number of images, but of more interest is whether the homepage uses animation. Cyr and Trevor-Smith (2004), found that US websites used significantly less animation compared to German and Japanese websites. Although Cyr and Trevor-Smith (2004) did not find a significant difference in the use of multimedia, streaming video and sound across cultures, Zhao (2003) found that animated content and floating banners were significantly different for Chinese and US websites. Furthermore, Callahan (2005) also found that Malaysian and Ecuadorian websites used a lot of animation compared to other countries. Therefore, animation should be incorporated as a dichotomous graphical element in this study. However, due to limitations in the development of the stimuli, as merely images are used to assess homepages, this graphical element will not be used in the comparative content analysis. However this graphical element should be of interest when developing or studying websites.

5.4.3 Video

As with animation, video should be categorized as a dichotomous variable. The amount and use of streaming video on websites has been shown to differ culturally. When looking for cultural manifestations on websites Kim and Kuljis (2007) found that Korean websites had significantly more streaming videos and animation than UK websites. Nearly the same conclusion was drawn by Kim, Coyle and Gould (2009), in their study on collectivistic and individualistic influences on website design, which showed

that streaming video's on a website were predictors of Korean group membership. However, as mentioned earlier, due to the limitation in the development of the stimuli this graphical element will not be used in our comparative content analysis.

5.4.4 Logo

Use of symbols and logos seemed to differ significantly according to Cyr and Trevor-Smith (2004). The American websites used, in contrast to other countries, no local or cultural specific symbols. Japanese sites however where the only sites to use Asian symbols, which is not remarkable while it was the only Asian country in the three country comparison. What was remarkable was that it was the only country to use symbols for currency and that the symbols were significantly different as they were easy to understand. However looking at symbols would be searching for differences in content rather than design, therefore we will not look at this in our comparative content analysis. However, we do look at the difference in the logo design as this might also symbolize differences in preference of either a visual preference or a textual preference.

5.5 Operationalization

After the graphical elements were deducted from the literature as, they needed to be operationalized. The literature and common sense were used to operationalize the graphical elements so there would be no overlap between the various choices within the graphical elements. The author tested an initial draft of the coding instrument by coding 90 homepages. Based on this test, coding problems were found and the instrument was revised. Then a pilot test was held to check the intercoder reliability and after this the coding workbook was revised again. Hereafter, the coding workbook was finalized, and it was believed that the coding workbook would permit reliable coding with little training necessary for coders. Tabel 5-1 shows the final operationalization of the graphical elements.

Table 5-1
The operationalization of the graphical elements

	Operationalization
Spatial organization	
Symmetry	Two thirds of the container of the website is vertically symmetrical.
Page alignment	The page is aligned on the left, in the center or on the right.
Menu placement	The menu is situated within this part of the container of the homepage.
Menu orientation	The menu is either horizontally orientated, from left to right or vice versa or the menu is vertically orientated thus from top to bottom or vice versa.
Menu corners	Are the corners of the menu angular or rounded or are there no corners
Logo placement	In which section of the website is the logo of the city / newspaper / university situated? Thus not the logo of the website but the logo of the city / newspaper / university
Placement of the main image	In which section is the main image situated? E.g. the most prominent image
Orientation	Is the website vertically or horizontally orientated (thus is the width < length of the homepage)
Dimensions of the website	The dimension of the homepage in pixels in height and width
Text design	
Typography	The most prominent font of the homepage is in: Sans serif, Serif, Sans serif & serif, Mimicry, or other typography.
Text color title	The color of the most prominent title of the homepage
Text colors text	The color of the most used text (body text) of the homepage
Link typography	The most prominent font of the links of the homepage is in: Sans serif, Serif, Mimicry, or other typography.
Link colors	Color of the most used link type of the homepage
Color	
Main color	The color most used on the homepage. customarily, black and white are not colors, unless this really sticks out
Menu color	The color of the menu
Menu gradient	The menu uses a gradient as part of its background
Background color	The background color of the entire homepage
Background image	The website uses a background image or does it merely use a color
Background container color	The color of the background of the container of the homepage
Multimedia	
Text to image ratio	The ratio between text and images 10to90, 25to75, 50to50, 75to25, and 90to10
Logo	What kind of logo is used, one with only an image, only text, or a combination of both text and image

6.

Study 1: The comparative content analysis

To answer whether the graphical web design elements are used differently between countries, a comparative content analysis was conducted of in total 90 website homepages. The following chapter will provide insight into this comparative content analysis. First, the collection of the sample of websites will be described. Then the method and intercoder reliability will be provided. Then the results will be described. Last, the country specific graphical web design elements will be provided.

6.1 Sample

The homepages of in total 90 websites, 30 from websites from the Netherlands, 30 from South Korea and 30 from the United States, were selected for coding. In the sample three domains of websites were used, municipality, newspaper, and university websites. Per domain 10 websites were analyzed per country thus resulting in 10*3*3 equaling in 90 websites. Screenshots of the homepages were taken on the 13th of august 2011 by using the Screengrab add-on for Firefox 3.6. Furthermore, the websites were also recorded with Flash and Javascript codes enabled with the Scrapbook add-on also for Firefox 3.6, this was done for backup purposes as this captured the entire homepage with animation and pop-ups. The latter were not used in this study but could have been, would the choice of the development of the stimuli have been different, thus not images, but functioning homepages.

6.2 Method and intercoder reliability

As mentioned before, the author tested an initial draft of the coding instrument by coding 90 homepages. Based on this test, coding problems were found and the instrument was revised. Thereafter, a pilot test was held to check the intercoder reliability and after this the coding workbook was revised again. This led to a finalized version of the coding workbook, and it was believed that the coding workbook would permit reliable coding with little training necessary for coders. No pilot test was run hereafter and the coding was done by the first author and a second coder. The coding was done separately, the second coder was handed a coding workbook, the screenshots and got an initial training of approximately an hour. After the initial content analysis some of the intercoder reliability results were not above the cohen's kappa mark of .80 which is commonly used as a benchmark for good intercoder reliability and some revisions were made to the coding workbook to get the intercoder reliability of all the graphical elements used to a cohen's kappa of .800 or above. Another round of coding on the final sample was conducted after an additional training. The reliability results from the last round of coding are reported in table 6-1.

Table 6-1.
The results of the reliability analysis performed by two coders

	Cohen's Kappa (*n* = 90)
Spatial organization	
Symmetry	.80
Page Alignment	.96
Menu placement	.84
Menu orientation	.68
Menu corners	.97
Logo placement	.96
Placement of the main image	.84
Orientation	.83
Dimension[2]	-
Text design	
Typography	.82
Link typography	1.00
Text color title	.83
Text colors text	.96
Link colors	.89
Color	
Main Color	.90
Menu Color	.92
Menu gradient	.80

Background Color	.98
Background Image	.95
Background container color	.47
Multimedia	
Text to Image ratio[1]	.93
Logo	.75

[1] Not independently coded, but after discussion this level of agreement was reached.
[2] Not coded as is a determined by the dimensions of the screenshot that was acquired with the screenshot extension for Firefox.

As can be seen from the Cohen's kappas in table 6-1, we can conclude that merely three variables are under the .80 mark, which is considered as good intercoder reliability (Ellis, 1994). Therefore, we conclude that the intercoder reliability is good and thus continue to use the data gathered. For the comparative content analysis, the coded scores were aggregated. This was done by randomly selecting one of the two scores of the coders per item, thereby when they coded something equally this would not make a difference, but when they coded something different it would be randomly selected which judgment would be used in the rest of this study.

6.3 Results

The results of the comparative content analysis are provided here. Due to the small sample size instead of loglinear analysis, here chi-square and fisher's exact test were used. The assumptions of expected frequencies of five or more could not be reached for the loglinear analysis, this greatly decreases the power of the test and therefore chi-square tests were used. Due to the nature of this research as being merely interested in the differences between countries this would suffice here. However, when the chi-square tests were performed several of the graphical elements also did not meet the assumption of at least an minimum expected count of five or more in 80% of the cells (Field, 2009). Therefore, when the minimum expected count was less than five in more than 20% of the cells, the fisher's exact test was used to spot differences. The data presented in Table 6-2 are the results of the comparative content analysis. If a *p*-value of .05 or less is reached, the graphical element is considered to be statistically different and will therefore be used in part II of this study, the user experiment.

Because we are merely interested in the differences on the country level, this section will not provide the graphical elements that were solely different on a domain level[2]. This section will first provide a description of the graphical elements that were solely different between countries, then the graphical elements that were different between both the country and domain level.

Table 6-2.
The results of the comparative content analysis

			Country		Domain	
	df	*N*	χ^2	*p*	χ^2	*p*
Spatial organization						
Symmetry	2	90	.82	.75	7.48	.03*
Page alignment	2	90	1.06	.67	9.27	.01*
Menu placement[1]			-	.01*	-	.05
Menu orientation	2	90	3.36	.29	1.92	.44
Menu corners	2	90	7.92	.03*	12.92	.00*
Logo placement[1]			-	.70	-	.21
Placement of the main image[1]			-	.00**	-	.25
Orientation	2	90	8.09	.02*	24.04	.00**
Dimensions of the website[2]			(F)5.25	.00	(F)68.04	.00
Type						
Typography[1]			-	.22	-	.00**
Link typography	3	90	9.73	.007*	15.20	.00**
Text color title[1]			-	.04*	-	.04*
Text colors text[1]			-	.12	-	.00**
Link colors[1]			-	.00**	-	.00**
Color						
Main color [1]			-	.01*	-	.10
Menu color [1]				.02*	-	.29
Menu gradient	2	90	4.82	.11	.39	.89
Background color	2	90	9.99	.01**	5.04	.08
Background image	2	90	1.40	.59	7.90	.02*
Background container color[1]			-	.03*	-	.19
Multimedia						
Text to image ratio[1]			-	.03*	-	.00**
Logo[1]			-	.86	-	.00**

*p < .05 **p < 0.01 [1] Fisher's exact test, [2]F statistic instead of χ^2

Due to an overlap in, the dimension of the website will not be taken into further consideration as a web design element as the same consequences for the second study are gathered by the orientation graphical web design element.

[2] Graphical elements different on the domain level were Symmetry, Page alignment, Dimension of the website, Typography, Text color text, Background image, and Logo.

6.3.1 Elements that are statistically different merely on the country level

Here the graphical elements are presented that were different on the country level. The different chi square and fisher's exact test statistics of differences between countries will be presented. This gives insight into which country or countries were different from the others.

Table 6-3 provides the elements that are different on the country level. These elements will be discussed further in the following sections.

Table 6-3.
The graphical elements that are different on merely the country level

	χ^2	*p*
Placement of the main image*		.01
Background color	9.99	.01
Main color*		.01
Background container color	9.71	.05
Menu color	26.86	.02

*Fisher's exact test was used instead of a chi-square when the expected frequency was less than five.

To get a better overview of the differences see appendix D. Here a short description will be provided to indicate the differences within the graphical element.

6.3.1.1 Placement of the main image:

There is a significant association between the homepage's country and the placement of the main image on the website (p = .01, Fisher's exact test).The Korean homepages have no main images on the right side of the homepages, which is in contrast with the US homepages where the main images are equal divided over the website, left, center and right.

Table 6-4.
Significant test of placement of the main image

	χ^2	*p*
NLD-KOR*		.39
NLD-USA**	5.52	.08
KOR-USA *		.00

*Fisher's exact test
**Df = 2 , n = 60

6.3.1.2 Background Color

There is a significant association between the homepage's country and the background color χ^2 (2, N = 90) = 9.99, p = .01. The Korean websites most often use white as a background color. The Dutch homepages also use white most often as a background color but grey is also used a fair amount. The American websites also use white the most, but blue and grey are also used as background colors.

Table 6-5.
Significant test of the background Color

	χ^2	p
NLD-KOR*	6.65	.02
NLD-USA*	.27	.80
KOR-USA*	9.32	.01

*Df= 1 , n = 60

6.3.1.3 Main Color

There is a significant association between the homepage's country and the main color (p = .011 , Fisher's exact test). On Korean and US homepages, blue is most often used as the main color of the website, where in the Netherlands red, blue and. green are all used and no specific color is used most as the main color of the website

Table 6-6.
Significant test of the main color

	χ^2	p
NLD-KOR*		. 01
NLD-USA*		. 03
KOR-USA*		. 23

*Fisher's exact test

6.3.1.4 Background container color

There is a significant association between the homepage's country and the background container color χ^2 (N = 90) = 9.71, p = .05. The consensus of all the countries is that white is chosen as the container color of the homepage, but in both Korea and the US blue is also used as a viable option. Furthermore, Korean homepages only use white and blue as background container color, whereas both the Dutch and U.S. homepages also use other colors.

Table 6-7.
Significant test of the background container color

	χ^2	p
NLD-KOR*	6.07	.05
NLD-USA*	4.64	.10
KOR-USA*	6.67	.04

*Df= 2 , n = 60

6.3.1.5 Menu color

There is a significant association between the homepage's country and the background color of the menu (Fisher's exact test, p = .02). In Korea the color most often used as the menu color is blue whereas white and grey are most often used in respectively the Dutch and the US websites.

Table 6-8.
Significant test of the menu color

	χ^2	*p*
NLD-KOR*		. 01
NLD-USA*		. 03
KOR-USA*		. 22

*Fisher's exact test

6.3.2 Elements that are statistically different on both the country and domain level

Here the graphical elements are presented that were different on both the country and domain level. The different chi square statistics of the differences between the countries are presented in table 6-9. This gives insight into which country was different from the other two. To get a better overview of the differences see appendix D, were visual aids are used to further explain the difference. Also a short description will be provided to indicate the difference on the graphical element.

Table 6-9.
The graphical elements that are different on both the country level and domain level

	Country level		Domain level	
Graphical element	χ^2	*p*	χ^2	*p*
Menu Corners	7.92	.03	12.92	.00
Orientation	8.09	.02	24.04	.00
Text color title*		.04		.04
Link typography	9.73	.01	15.20	.00
Link colors*		.00		.00
Text to image ratio*		.03		.00

* Fisher's exact test

6.3.2.1 Menu corners

There is a significant association between the homepage's country and the style of menu corners χ^2 (2 , N = 90) = 7.92, p = .03. Furthermore, there is also an association between the homepage's domain and the style of the menu corners χ^2 (2, N = 90) = 12.92, p = 0.00. The rounded corners of the menu are used more often in Korea compared to the other two countries. Furthermore, no university website employ rounded corners on their homepages.

Table 6-10.
Significant test of the menu corners

	χ^2	p
NLD-KOR*	5.96	. 03
NLD-USA*	-	1.00
KOR-USA*	4.36	. 07

Df = 1, n = 60

6.3.2.2 Orientation

There is a significant association between the homepage's country and the orientation of the homepage χ^2 (2 , N = 90) = 8.09, p = .02. Furthermore, there is also an association between the homepage's domain and the orientation of the homepage χ^2 (2 , N = 90) = 24.04, p = .00. Korean homepages are more often horizontally orientated compared to the two other countries. Furthermore, there is a large difference between university and newspaper websites while the former does employs horizontal orientation on homepages, whereas newspaper only employ a vertical orientation.

Table 6-11.
Significant test of the orientation

	χ^2	p
NLD-KOR*	6.24	.02
NLD-USA*	.11	1.00
KOR-USA*	4.80	.05**

*Df = 1, n = 60 **not significant

6.3.2.3 Text color of the title

There is a significant association between the homepage's country and the color of the text of the most important title of the homepage (p = .04 Fisher's exact test).Furthermore, there is also an association between the homepage's domain and the

Table 6-12.
Significant test of the text color of the title

	χ^2	p
NLD-KOR*		.09
NLD-USA*		.36
KOR-USA*		.01

*Fisher's exact test

color of the text of the most important title of the

homepage (p = .04, Fisher's exact test). There is a difference in the use of black and blue as the color that is used for the main title color. In the US blue is used most often whereas in both the Netherlands and Korea black is used the most. When looking at the domains one can distinguish that newspapers use black the most and that universities and city hall homepages have a less pronounced favorability for black and for instance use more white.

6.3.2.4 Link typography

There is a significant association between the homepage's country and the typography of most of the links on the homepage χ^2 (2 , N = 90) = 9.73, p = 0.01. Furthermore, there is also an association between the homepage's domain and the typography of most of the links on the homepage χ^2 (2 , N = 90) = 15.20, p = 0.00. Korean homepages do not use serif fonts on their homepages in contrast to the other two countries. Furthermore, newspapers have a far higher use of serif fonts in comparison to the other two domains.

Table 6-13.
Significant test of the orientation

	χ^2	p
NLD-KOR*		.00
NLD-USA**	.11	.00
KOR-USA*		.00

*Fisher's exact test
**Df = 1, n = 60

6.3.2 .5 Link color

There is a significant association between the homepage's country and the color used for most of the links (p = 0.00, Fisher's exact test). Furthermore, there is also an association between the homepage's domain and the color used for most of the links. Korean homepages seemed to use a lot more black for the color of their links as opposed to the other two countries. Furthermore, city hall websites use a lot more other colors than black and blue for their link colors than did the other two domains. Also, university homepages used a lot more blue links in

Table 6-14.
Significant test of the link color

	χ^2	p
NLD-KOR*		.00
NLD-USA**	2.45	.33
KOR-USA*		.00

*Fisher's exact test
**Df = 2, n = 60

comparison to homepages for city halls

6.3.2.6 Text to image ratio

There is a significant association between the homepage's country and the text to image ratio (*p* = 0.03 , Fisher's exact test). Furthermore, there is also an association between the homepage's domain and the text to image ratio (p = 0.00, Fisher's exact test). US websites used a seemed to have no homepages where the amount of text was less than half of the amount of content. With the domains the same thing seemed to be the case for the newspapers.

Table 6-15.
Significant test of the text to image ratio

	χ^2	*p*
NLD-KOR**	3.07	.22
NLD-USA*		.26
KOR-USA*		.01

*Fisher's exact test
**Df = 2, *n* = 60

6.4 The graphical elements that will be used in the user experiment

An overview of the graphical web design elements that are statistically different is presented in table 6-16. Here we can see the graphical web design elements as well as their individual score per country as to how these graphical elements will be used in the development for the stimuli in the user experiment. These were derived from the data, as to which countries were significantly different. The significant different countries would get the score most commonly used but different from the other country, and if the third country was not significantly different from either country a choice was made by the first author to go with one of the countries. For a written documentation of the selection of graphical elements values see appendix D.

Table 6-16.
Differences in graphical web design elements between countries

	Countries		
	South-Korea	The Netherlands	The United States
Placement of the main image	Center	Center	Right
Background color	White	Not white(grey)	Not white(blue)
Main color	Blue	Red	Blue
Background container color	White	White	Blue
Menu color	Blue	White	Grey
Menu corners	Rounded	Angular	Angular
Orientation	Horizontal	Vertical	Vertical
Text color title	Black	Black	Blue
Link typography	Sans-serif	Serif	Serif
Link color	Black	Blue	Blue
Text to image ratio	Not 50%/50%	Not 50%/50%	50%/50%

These graphical elements will be used in the second study. They will provide the ground for the alteration of the websites to see whether the different websites will lead to differences in evaluation.

Part II

The user experiment

Introduction

To determine the effects of the country specific graphical web design elements that were found in part I, part II will deal with the user experiment. The user experiment consists of two parts, a questionnaire and a plus minus usability test with a concurrent think aloud protocol. These will be used to assess if the country specific web design elements influence the user perception of the homepages. However, we are not merely interested in whether the graphical web design elements have an influence on our determinants of user satisfaction, but through our plus minus usability test with the concurrent think aloud protocol, we hope to determine which graphical web design elements influence these determinants the most. By the plus minus usability test with concurrent think aloud protocol we hope to get a better grasp of why the participants chose to evaluate certain homepages better than others.

Part II will first provide insight in the selection of determinant with which we will evaluate whether country specific graphic design elements have an influence on the evaluation of websites. Then it will provide insight into the user experiment. Last, the results of both these experiments will be discussed.

7.

Selection of evaluation criteria

With the design of a website several considerations have to be taken into account to accommodate user satisfaction. In their exploratory study to determine what user satisfaction is, Lindgaard & Dudek (2003) claim that their data suggest that user satisfaction "is a complex construct comprising several affective components as well as a concern for usability, and that a priori expectations seem to play a major role in shaping user satisfaction" (Lindgaard & Dudek, 2003, p. 477). They claim user satisfaction of websites consists of five determinants, emotion, expectation, aesthetics, likeability and usability (Lindgaard & Dudek, 2003). They found that all determinants were influential to user satisfaction, but that these varied with the type of interaction with a website. Their data however suggest that most important are aesthetics, likeability, and usability, as these determinants were mentioned most often in their three experiments.

The conclusions of Lindgaard & Dudek (2003), that aesthetics, likeability, and usability are most important as determinants of user satisfaction, is in line with the assumption of Lee & Koubek (2010) that aesthetics and usability are both highly influential when considering the experience of the user. In the study of Lee & Koubek (2010) on both of the determinants of user satisfaction, they showed that there is a difference in before and after actual use of a system in both these determinants. Before actual use, user preference was affected significantly by the differences in aesthetics and hardly by differences in usability. However, after actual use, user preference was significantly influenced by both the determinants. This is in line with other research by for example Tractinsky, Katz, & Ikar (2000), who found that perceived aesthetics influenced the post-use perception of both aesthetics and usability. But that there is a strong correlation with perceived aesthetics and perceived usability. This all indicates that

both actual and perceived aesthetics and usability are important. Here however we are merely interested in the perceived determinants while we merely compare the graphical elements prior to use.

We will use both perceived aesthetics and perceived usability to determine the impact of the differences in graphical elements on websites. However, as Lee and Koubek (2010) also note in their study, the familiarity with websites might have an influence on perceived usability and aesthetics. Here however it is not the familiarity with the websites in general, but the familiarity with certain graphical design choices we are interested in. As mentioned by Tractinsky et al,. (2000), due to the mere exposure effect, which suggests that our evaluation improves after repeated exposure, familiarity might have an impact on both perceived aesthetics and perceived ease of use.

Therefore, the three determinants of user satisfaction used in this study will be perceived aesthetics, perceived ease of use and familiarity. The next sections will provide some insight in the research done on these three determinants.

7.1 Visual appeal

Visual appeal, beauty or aesthetics, all describe the same construct and are hard to define as constructs, however they all can be judged without using a system or product. Here the term aesthetics is used to describe the construct. However, other studies thus use any of the names mentioned earlier. In their study in determining dimensions of visual aesthetics, Lavie & Tractinsky (2004), found that aesthetic consists of two dimensions, classical and expressive aesthetics. In which the former emphasizes orderly and clear design and the latter refers to the perception of creativity and originality of the designer. Expressive aesthetics can for instance be viewed as the work of a painter, thus were creativity plays a large role, while classical aesthetics can be viewed as work by an industrial designer, were much more consideration has gone into the users' satisfaction rather than the expressiveness of the painter himself.

However, both are important for user satisfaction. As part of a large scale survey, Fogg, Soohoo and Danielson (2003), found that 46,1% of consumers assessed credibility of websites based on overall

visual design of that site. It is thus important that websites are visually appealing to the user, wherever the user comes from. This is further emphasized, while users can asses visual appeal within 50 ms (Lindgaard, et al., 2006), even without being able to assess the quality of the content of the website.

In this study we will use the scale used in Lindgaard (2006) consisting of a six item questionnaire. This scale was chosen over the one used in Tractinsky et al., (2006) as it has less items and had a similar outcome as it measures visual appeal.

7.2 Perceived usability

In this study we consider perceived usability to be influenced by the same constructs as classical aesthetics. Several studies consider there to be a link between the perception of a systems' usability and its aesthetics (Kurosu & Kashimura, 1995; G. Lindgaard & Dudek, 2003; Tractinsky, et al., 2000). Lavie & Tractinksky (2004) show that there is a high correlation between classical aesthetics and usability. Although, Lavie & Tractinksky (2004) use some of the same constructs to describe both constructs, we still believe that both determinants describe clear, clean and easy to use websites. Therefore, perceived usability can also be interpreted as classical aesthetics and vice versa. This is assumed while when a design is clear users can find the relevant information and therefore the website should be more efficient and effective.

Lee and Koubek (2010) use both perceived usability and aesthetics as determinants of user satisfaction in their experiment. They conclude that perceived usability as a factor on its own does not have a significant influence on user preference before usage. This also supports regarding perceived usability as another label for classical aesthetics.

The items used in this study are items 1 through 8 of the Post-Study System Usability Questionnaire (PSSUQ) as used in Koubek & Lee (2010).

7.2 Familiarity

In an international context, designers need to make users feel comfortable with the design and usability of the website, thus providing a sense of familiarity. When websites conform to their cultural familiar communication styles and cultural habits, the more trust is established (Hermeking, 2005). This is in line with the "country of origin" effect, which states that products or services from one's own country are favored over those from foreign countries (Knight & Calantone, 2000). Barber and Badre (1998) coined up the term culturability for this phenomenon. Familiarity with certain systems is considered to influence perceived usability, while users might perform tasks well regardless of the systems actual usability level (Lee & Koubek, 2010). Tractinsky et al. (2000) explain this by the mere exposure effect which states that repeated exposure leads to an improved evaluation of an object.

However important, there has not been a study to use a verified measure for this determinant and therefore we will develop our own three variable questionnaire component. Thereby, abiding to the minimum of three variables per factor as suggested by Kline (1993).

8.

The user experiment

This study addressed the following research question: What are the effects of country specific graphical web design elements on the evaluation of Dutch /German students? An experiment was set up to investigate this relation. Because a quantitative as well as qualitative method was used to investigate and explain the differences in the three determinants this chapter will only provide insight into the participants, the procedure of the experiment, and the stimuli used. The instruments used and the pre-test will be described in the following chapters were both these methods will be described separately.

8.1 Participants

The sampling of participants of this study was based on "convenience sampling", which means that the participants were selected due to the easy accessibility and/or availability (Schonlau, Fricker, & Elliott, 2002). 65 students from a Dutch university near the German border participated in the experiment. The users were recruited through Sonas, a website in which first and second year psychology and communication students are obligated to register so they can participate in student' experiments. Alongside Sonas, students were recruited through a message on Facebook. All Students received one out of the fifteen experiment credits, obligatory for the first two years of the bachelor of both psychology and communication, as a compensation for their time.

From the user background questionnaire we obtained some participants information. Sixty five participants completed the experiment, 16 men and 49 women. The average time to complete the whole test was less than 27 minutes. Dutch was the mother tongue of 31 participants, and 34 had German as

their mother tongue, there were no participants with neither Dutch nor German as their mother tongue. All participants reported using the internet on a daily basis. Furthermore, all participants were students of a Dutch university that hosts many German students. The mean age of the participants was 21.29 years with a standard deviation of 2.10 years.

8.2 Procedure

To answer the research question a lab experiment was chosen. The experiment consisted out of a questionnaire and a plus-minus usability test with a concurrent think-aloud protocol. These were performed consecutively inside a single computer laboratory. Before the experiments started first an introduction to the experiment was given about the experiment. The participants were told they were participating in an experiment to gather information on perceived aesthetics and perceived usability of homepages. They were informed of the duration and the tasks they were asked to perform. All participants were informed according to a protocol which can be found in appendix E. After they were informed, they were asked to sign an agreement, which can be seen in appendix F, which told that they were well informed about the purpose of the study and that the data acquired would be used without revealing their identity. The purpose of the study was not revealed to the participant at this point.

Thereafter, the participants were seated in front of a computer and the research supervisor left the laboratory cubicle. On screen the participants were asked to provide some user information. Right after providing their user information they were instructed to evaluate ten randomized images of homepages by filling out a questionnaire per homepage. When they were done with evaluating the homepages through the questionnaire, they were asked to signal the research supervisor. The participants were instructed again by the research supervisor to use a plus minus method to assign positive and negative valences to the same randomized homepages on their appearance, they were able to assign three positive and three negative valences to each homepage. While performing the latter experiment, they were asked to verbally

explain their choices. After the participants were done, they were debriefed. There objective of the study was revealed and the participants were thanked for their efforts.

8.3 Stimuli

To facilitate the manipulation of all the categories tested in the comparative content analysis, in total nine, three countries by three domains, homepages were created. To eliminate the learning curve of both the experiments an additional training homepage was created to overcome this hurdle. This homepage was used as the first homepage in both the questionnaire as well as the plus minus usability test. The homepages were designed using three existing websites and were adapted in accordance with the country specific graphical web design elements found to be significantly different in study one (for an overview of these elements see table 6-16 in chapter 6). To give the participants an idea of the purpose of the homepage, the main menu and some headers, such as *most popular* or *business*, were in English, the rest of the homepage was in dummy text (*lorem ipsum*). Figure 8-1 provides an overview of all the stimuli used in this study, however for a better understanding of what is country specific per homepage see appendix H.

The homepages were shown on a computer in a controlled environment. In the first experiment the websites were shown on screen inside an image of a computer screen in which they were able to scroll up and down to view the entire website, as can be seen in figure 8-2.

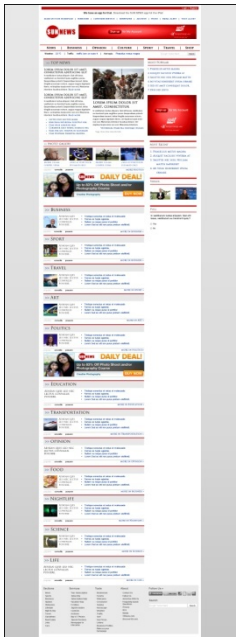
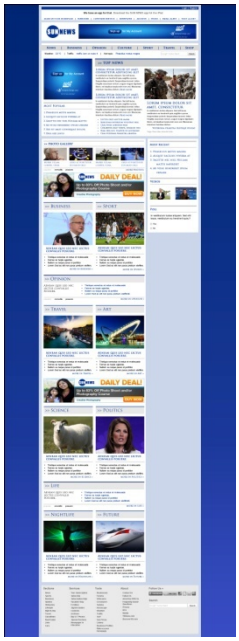
Domain	Country: South Korea	The Netherlands	United States
Municipal			
News			
University			

Figure 8-1 The stimuli used in the user experiment

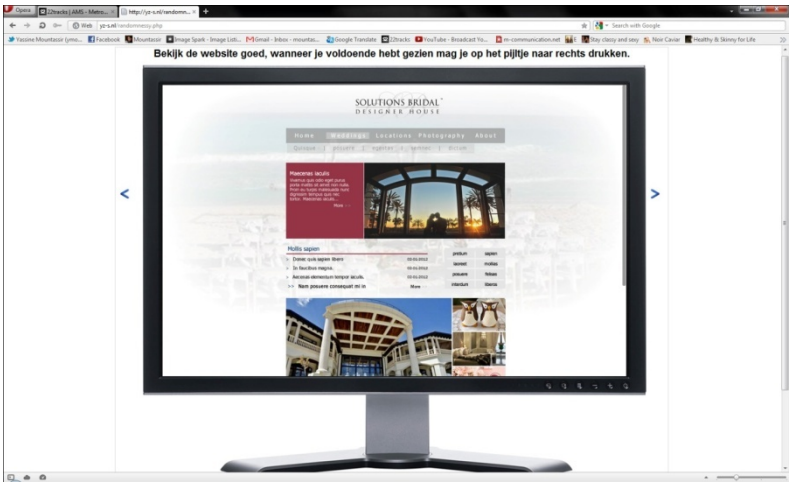


Figure 8-2. Example screenshot of a homepage of the online questionnaire (the test homepage)

In the second experiment the participants were shown the complete images of the homepage and were asked to assign plus and minus valences to the images, by drag and dropping the valences on the corresponding positive or negative feature of the homepage, as can be seen in figure 8-3. In appendix G the complete user experiment can be found in screenshots.

Figure 8-3 Example homepage of homepage during plus minus usability test

The experiment took place in a closed cubicle in the GW-Lab of the University of Twente. Both experiments took place on a Samsung 23 inch computer screen with a resolution of 1920px by 1080px.

8.4 Questionnaire

Here the instrument and the pretest of the questionnaire will be discussed. First the instrument used for the questionnaire will be discussed, thereafter the pretest.

8.4.1 Instrument

The questionnaire consisted of 17 items using a 7-point Likert scale. The first 14 items were from two validated experiments of which the first six were from the visual appeal questionnaire of Lindgaard (2006). Then eight items, for perceived ease of use were from the Post-Study System Usability Questionnaire (PSSUQ) as used in Lee & Koubek (2010).The last three items were newly developed and served as a manipulation check to see whether the Dutch homepages were more familiar than the other homepages and whether this had an influence on perceived visual appeal and perceived usability. In table 8-1 the items are presented, first in English and then in Dutch, which was used for the experiment.

Table 8-1.
Items of the questionnaire

Original item	Translation
Visual appeal	visueel aantrekkelijk – visueel onaantrekkelijk
Interesting – boring,	Interessant –saai
Good design – bad design,	Goed ontwerp – slecht ontwerp
Good colour – bad colour,	Kleurgebruik is goed – slecht
Good layout – bad layout	Lay-out is goed - slecht
Imaginative – unimaginative	Fantasievol –fantasieloos
Overall, I am satisfied with how easy it will be to use this system	In het algemeen, ben ik tevreden over hoe gemakkelijk het zal zijn om de website te gebruiken.
It will be simple to use this system	Ik denk dat de website eenvoudig te gebruiken zal zijn.
I will be able to effectively complete the tasks and scenarios using this system	Ik denk dat ik effectief taken en scenario's kan uitvoeren met de website.
I will be able to complete the tasks and scenarios quickly using this system	Ik denk dat ik snel taken en scenario's tot een goed einde kan brengen met de website.
I will be able to efficiently complete the tasks and scenarios using this system	Ik denk dat ik efficient taken en scenario's kan uitvoeren met de website.
I feel comfortable using this system	Ik denk dat ik me op mijn gemak zal voelen tijdens

	het gebruik van de website.
It will be easy to learn to use this system	Ik denk dat het makkelijk zal zijn om de website te leren gebruiken.
I believe I can become productive quickly using this system	Ik denk dat ik snel productief kan zijn met de website.
The website looks familiar	De website ziet er herkenbaar uit
The familiarity of the website is large	De herkenbaarheid van de website is groot
I think the website looks familiar	Ik vind dat de site herkenbaar is

8.4.2 Pre test

Two pre-tests were performed to ensure comprehension and applicability of the test material and to ensure the test was understandable and logical. Two participants were asked to fill out half of the questionnaire to enhance comprehension of the test material and items used, thus the participants reviewed a total of five homepages. Beforehand, they were asked to verbally comment on anything that struck them as difficult or odd. After they were done with the test, they were asked to translate the Dutch items into English. This was done to see whether the translations of the original English items were comprehended as intended. This lead to several changes within the introduction of the questionnaire in which an adaption was made to show people they can scroll within the depicted screen. Furthermore, instead of “beeldscherm” (monitor), “afgebeelde monitor” (depicted monitor) was used to ensure people understood that they could scroll within the depicted monitor. Furthermore, the core concepts per sentence that were deemed to be important in the eye of the researcher, which were underlined in the pre-test version of the questionnaire, were stripped from their type-decoration, while the pre-test participants deemed it distracting. The layout of the questionnaire was changed to be less cluttered, as both participants mentioned that the questionnaire was visually cluttered.

To get a time estimate and to ensure comprehension, four participants were asked to complete the full test. Here the protocol was also tested on comprehension and logic. The protocol for the test stated several things, such as welcome message, introduction and debriefing. The protocol for the researcher can be found in appendix E. The complete test took approximately 55 minutes, of which five minutes were

necessary for the introduction, 45 minutes were necessary for the actual test and five minutes for the debriefing.

The second pre-test showed that participants found it difficult to both assign valences as well as verbally comment on their choice. They sometimes forgot to drag the valences to the specific location they were about to make a comment on. Furthermore, with the increased experience of web design or web technology, the statements of the participants were also different as less internet savvy people tended to focus on what they saw, were more experienced participants also portrayed their expectations of what is good practice in web design. To ensure that people first put either a plus or minus before they made a remark, this was emphasized in the protocol, so people were aware that it was a necessity to do both, rather than the one or the other. Last, the questions were put in a more random order to make the three factors less obvious in the test.

8.4.3 Pretest outcome questionnaire

The data of the second pre-test was used to check whether the questionnaire measured the three factors that are used in this study. A Principal Component Analysis (PCA) was performed to check how many factors were found and which items corresponded to which factor. The factor loading in the rotated pretest can be seen in table 8-2. As can be seen it is not a perfect match with the three factors used, but there are three distinct factors with almost optimal loading on all items. Due to the small sample size we believe that the item loading will be better in a larger group while more data will correct outliers. The PCA, which inherently calculates the optimal amount of factors, still gets three components and most items load on their corresponding component. The only outlier is lay-out which does not load on its corresponding determinant, but on both other determinants. If necessary this could be adjusted in the final experiment. Therefore, we are confident the results of the experiment will be useful.

Table 8-2.
The rotated principal component analysis outcome of the pre test

	Component		
	1	2	3
Efficiently	.906		
Productive	.896		
Effectively	.885		
Quickly	.871		
Simple	.856		
Overall	.836		
Easy	.809		
Comfortable	.739		.447
Design	.543	.483	.520
Familiar1		.939	
Familiar2		.927	
Familiar		.887	
Layout	.429	.607	
Interesting			.900
Appeal			.891
Inspiration			.888
Color			.687

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

8.5 Plus minus usability study with think aloud protocol

The plus minus usability study with think aloud protocol came right after the questionnaire. Here the instrument is discussed.

8.5.1 Instrument

The participants were able to appoint six valences per homepage. With each valence they were asked to verbally assist their choice. To enhance the extraction of similar verbalizations, the comments were later categorized by the author. The categories were formed after all the participants had evaluated the homepages and all the comments were assigned to their content location on the homepage, thus after the coordinates of the valences were translated to their linguistic counterpart, such as *menu*, *advertisement*, or *main image.* Thereafter, the verbalizations were reviewed and classified into one of the four categories of web design. However, not all the verbalizations could be classified into one of the four categories, therefore some additional categories were added to address this problem. Table 8-3 shows the categories used in the final categorization of the verbalizations.

Here can be seen that alongside the four categories of design, also the three determinants of user satisfaction used in this study are used as categories. Several participants made statements that were seemed to relate to items of the questionnaire and therefore, the three determinants, *familiarity*, *perceived ease of use*, and *visual appeal*, were taken up as categories for the categorization as well. Furthermore, several participants made statements about the content of the website rather than the design of the homepages, therefore the content category was added. The *generic* category was also included, while some verbalizations were too ambiguous that they could not be classified in any category and therefore the generic category was added. Last, the category none, was included while, even though specific instructions were given to verbalize their choice, some participants sometimes forgot to elaborate on their choice. Thus the category *none* had to be included. Table 8-3 provides all the categories with the operationalization per category.

Table 8-3
Categories for think aloud protocol

	Operationalization
Advertising	All comments mentioning the advertisements
Color	All comments concerned with the color of an element or the homepage in general
Content	All comments mentioning the content of the homepages
Familiar	All comments concerned with the familiarity of the homepages
Generic	All comments that are generic of nature, or that do not fall in any other category
Multimedia	All comments concerned with multimedia on the homepages
none	All valences that had no comment accompanying them
Perceived ease of use	All comments concerned with the ease of use of the homepage or references to usage problems
Spatial organization	All comments concerned with the spatial organization of the homepage, thus page-lay-out position of content use of whitespace page orientation
Text design	All comments that were about the text design of the homepage, thus Size of text Typography
Text to image	All comments that mentioned the amount of text or the number of images on the homepage
Visual appeal	All comments concerned with the visual appeal of the homepages

9.

Results

Here the results from both parts of the user experiment will be presented. First, the results from the questionnaire will be described. Second, the results from the concurrent think aloud method will be presented.

9.1 Questionnaire

Here the results of the questionnaire will be presented. Before the data can be analyzed to evaluate differences between the three determinants of user satisfaction we need to check whether the questionnaire did properly distinguish the three factors so that these scores can be used to distinguish differences in the evaluation of the homepages. Thereafter we needed to assess whether the then acquired scores meet the assumptions to analyze them through a Repeated Measurement MANOVA. Thereafter, the results of the R.M. MANOVA are explored to assess whether differences arose in the evaluation of the homepages.

9.1.1 Determining the three determinant scores

To compare the scores of the three determinants per participant per website, these scores need to be determined first. To make sure that the items in our questionnaire measure the same determinant, here a Confirmatory Factor Analysis (CFA) will be performed first. The CFA measures how much an item loads on one of the three predetermined factors. Thus in contrast to the pre-test, with a confirmatory factor analysis the number of factors is predetermined.

The Confirmatory Factor Analysis was conducted with the Principal Axis Factoring (PAF) on the 17 items with a direct oblimin rotation. The Kaiser-Meyer-Olkin Measure of sampling adequacy (K.M.O.) verified the sampling adequacy for the analysis, K.M.O. = .95 which indicates a superb sampling adequacy (Field, 2009). Furthermore, all but 2% of all KMO values for individual items were >.5, which is well above the acceptable limit of .5 (Field, 2009).

Bartlett's test of sphericity χ^2 (136) = 11831.28, $p < .01$, indicated that correlations between items were sufficiently different to perform a Confirmatory Factor Analysis. To check whether three components could be kept for the factor analysis, an initial analysis was done to obtain Eigen values for each component in the data. Three components had Eigen values over Kaiser's criterion of one, and in combination explained 80.42% of the variance. Therefore, three components were retained in the final factor analysis.

To evaluate if the items did load on their intended factors of perceived visual appeal, perceived ease of use, and familiarity, the factor loadings were checked. Table 9-1 shows the factor loadings after rotation. The items that load on the same components suggest that these components measure the same construct. The table tells us that the items all loaded highly on their expected factors and did not load as high on any other factor, thereby suggesting that the questionnaire reliably measured three components.

Table 9-1
Rotated Confirmatory Factor Analysis results*

	Determinants		
	Percieved Usability	Visual Appeal	Familiarity
VisualAppeal		.94	
Interesting		.83	
Design		.71	
Color		.79	
Layout		.66	
Inspiration		.74	
Overall	.80		
Simple	.87		
Effectively	.95		
Complete	.97		
Efficiently	.98		
Comfortable	.58		
EasyToLearn	.82		
Productive	.88		
Familiar 0			.87
Familiar 1			.90
Familiar 2			.93

*Rotation converged in 6 iterations / scores under .40 are not shown in the table

After concluding that the questionnaire did measure the intended factors, the item scores were combined into single factor scores for further analysis.

Table 9-2 provides the mean scores of the three determinants, thereby providing insight into the differences between the groups on both a country as well as a domain level. The determinant scores were calculated by summing the item scores and thereafter dividing these scores by the amount of items of the construct. Therefore, the item scores have a score comparable with a seven point Likert scale.

Table 9-2.
Calculated determinant scores by country and domain

	Determinant								
	Visual Appeal			Perceived ease of use			Familiarity		
	News	Uni	Mun	News	Uni	Mun	News	Uni	Mun
Country									
South Korea	3.87	4.52	3.41	4.13	5.02	3.95	4.59	4.60	3.83
The Netherlands	4.28	4.72	3.51	4.90	4.79	4.22	5.12	5.02	3.92
The United states	4.46	4.66	4.53	4.85	5.10	4.81	5.07	4.89	4.53

This table is the input for the following section where we'll see if there are significant differences within the sample.

9.1.2 Exploratory analysis of determinants

Before performing the Repeated Measurement MANOVA to see whether there are significant differences between both the countries as well as the domains, first it is checked whether the data meets the assumptions for the tests.

9.1.2.1 Assumption testing

When using a Repeated Measurement MANOVA, the multivariate test is free of assumptions. For the univariate test however sphericity is assumed. Therefore, the Mauchly test of sphericity was inspect to see whether sphericity could be assumed. Although two out of the nine conditions violated the assumption of sphericity, (Domain X familiarity χ^2 (2, N = 65) = 6.95, $p < 0.05$ and Domain*Country's X Percieved ease of use, χ^2 (2, N = 65) = 17.66, $p < 0.05$) this had no effect on the univariate test statistics. These two conditions were significant whether sphericity was assumed or whether the most conservative test statistics were used. Therefore, the test statistics where sphericity is assumed will be reported here as this will be easier to compare with the other test statisctics.

9.1.3 Significant differences on country, domain and interaction effect level.

First a multivariate test was performed to check whether there the data shows any differences within the dependent variables. A 3 x 3 Repeated Measurement MANOVA was performed on the three dependent

variables: Visual Appeal, Perceived ease of use and Familiarity to evaluate differences in these factors. The independent variables were country (South Korea, The Netherland, and The United States) and domain (Municipal, News, and University).

SPSS GLM Repeated Measurement was used for the analyses. Total N was 65, due to the use of a RM MANOVA there are no assumptions that needed to be met.

With the use of Pillai Bartlett trace it was concluded that the dependent variables were significantly affected, as can be seen in table 9-2.

Table 9-2.
Multivariate results of the Repeated Measurement Manova

	v	F	p	η^2	η_p^2
Country	.38	6.07 (6,59)	0.00	0.04	.38
Domain	.60	14.53 (6,59)	0.00	0.09	.60
Country X Domain	.42	3.25 (12,53)	0.00	0.02	.42

Therefore, we can conclude that country, as well as domain, but also their interaction effects have a significant effect on the dependent variables. A univariate analysis will be needed to evaluate to see where these differences come from and on which dependent variables these have an effect.

9.1.4 Exploring the significant differences in the three determinants

Next a description of the univariate analysis will be provided per independent variable as well as providing the results of the Bonferroni post-hoc test of the differences between the countries. This will provide insight into which dependent variables are significantly different and where these differences come from. Because the interaction effects have not been discussed in the entire study, we will merely provide the interaction effects here. There was a significant interaction effect of country*domain on visual appeal $F(4,256) = 7.49$ $p < 0.001$, $\eta^2 = 0.09$, as well as on Perceived ease of use $F(4,256) = 7.04$ $p < 0.001$, $\eta^2 = 0.09$, and on familiarity $F(4,256) = 3.27$ $p < 0.05$, $\eta_p^2 = 0.04$.

The following section will discuss the differences on a country level and domain level. This will provide answers to the questions where the significant differences of the dependent variables came from. See appendix I for the interaction effect scores.

9.1.4.1 Differences on a country level

To answer our question whether country specific web design elements we were interested in whether these elements also lead to a difference in appreciation. As can be seen in the next section this is the case. There was a significant effect of country specific web design elements on visual appeal $F(2,128) = 12.68$ $p < 0.001$, $\eta^2 = 0.15$, as well as on perceived ease of use $F(2,128) = 15.33$ $p < 0.001$, $\eta^2 = 0.14$, and on familiarity $F(2,128) = 11.65$ $p < 0.001$, $\eta_p^2 = 0.11$. Here the three determinants will be discussed to explore where the differences stem from.

Country by Visual Appeal

Bonferroni post hoc test results.

On average the participants found the South Korean websites were visually significantly less appealing than the American websites Mdiff=-.619, $p < 0.01$. Furthermore, the Dutch website were also visually less appealing than the American websites Mdiff=-.378, $p < 0.05$

Table 9-3.
Country by visual appeal

Country	Mean*	Std. Error
South Korea	3.93	.10
The Netherlands	4.17	.10
The United States	4.55	.11

*7-point Likert scale

Country by Perceived ease of use

Bonferroni post hoc test results.

On average the participants perceived the South Korean website significantly less easy to use than both the Dutch Mdiff= -.271, $p = 0.05$, and the American websites Mdiff = -.554 $p < 0.01$. Furthermore, the participant also perceived the Dutch website significantly less easy to use than the American website Mdiff = -.283, $p < 0.05$

Table 9-4.
Country by perceived ease of use

Country	Mean*	Std. Error
South Korea	4.37	.12
The Netherlands	4.64	.11
The United States	4.92	.10

*7-point Likert scale

Country by Familiarity

Bonferroni post hoc test results.

On average the participants found the South Korean websites less familiar as the Dutch, Mdiff = -.344, $p < 0.01$, and the American websites, Mdiff = -.487, $p < 0.01$.

Table 9-5
Country by familiarity

Country	Mean*	Std. Error
South Korea	4.34	.12
The Netherlands	4.69	.10
The United States	4.83	.10

*7-point Likert scale

As can be seen in the tables above, on all three determinants the South Korean homepages scored significantly less than the other two countries homepages. Furthermore, the Dutch homepages scores significantly less on both visual appeal as on perceived ease of use. Only on familiarity the American and Dutch homepages were not statistically different.

9.1.4.2 Differences on a domain level

Although our primary focus was differences in country specific graphical web design elements and their evaluation, here also is looked at significant differences between the different domains. This while this provides evidence that context might also play an important role in the choice of graphical web design elements. As can be seen below there were significant differences in the determinants between the domains.

There was a significant effect of country on visual appeal $F(2,128) = 12.68$ $p < 0.001$, $\eta^2 = 0.15$, as well as on perceived ease of use $F(2,128) = 15.33$ $p < 0.001$, $\eta^2 = 0.14$, and on familiarity $F(2,128) = 11.648$ $p < 0.001$, $\eta_p^2 = 0.11$. Here the three determinants will be discussed in further detail to see where the differences stem from.

Domain X visual appeal

Bonferroni post hoc test results.

On average the participant found that all the website domains were significantly different, were the University websites were perceived as most visually appealing in

Table 9-6
Domain by visual appeal

Domain	Mean*	Std. Error
News	4.20	.10
University	4.64	.10
Municipal	3.81	.11

*7-point Likert scale

comparison to News Mdiff = .435, $p < 0.01$, and compared to Municipal Mdiff = .822 $p < 0.05$. Furthermore, there was a significant difference between the news and municipal website, where the news websites were perceived as more visually appealing Mdiff = .388, $p < 0.01$

Domain X Perceived ease of use

Bonferroni post hoc test results.

On average the participant perceived the News websites as significantly harder to use than the university websites Mdiff = -343, $p < 0.05$. Furthermore, the university

Table 9-7
Domain by perceived ease of use

Domain	Mean*	Std. Error
News	4.63	.13
University	4.97	.09
Municipal	4.33	.13

*7-point Likert scale

websites were perceived as easier to use than the Municipal websites, Mdiff = .645, $p < 0.01$.

Domain X Familiarity

Bonferroni post hoc test results.

On average the participant found the news websites more familiar than the municipal websites, Mdiff = .831, $p < 0.01$. Furthermore, the university websites

Table 9-8
Domain by familiarity

Domain	Mean*	Std. Error
News	4.93	.12
University	4.84	.11
Municipal	4.10	.12

*7-point Likert scale

As can be seen in the tables above, on two determinants, visual appeal, and familiarity, the municipal homepages scored significantly less than the other two homepage domains. On perceived ease of use municipal homepages were perceived as less easy to use in comparison to university websites. The university homepages were also perceived as easier to use and visually more appealing than the news homepages.

9.1.5 Test of homogeneity of the sample

To assess whether gender or nationality had a significant influence on the test result the 3 x 3 Repeated Measurement MANOVA was rerun, with the addition of two within subject factors, gender and nationality. The result showed no significant difference for all dependent variables as can be seen in table 9-9.

Table 9-9.
Results of the homogeneity test of the sample

	Dependent variable				
Within subject factor		df	F	sig	η_p^2
Gender	Visual appeal	1	.75	.39	.012
	Perceived ease of use	1	.27	.60	.004
	Familiarity	1	.04	.85	.001
Nationality	Visual appeal	1	.23	.63	.004
	Perceived ease of use	1	3.57	.06	.055
	Familiarity	1	.55	.46	.009
Gender X Nationality	Visual appeal	1	.23	.64	.004
	Perceived ease of use	1	.08	.78	.001
	Familiarity	1	.18	.67	.003
Error	Visual appeal	61			
	Perceived ease of use	61			
	Familiarity	61			

Therefore, it is concluded that there were no significant differences between male and female participants or between the Dutch and German students within the sample. The sample is therefore seen as a homogenous group, which in this case represents Western European students.

9.2 Plus minus usability study with a concurrent think aloud protocol

Here the results of the plus minus usability study will be presented. The plus minus usability study with a concurrent think aloud protocol was done after the questionnaire to get insight into which graphical web design elements were responsible for the differences in the determinants of user satisfaction.

First, a description will be provided on the collection of the data and also how the statements were divided into categories by a content analysis. Second, the number of positive and negative statements will be put side by side by the determinant scores of user satisfaction to see it the amount of statements match their evaluation scores. Third, the plus minus usability results will be discussed by number of total mentions per category. Here also the differences between countries will be discussed and what might have caused these differences.

9.2.1 Methodology

As mentioned before, for the second user experiment, the participants were asked to assign positive or negative valences on elements of the homepages. Three positive and three negative valences could be given per homepage. The participants were asked to drag and drop the valences and verbalize their thought process as to why they assigned a positive or negative valence to the specific element. Thereby providing a location of an element, a valance, and an explanatory comment to be recorded for evaluation purposes. The coordinates of the element and the valence were recorded in an online database through the use of jQuery, and the concurrent think aloud comments were audio taped. Later, the comments were transcribed ad verbatim and then assigned to their corresponding comments on the homepage on the corresponding valence. Thus for instance, a comment “The use of color is good” which was placed on the menu, would be a statement about the color on the website. The thereby acquired document was used to acquire preliminary insight in process of the homepage evaluation by the participants. Due to technical difficulties only 57 of the 65 participants could be used in the usability test.

9.2.2 Comparing determinant scores with number of statements

By evaluating whether there were less negative statements and or more positive statements for homepages that scored higher on our three determinants we hoped to see the same pattern as with our three determinants. Fortunately, the country scores of all the three determinants are in the same order, the American homepages were first in all determinants, the Dutch scores for the determinants were always second, and the Korean scores were always the lowest. In table 9-10 can be seen that the number of negative statements decreases as the scores of the three determinants rises. Furthermore, the number of positive statements increases as the scores of the three determinants rises.

Table 9-10.
Determinant scores by number of statements*

	Mean scores determinants			Statements	
	Visual Appeal	Perc. ease of use	Familiarity	Negative	Positive
Country					
South Korea	3.93	4.37	4.34	258	271
The Netherlands	4.17	4.64	4.69	234	302
The United States	4.55	4.92	4.83	230	312

*7-point Likert scale

Even though the statements did follow the same pattern as the means of the three determinants, the differences in the number of statements is not significant χ^2 (1605, 2) = 4.90, p = .09. Although this almost significant we will not search for a correlation between more positive or less negative statements and the score on our three determinants.

However, the data is full of rich information and here the data is used to get preliminary insight into which elements triggered the differences in the evaluation scores. Therefore we are interested in the number of statements made per category per country but of more importance is what has been said. First, we will discuss the number of statements made per category, as this indicates relative importance to the participants, to later asses the differences between countries within these categories. When looking closer at our data we'll try to estimate which factors played a role in the positive evaluation given in the questionnaire.

9.2.3 Number of comments per category

As mentioned earlier, here the comments were divided into several categories to structure the evaluation. When looking at the number of comments made on the homepages as can be seen in table 9-11 the category with the most comments was the generic comment category. The comments in this category were not distinctive of nature, comments such as “this is good” or “this is bad”. What this tells us is that the reasoning for the immediate valences are not always easy to verbalize for participants, as they merely verbalize their scores instead of verbalizing their reasoning for their positive or negative valence.

Table 9-11.
Number of comments per category

	Score			
	Min	Plus	Total	Exemplary comment
Generic	141	161	302	Yes, I found this one very good
Content	95	195	290	Good menu bar
Multimedia	51	172	223	This image was really dull
Spatial organization	90	105	195	This site is far too long
Color	92	83	175	The colors here are ugly
Perceived ease of use	38	94	132	A search bar is also useful
Advertising	99	3	102	Furthermore, there is advertising, I think that is bad
Text to image	52	9	61	Visually, there were not that many images
Text design	33	16	49	The text is still so small
none	16	25	41	-
Visual appeal	11	17	28	And here it is very ugly
Familiar	4	5	9	This looks very familiar and positive
Total	722	885	1607	-

What is also surprising to see is that the second most commented category is content, this could be due to the fact that they were trying to figure out what the homepages were about and therefore paid close attention to the content of the homepages. The number of comments were therefore higher than for other categories.

Third, was the number of comments on multimedia. As mentioned earlier, there is a debate whether this is really design rather than content, but when figuring out what the content of the homepages was about certainly the images on the webpage were scanned for comprehension purposes. Images can elicit more than a thousand words, therefore these images help in understanding the homepage. We

believe participants therefore mentioned them often while they helped them understand the content of the page.

Fourth, comments on the spatial organization were mentioned most often. Apart from the colors used on the homepages, the spatial organization of the homepages was also easy to distinguish between countries, because the homepages were vastly different in size. Apparently, participants found it worth mentioning more often than the color of the homepages and we therefore assume that this graphical elements category is important when localizing the design of a website.

Fifth, color is mentioned most often, what is interesting here is that it is the first category, when reviewing the homepage in this order, which has more negative than positive statements. Thereby, providing evidence that the participants were unpleasantly surprised by the use of the colors on the homepages.

Sixth, comments that concerned the perceived ease of use were mentioned most often. As this is the most mentioned determinant of user satisfaction this tells us that from the three determinants this was the determinant that was either the easiest to verbalize comments on, or that it was the most important determinant of user satisfaction.

Seventh, comments concerning advertising were mentioned most often. Very interesting here is the ratio between positive and negative comments. Almost all comments were negative, thereby clearly showing that advertising was not appreciated by our participants.

Eighth, comments concerning the text to image ratio were mentioned most often. As with advertising, here most comments were negative of nature. How this is divided between the countries will be interesting to see as this might give an indication as to a preferred text to image ratio can be seen.

Ninth, comments about the text design were mentioned most. Although mentioned almost 50 times, almost two thirds of the valences were negative of nature, most comments were about the size of the text, which appeared to be too small. One participant even mentioned that this would be a hinder for elderly people. Therefore, we believe that this will have influenced the perceived ease of use.

Tenth, were valences without any rationalization, even though participants were summoned to rationalize their valences, sometimes they forgot to mention why they scored a certain graphical element.

Eleventh and twelfth, respectively were comments on visual appeal and familiarity. These were not mentioned that often and it would be of interest to learn whether they would be mentioned at all when they were not taken up in the previous questionnaire.

9.2.4 Comments per category by country

Here the number of comments per category by country will be discussed. This is done to see whether there are differences found in the amount of positive versus negative valences between the countries that could have lead to a difference in the determinant scores. Furthermore, we try to find common denominators in the comments to look for possible design guidelines.

Generic comments

The generic comments are almost evenly divided, thus there were an approximate even amount of generic comments of both positive as well as negative nature. Due to the nature of these statements it's difficult to draw conclusions on how any graphical web design element influenced the evaluation of the homepages positively or negatively. What is interesting to see however is that Korean websites score highest on both the positive as well as negative statements. However, the difference between the positive statements is far less than the negative statements between the countries, nevertheless does this not lead to a significant difference.

When looking at the most common generic comments, a lot of common statements were in line with phrases like "Dat vind ik wel goed" (*I think this is good*), or "dat vind ik ook goed" (*It think that is also good*) for positive comments. There was not that many negative statement were alike, but phrases like, "volgens mij is de website heel saai" (*I think the website is very boring*), or "En dit ziet er ook niet echt heel interessant uit" (*and this also does not look that interesting*), or "dit vind ik een beetje vaag" (*I find this to be a little vague*). Especially the negative comments indicate that websites need to be interesting / not boring. Therefore, web designer should try to make their designs interesting.

Tabel 9-12.
number of valences per category per country with Chi-square statistic

Graphical element new			country			Total	χ^2	*p*
			South Korea	The Netherlands	The United States			
Generic	Score	Minus	66	38	37	141	3.61	.16
		Plus	58	52	51	161		
	Total		124	90	88	302		
Content	Score	Minus	32	36	27	95	3.76	.15
		Plus	57	60	78	195		
	Total		89	96	105	290		
Multimedia	Score	Minus	18	17	16	51	.40	.82
		Plus	53	59	60	172		
	Total		71	76	76	223		
Spatial organization	Score	Minus	24	28	38	90	3.74	.15
		Plus	38	36	31	105		
	Total		62	64	69	195		
Color	Score	Minus	17	40	35	92	.98	.61
		Plus	17	30	36	83		
	Total		34	70	71	175		
Perc. ease of use	Score	Minus	20	5	13	38	6.60	.04*
		Plus	31	31	32	94		
	Total		51	36	45	132		
Advertising	Score	Minus	24	41	34	99	8.59	.04*
		Plus	3	0	0	3		
	Total		27	41	34	102		
Text/Image ratio	Score	Minus	33	12	7	52	6.69	.04*
		Plus	2	3	4	9		
	Total		35	15	11	61		
Text design	Score	Minus	16	7	10	33	7.85	.02*
		Plus	2	9	5	16		
	Total		18	16	15	49		
None	Score	Minus	3	4	9	16	2.47	.29
		Plus	6	11	8	25		
	Total		9	15	17	41		
Visual Appeal	Score	Minus	4	3	4	11	.56	.76
		Plus	4	6	7	17		
	Total		8	9	11	28		
Familiar	Score	Minus	1	3	0	4	1.41	.24
		Plus	0	5	0	5		
	Total		1	8	0	9		
Total	Score	Minus	258	234	229	721	4.90	.09
		Plus	271	302	311	884		
	Total		529	536	540	1605		

*statistically significant at the .05 level

Content

When looking at the statements about the content is that more than 66% of the statements were positive statements. Thus the participants not only found it important to mention often, but were also pleasantly surprised with the content of the homepages. What is also interesting, is that the number of statements were pretty close with to one other when looking at the valences between countries except for one outlier, the number of positive comments on the content of the American websites was a lot higher than of both other countries, the American homepages also had the least number of negative comments on content. However as with the generic comments, there is no significant difference. Still this does tell that it is important to place our content in such a way that it is clear what your content is and where it is.

Common positive comments were comments about the menu, such as "Goede navigatie aan de bovenkant" (*good navigation on the top of the page*). Common negative statements were statements about the amount of information, which was either too much, "Ik vind te veel informatie op de, ja op de hoofdpagina" (*In my opinion there is too much information on the main page*), or too little "Te weinig informatie" (*too little information*).

These statements tell us that when critically assessing a website of large interest are the menu and the amount of information on the page. Especially the menu was mentioned positively very often (fifty-six times), which indicates that the menu is very important when designing a website. The comments about the menu did not signal a difference in any of the determinants between the countries as all had approximately the same number of positive as well as negative comments.

Multimedia

Interesting here is that multimedia is the first of our four graphical elements categories. However, as mentioned earlier, some might view multimedia as content rather than design, and this might explain why it was mentioned so often, while it both is content and design.

Here there were three times as many positive statements made about multimedia items than negative statements. Thus the use of multimedia can have a positive influence on the user satisfaction of websites.

However, across the countries the number of valences were almost equal, America again had the highest positive mentions and the least negative, however the differences in the number of valences was far from significant. Nevertheless, most of the positive comments that were made on multimedia were made on the university homepages (110 out of the 172 positive comments), and most of the negative comments were made on the municipal homepages (thirty-six out of the fifty-one negative comments). Therefore, we conclude that, even though images might be considered content, web designers need to carefully select the images they use on a website, while websites with more positive mentions also scored more positive on the three dimensions when looking at the differences in the domains.

Common positive statements were statements concerning the images such as, "dit plaatje is wel mooi" (*This image is nice*) or "Maar dit beeld is mooi" (*But this image is nice*). Common negative statements were statements that stated that the images were boring, "Heel saai plaatje" (*very boring image*), which was mostly used for the images of the municipal homepages.

Spatial organization

Spatial organization had slightly more positive statements than negative ones. When looking at the differences between countries, with spatial organization it is visible that the Korean websites have the most positive and the least number of negative statements. This however did not lead to a significant difference, nevertheless this is quite remarkable as the Korean homepages scored lowest on the perceived ease of use, the ease of use was believed to be influenced by a large portion by the spatial organization. Although the comments provided here were mainly about the length and width of the page. The longer pages, thus the Dutch and American pages, were considered to be too long. The American news homepage, the longest of all the homepages, even had the most negative statements on spatial organization with twenty-two negative mentions. This is quite interesting as the homepages from the comparative content analysis were longer in both the Dutch and American homepages compared to the

Korean homepages. Although not visible through the determinants of user satisfaction this might be something to consider as a western web designer. What is also interesting is that the length which was commented on many occasions, did however not have a negative influence on the determinants. Thus although participants were not pleased with the length, other factors are deemed more important when assessing a website, or the users did not look 'under the fold' when assessing these homepages.

Common positive comments were comments about the clear division of the page such as, "Dit vind ik ook wel mooi opgedeeld" (*I also find this to be nicely divided*). Common negative comments were about the length of the page, comments such as, "en deze site is gewoon te lang" (*this page is just too long*) or "Meteen hier, veel te lang", (*Here, instantly, far too long*).

Color

As mentioned before, for the first time here the negative statements exceed the positive statements. The amount of statements are interesting, the Korean homepages have the least positive (seventeen) and least negative statements (also seventeen), thus these evoked the least number of expectancy violations. However the American homepages had the most positive statements (thirty-six), but also an almost equal number of negative statements (thirty-five). In contrast to the Dutch homepages which have less positive statements (thirty) compared to negative statements (forty), about the color of the website. However, again no statistical difference is reached. Nevertheless, the difference in the number of positive versus negative statements is something to explore a little further as it does not correspond with any of the determinants. Several participants complained about the vividness of the color red used for the Dutch news homepage. The participants found it too aggressive, or too loud. Twenty-five of the forty negative statements about the color of Dutch homepages were for the Dutch news homepage. This had an influence on the number of negative statements, therefore, when a different vibrancy for the red color on the Dutch news homepage had been chosen, the number of negative valences might have been different. This is further emphasized by another Dutch homepage, the Dutch university homepage, while it only had

two negative mentions and seventeen positive mentions. This ratio of positive versus negative was the best of all the homepages.

When looking for common denominators, there were not any real common factors for the comments about the color other than the intensity of the Dutch news homepage, with the use of two colors, red and blue there were not any big differences in the number of positive or negative comments about either color.

Perceived ease of use

The number of positive statements is about equal between the countries. However the number of negative statements is significantly different. Where Korean homepages have twenty negative statements, the ease of use of the Dutch homepages was merely mentioned five times in a negative fashion. The amount of negative statements about the American homepages was thirteen statements. In line with the questionnaire the Korean homepages were perceived as the hardest to use, however the order of the Dutch homepages and the American websites was switched. It is of interest to see that the number of negative valences is in line with our determinant scores, as there is a difference between eastern and western websites.

Common positive comments were comments about easy navigation such as "Makkelijk navigeren krijgt een plus"(*easy navigation gets a plus*) and the clarity of the website, such as "dit vind ik wel overzichtelijk" (*I find this clearly organized*). The negative statements mostly mentioned the lack of structure for instance, "Verwaring een beetje, geen duidelijke structuur" (*a bit confusing, no clear structure*), or "dit is weer onoverzichtelijk" (*this again is unclear*). The menu was most often used to assign the valence on (fifty times), therefore, we assume that a clear menu will provide users with a clear understanding of a website. Therefore, designers should put a lot of thought in developing the menu of a website as users quickly derive the ease of navigation from it.

Advertising

Participants were unappreciative of advertising. Several participants even mentioned that they have an aversion for advertisement. This begs the question whether advertising on a websites has a positive

influence on a brand or that people are merely annoyed by them. Furthermore, it begs the questions why people are not more appreciative of advertisements, while these are most commonly the only revenue for the websites they visit and thus provide the existence of the websites.

The amount of negative statements compared to the positive statements is extremely high across all the countries. However, there were fewer mentions on the Korean homepages. This might be due to the fewer number of advertisements due to smaller screen real estate while these pages were far shorter than their Dutch and American counterparts.

Due to the fact that there were merely three positive comments on advertising, there was not a common denominator. However, for the negative comments it was merely the fact that there were any commercials that most people did not find pleasing. Common negative statements were comments along the line of, "Ik vind het vervelend dat die reclame balk ertussen staat" (*I find it annoying that there is an advertising block in between*) or "Reclame er tussendoor is echt irritant" (*Advertisment in between is really annoying*).

Text to images Ratio

Here the number of negative statements was almost four times as large as the number of positive statements on the ratio of text to images. As can be seen the Korean homepages acquired the most negative mentions on the text to image ratio with thirty-three mentions. When this is compared to the twelve of the Dutch and seven of the American homepages, there is a statistically significant difference. However, this was mainly due to the Korean municipal homepage, which had the most negative statements with twenty statements, stating that there was too much text on the website.

There was a significant difference between the mentions of comments on text to image ratio. However, due to an outlier this could have been different. But the Korean homepages had the most number of negative comments, this could however be explanation by the perceived screen real estate. Korean website had white as their container color and as their background color, thereby not clearly dividing the foreground from the background, making the website as large as the screen itself. This could

influence the perception of even less images as not only the homepage but the entire page is considered the canvas of that homepage and thereby making the amount of space filled with images even less. The Korean municipal website had the most number of negative mentions with twenty negative mentions and no positive mentions. This homepage was, due to its color and lay-out, the homepage with the least amount of 'excitement', thus color or images on the left side of its page. This combined with the reading direction of the participants might have had an influence on the number of negative comments.

When looking at common denominators for the number of positive comments, there were not enough similarities to make a good estimate to what was liked. However, with the negative comments there were several negative comments on the amount of text. Some common negative comments were, "oh ja deze vond ik vrij saai, was veel tekst zeg maar" (*oh yeah, this one I found to be boring, too much text*) or "Uhm, slecht, veel te veel tekst" (*Uhm, bad, far too much text*). A recommendation for designers should be to consider not only the amount of screen real estate they provide to text and multimedia, but also the location these elements are given.

Text design

Here the design of the text was mentioned mostly in a negative way. The Korean homepages were mentioned mostly in a negative way and the Dutch homepages having the most positive mentions. This also led to a significant difference between the countries. However, the negative comments were mostly about the relative small font size of the text. Therefore, we assume that the readability is of influence on the perceived ease of use of a website. Also the difference in positive statements of text design between the Dutch homepages compared to the American homepages came across as odd while the only difference was the color of the titles. With all the things different between the two homepages, it would seem hard that there would be a significant difference merely on that difference. Therefore, we believe this difference is something that needs to be studied more in future research as we believe we can not draw conclusions on the difference found here.

However, common positive comments were comments about typeface, comments like “Ja deze vind ik wel mooi, vind ik mooi rustig lettertype” (*Yes, this one looks nice, I find the typeface nice and serene*). Common negative comments were comments about the size of the text, common problem for the participants was the small size of the text, comments such as “de tekst is nog steeds klein” (*the text is still too small*).

None

Next, there were forty-one valences given that did not have any verbalization as participants forgot to mention why they assigned a positive or negative valence to the graphical element. These valences were not studied further as they do not shed light onto why the determinants were in the order they were.

Visual appeal

Twenty-eight comments were made on the visual appeal of the homepages, however no real common denominators could be found within this group of comments. An exemplary comment was “Oh ik vind deze mooi” (*oh, I find this one appealing*).

Familiarity

Last, familiarity was mentioned the least of all the possible coding categories, just nine times. However, familiarity comments were not expected to be in any comments, but it is believed that due to the familiarity items in the questionnaire before the concurrent think aloud that the participants were primed to search for familiarity issues.

Statements about the familiarity of the website were mentioned merely nine times of which the Dutch websites were mentioned most often in both the positive as the negative comments. Due to small number of comments there were no real common denominators within this group of comments.

9.3 Analysis results of both user experiments

Here the results of both the questionnaire as well as the plus minus usability test with concurrent think aloud protocol will be discussed.

As mentioned earlier all three determinants, visual appeal, perceived ease of use, and familiarity were statistically different. Korean homepages were evaluated as significantly less visually appealing, perceived to be significantly less easy to use and were assessed as significantly less familiar than their American counterparts. The Korean homepages were also perceived significantly harder to use and less familiar than their Dutch counterparts. Last the participants evaluated the Dutch homepages as significantly less visually appealing and perceived them as significantly harder to use as their American counterparts.

The underlying assumption that familiarity might correlate with the scores on both visual appeal and perceived ease of use can be confirmed while the correlation is high for both visual appeal, $r (585) = .602$ $p = .000$ as for perceived ease of use $r (585) = .528$ $p = .000$. This shows a strong positive relation of familiarity with both the other determinants. Furthermore, perceived ease of use and visual appeal also correlate highly, $r (585) = .621$ $p = .000$, even when controlling for the influence of familiarity the correlation is still high, $r (582) = .447$ $p = .000$.

The strong positive relation of familiarity with both the other determinants indicates that more familiar websites will also have a higher score in both visual appeal and in perceived ease of use. Lindgaard Litwinska and Dudek (2008) found similar results when they looked for differences in judgment of the visual appeal of web pages between Chinese and Canadian participants. There the Canadians rated the Chinese web pages significantly lower than the Chinese participants, but there was no difference between the ratings on the North American web pages between the participants. They ascribed this to the lack of exposure. This also might explain the differences found between the Korean homepages and the two Western pages, while it is assumed that not a large portion of the participants visit Korean or Asian websites. We therefore conclude that there is a difference in Western and Eastern design, and that

this difference also leads to a difference in at least the perceived ease of use on these homepages, and also to a difference in the visual appeal between the Korean and American homepages.

However, this lack of exposure cannot fully explain why the American websites scored significantly higher on both visual appeal and perceived ease of use, even more so because the familiarity scale did not differ significantly. That the American and Dutch homepages did not differ significantly on familiarity can be explained by internet behavior of Dutch internet users. Dutch internet users spend a lot of time on American websites. For instance, out of the ten most visited websites in the Netherlands, seven are of American origin[3] (www.alexa.com data retrieved on 10th august 2012). This provides an indication as to why Western Europeans are familiar with both country specific design elements of Dutch and American websites, and thus a non significant difference in visual appeal and perceived ease of use might be expected. However, this was not the case, American websites were deemed as both visually more appealing and were perceived easier to use.

That the American homepages were perceived as easier to use and more appealing can be explained in three ways. First, we will look at the differences in the plus minus usability test with concurrent think aloud protocol, and look for indicators for what participants found most important and least important to explain this difference. Second, it might be explained by the fact that Western Europeans are equally familiar with both country specific design but apparently favor the American design over the Dutch design. Last, it might be possible that the stimuli were designed according to the uncovered differences in design but that other factors, for instance the vibrancy of the colors used, an often mentioned comment, mattered more than was assumed when creating the stimuli.

First, we will try to explain our difference by the number of valences. When looking at the differences in mentions of positive versus negative between the Dutch and American homepages, there were four categories that were statistically different, advertising, text design, text to image ratio and usability. Of these four, on only two America homepages scored better, advertising and text to image ratio. In the category advertising the participants had thirty-four negative valences and no positive

[3] Google.com, Facebook.com, Youtube.com, Linkedin.com, live.com, Wikipedia.com, and Twitter.com

valences on the American homepages, for the Dutch homepages this was forty-one negative valences to zero positive valences as well. Furthermore, the text to image ratio was mentioned seven times negatively and four times positively for American homepages and twelve times negatively and three times positively. Thus of interest are these two categories while they are in line with the results from the questionnaire. With the advertisement on both of the websites taking up the same amount of screen real estate it is remarkable that this differs. However, an explanation can be sought in the difference in color of the advertisements. The two main advertisements were adapted to the main color of the website, however participants complained about the vividness of the color red on the Dutch homepages. The advertisements might therefore have been noticed more often and thus the aversion for advertisements might have been brought to the surface more due to the more noticeable color which led to a less positive attitude towards the homepages.

However, the text to image ratio might have been more of an influence. The Dutch websites all had less multimedia then their America counterparts. As Lindgaard, lidwinska and Dudek (2008) concluded in their study on differences between east and west on visual appeal, appealing websites should contain plenty of graphics. This could explain why the American homepages were perceived to be visually more appealing and due to the correlation between visual appeal and perceived ease of use, as found here, but also found by Lee and Koubek (2010), thus also perceived as easier to use. In line with this we saw that, when looking at the generic comments provided in the think aloud protocol, that websites need to be interesting, therefore, the lack of images might have made the homepages less appealing as well. Last, the difference in the number of comments on the content might also explain the difference between the two countries, while there were far less negative and far more positive statements about the American than the Dutch homepages. This might have influenced the perceived ease of use as the content was apparently perceived better which in turn led the homepages to be perceived as easier to use. This combined with the high correlation between the perceived ease of use and the visual appeal might also be an explanation for the difference between the determinants and the two Western countries.

The second explanation that might explain the differences between the American and Dutch homepages is that Dutch websites are merely not perceived to be as visually appealing and/or perceived as easier to use. Our data provides very little feedback on the exact reason, while there were little significant differences between the two countries on the plus minus usability test.

The last explanation can be sought in graphical web design elements that were outside of the scope of this study. As said several participants complained about the vibrancy of the color red on especially the Dutch news homepage. Furthermore, the low score on the visual appeal of the Dutch municipal website, which was mentioned to be boring by several participants, had the least amount of image real estate on its homepage from all the homepages, this might have had a negative influence on the scores for both the visual appeal as well as its correlated determinant of perceived ease of use. However these factors were not taken up in our study, or not in such detail, but these might have had a big influence on both visual appeal as perceived ease of use. However, this cannot be concluded from the data gathered here.

10.

Discussion and limitations

Research on user perception of websites has shown the importance design plays in an online environment. Studies on local preferences of content and design of websites have shown that country specific elements are present in today's online environment. However few studies have systematically examined the effects these country specific elements have on the user perception of web sites (Cyr & Trevor-Smith, 2004). Therefore, the main objective of this study was to investigate whether country specific web design elements would affect the user satisfaction of homepages.

This study not only confirms that there are country specific graphical web design elements, but also shows that country specific graphical web design elements clearly have an influence on the user evaluation of websites. This is an important finding because it helps to shed light on the ever present discussion of standardization versus localization in web design. Here both studies will be discussed separately, first study one, the comparative content analysis is discussed, thereafter follows study two, the user experiment.

Study I: Comparative content analysis of preferences in the use of graphical web design elements between South Korean, Dutch, and American homepages

As mentioned earlier, several other studies have demonstrated differences in the use of several web elements between different countries and/or cultures. This study support the notion of design differing across countries as the comparative content analysis shows statistical differences in the use of several graphical web design elements between the American, Dutch and South-Korean homepages.

Three domains were selected to test the differences in the use of graphical web design elements. Including websites from too many domains would introduce too many confounding variables to arrive at meaningful results. The graphical elements that were found to be statistically different between the countries are the placement of the main image, the background color, the main color, the background container color, the color of the menu, the corners of the menu, the orientation, the color of the titles, the link typography, the color of the links, and the text to image ratio of the homepages. All these items could be classified as country specific markers and should be of great interest to web designers when making web pages for any of the three countries used in this study.

Although comparative content analyses have been previous studies, this investigation concentrated on design characteristics as it is believed that design is less sensitive to translation or comprehension errors than content. Therefore, web design was divided into content and design, where the latter was further divided into four design categories to suit the aim of this first part of the study. The division has been helpful in the search for country-specific design characteristics, however, a call is made to the HCI field to reach consensus on what design and content constitute out of. The review of the literature did not provide any consensus on the division of design or content and its characteristics, we believe consensus will help stimulate the growth in knowledge on differences in web design between countries.

Here in total twenty-two graphical web design elements were compared of which twelve were statistically different between countries. Due to the use of three domains, we were also able to distinguish differences in the design between these domains. Therefore, caution should be exercised on the interpretation of the results of the comparative content analysis. Although we used ninety homepages to distinguish differences in design, the number of homepages was unable to provide us with enough statistical power to perform a loglinear analysis, and therefore the interaction effects of countries and domains could not be derived. Thus even though our results show differences in the use of graphical elements between countries, the difference might not hold for all the domains.

Furthermore, here a comparison is made between three countries, in contrast to two countries, which seems to be the norm. Ideally this type of study should contain a larger number of countries to increase the generalizability of the study. Here however, it was chosen to keep countries to a set of three countries as the second study would become either too time consuming for participants to evaluate the stimuli or it would become impossible to find and/or explain the statistical differences between countries while too many differences between countries would occur.

Additionally, as with the comparison of countries, ideally this type of study should contain a larger number of coders. While an ill trained or inattentive coder will confound the results. However, our intercoder reliability scores were more than acceptable for all but one graphical web design elements. This provides evidence that the two coders used in this study was enough to not be affected by an ill or inattentive coder.

Last, the number of graphical web design elements that were chosen to be incorporated in the study were limited to graphical web design elements that were candidate markers for country specific elements graphical web design elements, obtained through reviewing the existing body of literature and simple observation. However, other graphical web design elements could also play an important role in adapting web sites to countries. Future work is needed for other graphical web design and content elements to see whether these also differ significantly.

In sum the comparative content analysis provides statistically significant evidence to support the notion that design differs between geographical regions and also that the effects of this need to be studied as these differences might lead to differences in preference and thus use.

Study II: The user experiment

With confirming differences in the use of website elements, the question whether these differences also lead to differences in user preference becomes increasingly interesting. Not only would this provide an answer to whether web designers are currently doing their jobs well, but also provides insight into the

debate whether localization is a good strategy to use when developing websites. Here it was sought to assess if the graphical web design elements lead to differences in the user preference. First, the users were requested to rate the websites on visual appeal, perceived ease of use, and familiarity through a questionnaire. Then the participants performed a plus-minus usability study with think aloud protocol.

The questionnaire shows that Western European users are more satisfied with western graphical web design elements than with South Korean graphical web design elements. The study show that the participants found the American-style homepages were visually more appealing and perceived the homepages as easier to user than both the Dutch or South Korean homepages. Furthermore, the Dutch homepages were perceived to be easier to use than the South Korean homepages. Last, the participants deemed both the American and Dutch homepages more familiar than the Korean homepages.

Next, through a plus minus usability study with concurrent think aloud it was sought to explain what elements were responsible for the differences in user preference. Although not statistically different, here the American homepages also were preferred over the Dutch and South Korean homepages. The American homepages got the highest number of positive and the lowest number of negative valences. The Dutch homepages were in second with both the number of positive and negative valences and the South Korean homepages got the lowest number of positive and the highest number of negative valences.

When analyzing the comments, we saw that the largest category of comments were statements made that were generic of nature, thereafter comments on the content and the multimedia were mentioned most often. Furthermore, we saw statistical difference in the number of comments between the countries of statements on perceived ease of use, advertising, text to image ratio and text design. Remarkable is that the statistically significant differences within these categories were not the categories mentioned most often. This raises the question whether our categorization was effective in capturing the reasoning behind the differences found in the questionnaire.

However, when analyzing what the user said, several interesting observations were made. First, the participants negatively assessed boring looking homepages. Furthermore, they inferred a lot of the ease of use of the system on the clearness of the menu. Additionally, the participants commented on the

lack of images and the lack of interesting images. Here the concurrent think aloud provided several beneficial insights into our plus minus usability study, however we wonder whether assigning valences really let's people explain why they choose one design over the other. Therefore, another strategy, for instance putting two homepages side by side and asking the participants which they like more and why would increase understanding of what is important in localizing design

In this study sixty-five participants from Western Europe evaluated our stimuli. Although the participants were able to distinguish the designs they were used to and also preferred these designs, ideally the same stimuli would be presented to a wider variety of participants to increase the studies generelizability. Therefore, now we can only state that Western Europeans prefer websites targeted towards westerners, but no claim can be made about Korean users preferring their use of graphical web design elements as our western participants did with the western design elements. Our study provides clear evidence that adapting to western standards leads to a better appreciation by Western users and in line with previous research we believe that this will also hold true the other way around (Lindgaard, et al., 2008). Unfortunately, our data does not suffice to make this claim as no Korean participants took part in this study. Therefore it is suggested that a similar study is done, where first domain and country specific elements are distinguished to make stimuli, which then are presented to a diverse set of participants to evaluate if the difference found here work both ways.

This method is also suggested because the underlying assumption that familiarity might correlate with the scores on both visual appeal and perceived ease of use can be confirmed while the correlation is high for both visual appeal and perceived ease of use. The strong positive relation of familiarity with both the other determinants indicates that more familiar websites will also have a higher score in both visual appeal and in perceived ease of use. Lindgaard, et al., (2008) found similar results when they looked for differences in judgment of the visual appeal of web pages between Chinese and Canadian participants. Therefore other countries might be less averse to the American design, while a large portion of popular websites are of American origin. However, the exposure cannot fully explain why the American websites scored significantly higher on both visual appeal and perceived ease of use, even more so because the

familiarity did not differ significantly. However, that the familiarity scores of the Dutch and American homepages did not differ significantly might also be explained by the fact that Western Europeans spend a lot of time on American websites.

Last, some considerations into the methodology of the second study are worth mentioning. A limited number of valences were given to the participants, more valences might have led to a different outcome while some participants were not finished with assigning valences to the homepages. However, due to assign a maximum, we hoped that the participants would focus on the most important issues. However this might be something to consider in future research.

In sum, the country specific web design elements did evoke differences in user preference, but the familiarity with the design might have had an influence on the outcome of user preference. It would be interesting to see if the same results would have been gathered if the user experiment was also conducted in Korea to assess whether they would prefer the Asian styled homepages.

From the comments could be derived that not only the graphical elements that were taken up in our stimuli were factors that were included in the evaluation of homepages by our participants, but that other factors also played an important role in user preference.

11.

Conclusions

This study investigated the influence of country specific web design elements on the evaluation of homepages. It is concluded that country specific web design elements indeed have an influence on the evaluation of websites. First, it was concluded that several graphical web design elements significantly differed between the three countries. Thereafter, we recruited Western European students to evaluate stimuli that contained the previously found country-specific design elements. Our findings suggest that users evaluated country-specific stimuli to be significantly different.

The participants evaluated the stimuli on three determinants, visual appeal, perceived ease of use, and familiarity. The American-style homepages were evaluated to be significantly different from the other homepages as they were the most visually appealing and were perceived as the easiest to use. Furthermore, the Dutch-style homepages were perceived as easier to use than the South-Korean homepages. Furthermore, when comparing the familiarity of the design of the websites, the South-Korean homepages were deemed to be significantly less familiar than both other countries. While participants were able to distinguish the homepages that looked familiar from the homepages that did not, we conclude that there is a difference in Western and Eastern design, and that this difference also leads to a difference in the evaluation of the homepages.

This study therefore supports the claim that localizing website is a good strategy to cope with the challenge of building efficient and effective websites. When creating websites for a specific geographical region, web designer therefore need to carefully study the prevalent design characteristics used in that region. As stated this is because the correlation between familiarity and both the visual appeal as well as

the perceived ease of use is high. Furthermore, here the correlation between the visual appeal and the perceived ease of use is also high which is in line with previous work of Lee & Koubek (2010). Here however, this is supplemented by the high correlation of familiarity on both these determinants.

Furthermore, when considering making localization guidelines with the use of the found country specific web design elements, one has to be aware that there were also significant differences found between the three domains used for the stimuli. Thus when designing websites not only the country specific web design elements are important, but also the domain specific elements need to be taken into consideration. Here merely the country specific web design differences were sought in the preliminary study and the domain specific web design differences were not taken up in the development of the stimuli. However, the stimuli were made to mimic a specific domains websites. This might explain the differences found between the domains. However, here we conclude that when localizing websites do not merely take into consideration the country specific graphical web design elements, but also consider the domain specific elements as these also have an influence on user satisfaction.

In conclusion, this study extends previous work on the issue of localization as it shows there are differences in the current use of web design, but more importantly this study shows that westerners are more familiar with Western design and also prefer this over Eastern design. Therefore, this study supports the use of localization when coping with the challenge of building efficient and effective websites within today's digital world without geographical constraints.

Future work

Future research should adapt the methodology used here, as it has proven to be fruitful for a number of reasons. First, it has led to statistically sound conclusions and also the fact that elements from one's own sample are used develop stimuli provides more power to make inference about, while more variables can be controlled.

Furthermore, research should develop and test divisions of design to eventually make studies more similar and therefore a better understanding of web design would be acquired. Also, similar studies should be employed with either other countries or more diverse participants which could bring more insight into the generalizability of the results found here.

Last, a call is made to study web design between countries over time. Several differences were found in this study on the design of homepages. However, very interesting to see would be evolvement over time of these differences. Would the differences expand as more and more designers become aware of the power of adapting to local preferences or would design converge to a more standard design as some scholars foresee.

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Appendices

Appendix A: Selection of homepages for the comparative content analysis

Introduction

As mentioned in the chapter four our focusing is not predicting preferable use of design elements. Instead, we are merely exploring differences in the use of graphical elements between countries. By selecting websites for our comparative content analysis we are framing our research and thereby making it manageable. Here, a three country comparison is used, while a two country analysis, which seems to be the norm, greatly decreases the studies generalizability. Content analysis typically show a comparison between Anglo-Saxon and Asian websites, here we chose to start with a comparison between South Korea and the Netherlands. These countries represent very distinct cultures as determined by Hofstede (1980). However, both countries have an extremely high level of broadband internet penetration. The Netherlands is ranked as the number one country in fixed-broadband subscriptions per 100 inhabitants, with South Korea being fourth, being the first country outside of Europe (ICT figure 2011). Furthermore, the same data shows that South Korea has the most active mobile internet subscriptions per 100 inhabitants. This paired with high level of economic development leads us to believe that websites in both countries are well developed. Therefore, a comparison between these countries seems fit to find country-specific design elements. However, as mentioned earlier, using three countries benefits the generalizability. Consequently, the United States was added as a benchmark, as this country is often used in cross-cultural research. Besides being often used as a benchmark, The United states also has a high broadband internet penetration and is also economically well developed, thus as a country suits this research well.

Together with the selection of the countries, three website domains were chosen to compare the countries homepages. Three domains were selected to increase generalizability while comparing websites from too many domains may lead to see effects that are not country-specific but merely domain-specific.

In this study , News & media, Government and Education were chosen from the eight domains used in Barber and Badre (1998). The domains were chosen after reviewing which of these domains would be best suited for a comparison of graphical design elements between the three chosen countries. To asses which domains would be best suited for this study, table A-1 shows the domains with the eight questions that were asked to predetermine whether the domains would suffice in reflecting the country specific desires when looking at the websites. The valences are solely based on the researchers own experience with the domains. After, the valences were determined they were assigned points, where a ' - - ' would be rated as one and '++' would be rated as five. Thereafter, the total scores were calculated and it could be seen that News & media, and Education, both scored 34 points, and government scored 33 points, making these the top three out of the eight domains.

Table A-1.
Assessment by Criteria for appropriateness of website domains for current study

Criteria for the websites	Government	News & Media	Business	Education	Travel	Society & Culture	Science	Art & Humanities
Visually developed	+/-	++	++	++	++	-	-	-
Professional	++	++	++	+	+	+	+	-
Native language	++	+	+/-	++	--	+	-	+
Not a Multinational	++	+/-	-	+	-	+	-	+/-
HQ in own country	+	+	+	+	-	+	+	+
Targeted at a specific culture	+	+/-	--	+	-	+	-	-
People go there by choice	+/-	++	+	+	+	+	+	-
Comparable	+	++	+	+	++	-	+	-
TOTAL	**33**	**34**	**28**	**34**	**25**	**28**	**24**	**21**

For a better comparison the domains have been made more specific and therefore, newspaper, municipality and university websites were chosen to be included in this study.

The domains were chosen while we believe that websites from these domains are well developed, are in the native language and are targeted towards the countries citizens the websites are from. In case of the university websites, the native versions of the websites were used instead of the more internationally oriented English version.

In total 90 websites were selected, respectively 30 from each country. Within these 30 websites, 10 came from each genre. All the websites corresponded to being in the top ten on the following criteria. The homepages of the newspapers were selected on their paper's equivalent circulation figures. The municipality websites were chosen on their number of inhabitants. The university websites were chosen on their ranking on Top Universities.com.

1. The selection of newspaper homepages.

As mentioned, the selection of homepages of the newspapers was based on their circulation figures. Here, first the sources for the circulation figures will be discussed, and last a table per country will provide the newspaper's name, its corresponding circulation figures, and url.

Circulation figures

In contrast to the Dutch and American press, the circulation figures of Korean newspapers are not published. Korean newspapers do not reveal their circulation figures to, or participate in, the Korea Audit Bureau of Circulations programs as our source reveals (http://www.pressreference.com/Sa-Sw/South-Korea.html, retrieved at may 6th 2010). Therefore, we used the estimates of an advertising sponsors' group in November 2001 that were provided in the same article, these figures are used to select the ten websites which can be seen in table A-1.

The circulation figures for the Dutch newspapers can be found online at hoi-online.nl through a request module on the website. The circulation figures used in this paper are from the whole year 2009. Table A-2 provides the ten websites used in this study.

As with the Dutch newspapers, the circulation figures of the American newspapers are readily available. Here the circulation figures come from the audit bureau of circulations over the period of six months ending on September 30th of 2008 (www.BurrellesLuce.com/topmedia2009, retrieved at may 6th 2010) The circulation figures of the American newspapers can be seen in table A-3.

Table A- 1.
Korean newspapers taken up in our study with their corresponding circulation figures

Name	Estimated circulation per day	Url
Chosun Ilbo	2450000	http://www.chosun.com
Joong-ang Ilbo	2350000	http://www.joins.com
Donga-a Ilbo	2100000	http://www.donga.com
Hankook Ilbo	700000	http://hankooki.com
Kyunghyang Shinmun	450000	http://www.khan.co.kr
Hankyoreh Shinmun	450000	http://www.hani.co.kr
Korean Daily	400000	http://www.kdaily.com
Kukmin Daily News	350000	http://www.kukinews.com
Hankyung ilbo	-	http://www.hankyung.com
Busan Ilbo	400000	http://www.busan.com
Munhwa Ilbo	300000	http://www.munhwa.com

Table A-2.
Dutch newspapers taken up in our study with their corresponding circulation figures

Name	Circulation per day	Url
De Telegraaf	579932	www.telegraaf.nl
AD	395350	www.ad.nl
De Volkskrant	230114	www.volkskrant.nl
NRC Handelsblad	187633	www.nrc.nl
De Gelderlander	142860	www.gelderlander.nl
Noordhollands Dagblad	131835	www.dagbladvanhetnoorden.nl
Dagblad van het Noorden	128307	www.noordhollandsdagblad.nl
De Stentor	124330	www.destentor.nl
Dagblad De Limburger	124150	www.brabantsdagblad.nl
Brabants Dagblad	122860	www.delimburger.nl

Table A-3.
American newspapers taken up in our study with their corresponding circulation figures

Name	Circulation per day	Url
USA Today	2293310	www.usatoday.com
The Wall Street Journal	2011999	online.wsj.com
The New York Times	1000665	www.nytimes.com
Los Angeles Times	739147	www.latimes.com
Daily News – New York, NY	632595	www.nydailynews.com
New York Post	625421	www.nypost.com
Washington Post	622714	www.thewashingtonpost.com
Chicago Tribune	516032	www.chicagotribune.com
Houston Chronicle	448271	www.chronicle.com
The Arizona Republic	413332	www.azcentral.com

2. Selection of university homepages

The university homepages were less strenuous to acquire as one website, www.topuniversities.com, provided all the homepages for the three countries. Per country the ten best universities would be taken up in our study. The data was acquired on May 6th 2010. The following three tables will provide the universities plus their corresponding url. Table A-4 provides the South Korean universities homepages, table A-5 the Dutch universities homepages, and table A-6 the American universities homepages.

Table A-4.
Top ten South-Korean universities

Name	Url
Seoul National University	www.snu.ac.kr
KAIST – Korea Advanced Institute of Science & Technology	www.kaist.ac.kr
Pohang university of Science and Technology	www.postech.ac.kr
Yonsei University	www.yonsei.ac.kr
Korea University	www.korea.ac.kr
Hanyang University	www.hanyang.ac.kr
Sungkyunkwan University	www.skku.edu
PUSAN National University	www.pusan.ac.kr
Kyung Hee University	www.kyunghee.ac.kr
Sogang University	www.sogang.ac.kr

Table A-5
Top ten Dutch universities

Name	Url
University of Amsterdam	www.uva.nl
Leiden University	www.leidenuniv.nl
Utrecht University	www.uu.nl
Delft University	www.tudelft.nl
Erasmus university	www.eur.nl
Maastricht University	www.maastrichtuniversity.nl
Eindhoven University of Technology	www.tue.nl
Wageningen University	www.wageningenuniversity.nl
Free University Amsterdam	www.vu.nl
University of Twente	www.utwente.nl

Table A-6.
Top ten American websites.

Name	Url
Harvard University	www.harvard.edu
Yale university	www.yale.edu
University of Chicago	www.uchicago.edu
Princeton university	www.princeton.edu
Massachusetts Institute of Technology	www.mit.edu
California Institute of Technology	www.caltech.edu
Columbia University	www.columbia.edu
University of Pennsylvania	www.upenn.edu
John Hopkins University	www.jhu.edu
Duke University	www.duke.edu

3. Selection of the Municipality homepages

The selection of the municipality homepages was done on the number of inhabitants. The ten most inhabited municipalities per country were taken up in our study. The next tables will provide the municipality and its corresponding url per country.

Table A-7.
South Korean municipalities

Name	Url
Seoul	www.seoul.go.kr
Busan	www.busan.go.kr
Incheon	www.incheon.go.kr
Daegu	www.daegu.go.kr
Daejon	www.daejeon.go.kr
Gwangju	www.gwangju.go.kr
Ulsan	www.ulsan.go.kr
Suwon	www.suwon.go.kr
Changwon	www.changwon.go.kr
Seongnam	www.seongnam.go.kr

Table A-8.
Dutch municipalities

Name	Url
Amsterdam	www.amsterdam.nl
Rotterdam	www.rotterdam.nl
Den haag	www.denhaag.nl
Utrecht	www.utrecht.nl
Eindhoven	www.eindhoven.nl
Tilburg	www.tilburg.nl
Breda	www.breda.nl
Nijmegen	www.nijmegen.nl
Enschede	www.enschede.nl
Apeldoorn	www.apeldoorn.nl

Table A-9.
American municipalities

Name	Url
New York city	www.nyc.gov
Los Angeles	www.lacity.org
Chicago	www.cityofchicago.org
Houston	www.houstontx.gov
Phoenix	www.phoenix.gov
Philadelphia	www.phila.gov
San Antonio	www.sanantonio.gov
San Diego	www.sandiego.gov
Dallas	www.dallascityhall.com
San José County	www.sanjoseca.gov

Appendix B:
The selection of the graphical web design elements

Introduction

This document will provide a detailed description of the path of selecting the graphical web design elements used in this study. These graphical elements will be used to analyze which graphical web design elements are country specific through a comparative content analysis. The selection and operationalization of these graphical elements is important while not selecting the correct graphical elements or not operationalizing the elements properly will either not provide the information necessary to identify country specific markers or will make the comparative content analysis excruciatingly difficult.

The literature on country/culturally specific design will be examined to determine the graphical elements used in this study. First, we will start by providing a concept of what graphical elements are and how these relate to website design. Second, other studies, that use a comparative content analysis to analyze web design elements in a cross cultural setting, will be examined to both provide the graphical elements used in this study as well as provide categories to classify these graphical elements. In addition to the graphical elements found in the studies that make use of a comparative content analysis, other graphical elements that for instance have shown to be different in global web design setting will be added to the pre-selection of graphical elements. Third, an operationalization of both the categories as well as the graphical elements is provided, the pre-selected graphical elements will be tested to analyze whether they are easy to judge as well as if the operationalization is clear enough to reach consensus on by multiple coders. Last, the final set of graphical elements used in our comparative content analysis is given as well a their operationalization.

1. What are graphical elements and how do they relate to web design

As is done by Huizingh (2000) and Robbins & Stylianou (2003), websites can be divided into content and design. We believe the best description of both content as design might be the description of HTML and CSS provided by the World Wide Web Consortium (W3C), were HTML represents content and CSS represents design. Content, or HTML, provides the structure of the page, or in other words, the dynamic content of the web page. Design, or CSS, provides the visual and aural layout of the page (W3C.org). In this study we are merely interested in the visual design of a website, thus excluding other design characteristics such as usability design. We acknowledge that design is far more than merely the visual design of a website, although visual design is the gateway to all the other measures of website design as it provides the first impression of the website and has shown to be assessed with lightning speed (Lindgaard, Fernandes, Dudek, & Browñ, 2006).

When looking at the visual design of website design we are interested in which graphical web design elements are country specific. Graphical web design elements are visual website components. They can range from a specific color of a content unit to the dimension of a webpage or image. Because of the shear amount of graphical elements these will be divided into categories which are formed by reviewing the existing literature. Figure B-1.1 provides a graphical representation of how graphical elements relate to web design.

Figure B-1.1

As can be seen in figure B-1.1, web design can be divided into content and design. We divide design into visual design and other design elements, e.g. interaction design. Within visual design there are several categories that will be defined in this document, and also, which graphical elements will be included in which

category. Table B-1.1 provides an overview of what will be dealt with in which section. The table shows the chapter and whether the chapter provides insight into the classification of the category or the classification of the graphical elements. Last, it also provides insight into what is dealt with in the chapter by providing a operationalization of chapter.

Table B-1.1
Overview of structure of appendix B.

	Categories	**Graphical elements**	**Operationalization**
1			Introduction
2	Classification of categories used in the literature		Collect categories used in content analysis on country / culturally specific differences in website design
3	Selection of the categories that suit our research goal		Operationalize criteria for selection of useful categories that suit our research goal and select categories that fulfill the criteria
4	Compose and operationalize the categories used in this research		Group the categories that fulfilled the criteria and operationalize their goal for our study
5		Division of the graphical elements used in the literature into the composed categories	Collect and divide the Graphical elements used in the country / culturally specific differences in website design into the categories composed earlier
6		Group the graphical elements and eliminate double elements and	Group and aggregate the graphical elements in their category
7		Selection of the graphical elements that suit our research goal	Operationalize criteria for selection of useful graphical elements that suit our research goal and select categories that fulfill the criteria
8		Non content analysis graphical elements	Add non content analysis graphical elements with reasoning.
9		Operationalize the graphical elements used in this research	Operationalize the graphical elements for our study
10		Pre-test	Operationalize the graphical elements for our study after the pre-test

2. Division of categories used in the existing literature

As previously mentioned, several authors (Huizingh, 2000; Robbins & Stylianou, 2003) classify website into design and content. This classification is used here to divide several categories of website elements into either (visual) design, content or a mix of both content and design. Even though we are merely interested in the visual design of websites, which differs from the previously mentioned studies, in table B-2.1 we present the categories used in the literature along a slope representing a slope between content and design. The table provides an overview of the categories used and an estimation of where the category is along the aforementioned slope. Here are the definitions used to classify the categories from the other studies:

- Design: The visual representation of a website,
- Content: The information on the website, and
- An mixture of both: Either represent neither design or content such as download speed, or the representation of both content and design such as a photo, which can either be content for instance when it is accompanying a news article or it can be design when it is used as a background for the whole website.

Table B-2.1 provides the author and the category names as used. These categories are thus classified into either design, a mixture of both content and design, or content. By doing so the categories that do not describe design are discarded and we are able to combine categories that overlap.

Noteworthy however is the study of Cyr & Trevor-Smith (2004) , along the scale of design and content we had to classify content & structure into two categories as the description used in their research was too broad to be classified in one category.

Table B-2.1
Division of categories used in the existing literature

	Scale*		
	Design ←	**A mixture of both**	**→ Content**
Robbins & Stylianou (2003)	Presentation Navigation Security Speed Tracking		Corporate information Communication/ customer support Currency Financial information Employment opportunities Social issues
Huizingh (2000)	Features Navigation structure Search function Protected content Perception Quality of structure Image Presentation style		Features Content Information Transaction Entertainment Advanced site Perception Perception content
Juric, Kim & Kuljis (2003)	Visual Attribute Images Colour Text Lay-out	Audio visual attributes Sound Animation 3D	Verbal attributes Language Formats
Cyr & Trevor-Smith (2004)	Lay-out Color	Navigation Multimedia Content & Structure	Language Symbols Content & structure
Kim & Kuljis (2007)	Visual design Page lay-out	User Input Multimedia	Information
Fraternali & Tisi (2008)	Page lay-out Links	Navigation Search	

*Scale range from left to right: Strictly design - A mixture of both design and content - Strictly content

3. Selection of the categories that suit our research goal

With the division of the categories as either design or content, here it is decided if these variables are useful for our study of comparing the visual design of websites. We are interested in finding categories that would describe different aspects of design without overlap. The scale of design and content from chapter two is used here to present three tables with the corresponding categories:

- Table B-3.1 with all the design categories,
- Table B-3.2 with the content categories, and
- Table B-3.3 with the categories that are a mixture of both.

These tables contain the category as used in the original study, the author, an operationalization of the category as used in the original study, a confirmation whether the category is used in this study, and a justification why this variable will be used or discarded.

The criteria used to determine whether the category is useful for our study, are:

- The category should reflect visual design, thus the category should not be content and should be visible to the user.
- The category should be objectively measurable, thus for instance quantifiable or dichotomous and not dependant on subjective judgment.
- The category should be able to be judged without the need of actual interaction

When all these criteria are met the category is a viable candidate for use in our study.

Table B-3.1
The design variables used in previous studies.

Category	Authors	Operationalization*	Include	Reasoning
Presentation	Robbins & Stylianou	Visual appearance or general attractiveness of the site	No	Not objectively measurable
Navigation	Robbins & Stylianou	Allow the site visitor easy access to information of interest, both internal and external to the site.	No	Only measurable in interaction
Security	Robbins & Stylianou	A feature valued by the customer.	No	Not visible to the user
Speed	Robbins & Stylianou	The amount of time that a visitor of the site has to wait	No	Not visible to the user
Tracking	Robbins & Stylianou	Tracking the behavior and interest of the visitor	No	Not visible to the user
Navigation structure	Huizingh	Link structure	No	Only measurable in interaction
Search function	Huizingh	A function to that can be used to find specific information	Yes	Is visible and can be located
Protected content	Huizingh	Whether a website contains pages protected by means of a password	No	Not visible to the user
Quality of structure	Huizingh	To which extent a structure actually helps a user find information	No	Only measurable in interaction
Images	Huizingh; Juric, Kim & Kuljis	To which extend a website can be considered sober	Yes	Is visible and objectively measurable
presentation style	Huizingh	To which extent the presentation style within the various pages can be considered as uniform	No	Only measurable in interaction
Colour	Juric, Kim & Kuljis; Cyr & Trevor-Smith	What is the color of the style features of the website	Yes	Design choice with visual impact
Text	Juric, Kim & Kuljis	What is the formatting of the text on the website	Yes	Design choice with visual impact
Lay-out	Juric, Kim & Kuljis	Where are the features placed on the website	Yes	Design choice with visual impact
Visual design	Kim & Kuljis	Visual design comprises the choice of colour for homepage background, frame, image, hyperlink, logo, text, and the usage of image such as photo and symbol, and navigation.	Yes	Various factors that are design choices with visual impact
Page lay-out	Kim & Kuljis; Fraternali & Tisi	Page layout includes the type of menu, the position of elements such as main menu, sub menu, logo, image, animation, search engine, navigation button, donation menu, sitemap, and the number of images.	Yes	Design choice with visual impact
Links	Fraternali & Tisi	The percentage of occurrence of link with some specific feature	In	Is visible and objectively measurable in the context of number of links

Table B-3.2
The variables used in previous studies that were a mixture of both content and design variables

Category	Authors	Operationalization	Include	Reasoning
Sound	Juric, Kim & Kuljis	Sound on a website	No	Not visible
Animation	Juric, Kim & Kuljis	Animated content on a website	Yes	objectively measurable of number and placement
3D	Juric, Kim & Kuljis	3d images on a website	Yes	objectively measurable of number and placement
Navigation	Cyr & Trevor-Smith	The number and type of navigational tools	Yes	Design choice with visual impact
Content & Structure	Cyr & Trevor-Smith	The amount of space devoted to specific content and structure elements	Yes	The number and placement of content elements is a design choice
Multimedia	Cyr & Trevor-Smith, Kim & Kuljis	Design preferences for multimedia elements and the extent of multimedia used across cultures	Yes	Visible, number and placement is a visual design choice
User Input	Kim & Kuljis	To which extent are users allowed to input on the website	No	Content as put here, only measurable in interaction
Navigation	Fraternali & Tisi	The facilities available to explore information within the website	No	Only measurable in interaction
Search	Fraternali & Tisi	Indication of the presence of search functions of different kinds.	Yes	Visible, placement is a visual design choice

Table B-3.3
The content variables used in previous studies.

Category	Authors	Operationalization	In/Out	Reasoning
Corporate information	Robbins & Stylianou	Is there corporate information	No	Strictly content
Communication/ Customer support	Robbins & Stylianou	Is there customer support	No	Strictly content
Currency	Robbins & Stylianou	Which currencies are used	No	Strictly content
Financial information	Robbins & Stylianou	Is there financial information on the website	No	Strictly content
Employment opportunities	Robbins & Stylianou	Is there information of employment opportunities on the website	No	Strictly content
Social issues	Robbins & Stylianou	Is there information on social / privacy issues on the website	No	Strictly content
Information	Huizingh	Is there information on the website on the company or about products	No	Strictly content
Transaction	Huizingh	Is there a possibility to inquire / directly order products on the website	No	Strictly content
Entertainment	Huizingh	Does the site contain a form of entertainment and if available, which kind of entertainment	Yes	Are visible attributes, placement and number are visual design choices
Advanced site	Huizingh	The amount of different features a site contains	Yes	The number of features that are present.
Perception of content	Huizingh	The degree to which the website is considered to be informative	No	Not objectively mearurable
Language	Cyr & Trevor-Smith	Representation of language/script	No	Strictly content
Symbols	Cyr & Trevor-Smith	The variety of type and degree of symbols used	No	Strictly content
Content & Structure	Cyr & Trevor-Smith	Content style of textual and visual information	No	Strictly content
Information	Kim & Kuljis	The amount of information on the website	No	Strictly content

4. Compose and operationalize the graphical element categories used in this study

Now all the categories we want to include in our research have been selected in chapter three, we want to group them into several larger categories to keep them from overlapping and to keep the division of graphical elements not too widespread over too similar categories. Furthermore, to get an idea of the questions these categories provide an answer to, table B-4.1 provides a division of the categories into four larger categories. Here the categories and the authors where the category stems from are provided, as well as the questions the categories are trying to answer.

Table B-4.1
Converging of the categories from content analysis

Categry	Factors	Authors	What we want to know
Lay-out	Search function / Search Advanced site Lay-out Page lay-out Navigation Content & structure	Huizingh; Fraternali & Tisi Huizingh Juric, Kim & Kuljis Kim & Kuljis; Fraternali & Tisi Robbins & Stylianou Cyr & Trevor-Smith	Where is it on the website, How is it divided on the website. What are the dimensions of the website.
Text	Text Links	Juric, Kim & Kuljis Fraternali & Tisi	How it the text formatted
Color	Colour	Juric, Kim & Kuljis; Cyr & Trevor-Smith	Which colors are used for what
Multimedia	Multimedia Entertainment Images Animation 3D	Cyr & Trevor-Smith, Kim & Kuljis Huizingh Huizingh; Juric, Kim & Kuljis Juric, Kim & Kuljis Juric, Kim & Kuljis	The amount and the size of the media used
Visual design	Visual design (too broad, variables within category have to be divided up into the other four categories)		

In table B-4.2 the same categories can be seen as in table B-4.1, however here a description of the questions that need to be answered when analyzing the homepages in the comparative content analysis are provided. Furthermore, to what design choices these questions refer to in the context of design is provided. Last, the table provides the category names as used in this study, while we believe that these names better

describe the content of the categories. This study will use spatial organization instead of lay-out as we believe that lay-out does not properly describe the category as it does not encompass all the graphical design elements that are necessary to arrange the content of a website. Furthermore, the category of text has been renamed to text design, this merely has been done for clarification purposes, to point out that solely the design of the text is of interest and not the text itself. Therefore, here the four categories used here are Spatial organization, Text design, Color and Multimedia.

Table B-4.2
New names for the categories formed by the content analysis

Name	**Question**	**Refers to**	**New name**
Lay-out	Location, number of, and division of elements	Organization of elements on the website	Spatial organization
Text	Text formatting styles and number of	Formatting of readable elements	Text design
Color	Which colors are used for what	Use of color on the website	Color
Multimedia	The number and the size of the multimedia used	Amount media elements on the website	Multimedia

Now, we have the four categories that are used in this study to divide the graphical elements into manageable portions. We changed the names of the categories because we believe the new names better represent the nature of the category.

5. Division of the graphical elements used in the literature into the composed categories

After the four categories were formed here these categories will be used to categorize all the graphical elements used in previous content analysis studies. The classification of elements is done based on whether the element used in the literature is either design, content, or something else. If the element is regarded as a design element, thus graphical, it is classified in one of the four design categories. This categorization is done by reviewing as to what question the graphical element would provide an answer to. When an element, used in previous research, is not clear as a concept an operationalization is provided. The graphical elements are arranged per study. The tables consist of the graphical element, when necessary an operationalization, whether a difference (Diff.) was found in the study on the graphical element,and the category of the element is marked by an 'x'. The categories used are:

- Design,
    - SO: Spatial organization,
    - T: Text design
    - C: Color,
    - M: Multimedia.
- C: Content,
- O: Other classifications, such as
    - Interaction design, e.g. guided navigation, while this has nothing to do with either visual design or content.
    - Subjective, e.g. aesthetically pleasing while this is the outcome of all the graphical elements together, this is not a graphical element.
    - Too specific, e.g. if an image represents an Malay Image

The following tables will review the graphical elements from the following studies, table b-5.1 reviews the elements used in the study of Baack & Singh (2007), table b-5.2 the elements of Barber & Badre (1998), table b-5.3 the elements Callahan (2005), table b-5.4 the elements of Juric et al., (2003), table b-5.5 the elements of Kim & Kuljis (2007), table b-5.6 the elements of Kim, Coyle & Gould (2009), table b-5.7 the elements of Robbins & Stylianou (2003), table b-5.8 the elements of Tong & Robertson (2008), table b-5.9 the elements of Würtz (2005), table b-5.10 the elements of Zhao et al., (2003).

Table B-5.1
Classification of the graphical design elements of the study of Baack & Singh (2007)

Baack & Singh (2007)		Design					C	O
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
Graphic oriented	High levels of use of images, pictures, streaming video, etc. The website should be visually noticeable.					x		
Fantasy aspect or creativity	Fantastic elements to the website, that is elements not rooted in reality. Out of the ordinary features, creative features that capture your attention. Examples are the use of stories.							S
Aesthetically pleasing	Attention to aesthetic details, focus on beauty, and emphasis on pleasing images, format, design, etc.							S
Guided navigation	Site maps, well-displayed links, links in the form of pictures or buttons, forward, backward up and down navigation buttons.							I
Welfare of others	An emphasis on the importance of the welfare of other, the presence of concerns regarding how others are affected by company activities, presence of a social responsibility policy							S
Community relations	Presence or absence of community policy, giving back to community, links or activities relating to involvement with the community.							TS
Tradition theme	Emphasis on history and the ties of a particular company with a nation, emphasis on respect, veneration of elderly, phrases like “most respected company”, “keeping the tradition alive,”“for generations,”“company legacy.”						X	
Link to local locations	Mention of contact information for local offices, dealers, and shops.						X	
Family theme	Pictures of family, pictures of teams of employees, mention of employee teams, emphasis on team and collective work responsibility in vision statement or elsewhere on the website, emphasis on customers as a family.					X	X	
Pictures of important people/CEO	Pictures of executives, important people in the industry or celebrities.					X	X	
Organizational structure information	Information on the website regarding the organizational structure of the company.						X	
Use of proper titles	Titles of the important people in the company, titles of the people in the contact information, and titles of people on the organizational charts.						X	
Quizzes and games	Games, quizzes, fun stuff to do on the website, tips and tricks, recipes, and other fun information.					X		
Chat room	Presence or absence of chat rooms and live talks.							I
Emotional or entertainment theme	Presence of entertainment themes or emotional themes such as “exciting product,”“fun,”“will make you laugh.”						X	
Hedonism appeals	An emphasis on the pursuit of pleasure and the satisfaction of pleasure needs. Examples include images showing people enjoying themselves, phrases regarding enjoyment and indulgence.					X		S
Hard sell	Discounts, promotions, emphasis on product advantages using explicit comparison.						X	
Product effectiveness	Durability information, quality information, product attribute information, product robustness info.						X	
Realism theme	Less fantasy and imagery on the website, to-the-point information. FAQ's, customer service option, customer help, or cust. serv e-mails.					x		S

Customer Service	FAQ's, customer service option, customer help, or cust. serv. e-mails.										X		
Blurred gender roles	No separate pages for men and women, depiction of women and men in the same roles, emphasis on equality between the genders, no gender stereotypes used.										X		S
Soothing	Peaceful and soothing feel to the website. Emphasis on not jarring or upsetting the viewer.												S
Nature images	Use of nature images such as pastoral images, outside images, etc.										X		
Challenging website format	Level of difficulty of website use, lack of ease regarding navigation, understanding of format, finding of important information, etc.												I
Emphasis on fairness or equality	Presence of fairness or equality statements, fair or equitable presentation of information, presenting the company as a fair and equitable business										X		S

Table B-5.2
Classification of the graphical design elements of the study of Barber & Badre (1998)

Barber & Badre (1998)		**Design**					**C**	**O**
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
HTML Specific								
# of lines			X	X				
# of centers			X					
# of images		x	X			X		
# of links				X				
# of internal links		x		X				
# of external links				X				
link color					X			
visited link color					X			
horizontal bars			X					
tables			X					
bold				X				
italics				X				
underlines				X				
frames			X					
audio							X	
Video						X		
background image					X	X		
background color					X			
text color					X			
Icons/Metaphors								
international							X	
local							X	
clocks							X	
newspapers							X	
books							X	
pages							X	
homes							X	
stamps							X	
envelopes							X	
musical notes							X	
paperclips							X	
thumbtacks							X	
other.							X	
Colors		X			X			
Specific Colors								
flag							X	
graphics		X				X		
pictures						X		
borders			X		X			
background					X			
Grouping			X					
symmetrical			X					
asymmetrical			X					
proximity			X					
alignment			X					
boundary			X					
enclosure			X					
connection.			X					

Flag								
native							X	
foreign							X	
multiple.							X	
Language								
native							X	
foreign							X	
multiple.							X	
Geography								
maps							X	
outline							X	
globe.							X	
Orientation		X						
centered		X	X					
left-right		X	X					
right-left.		X	X					
Sound								
music							X	
voice.							X	
Font								
cursive				X				
italics				X				
bold				X				
size				X				
shading.				X				
Links								
color					X			
embedded								I
stand alone								I
internal external.								I
Regional								
foliage							X	TS
animals							X	TS
landscape							X	TS
water							X	TS
desert.							X	TS
Shapes								
squares							X	
circles							X	
triangles							X	
rectangles							X	
lines							X	
arrows.							X	
Architecture								
state building							X	
house							X	
church							X	
Office							X	
cityscape		x					X	

Table B-5.3
Classification of the graphical design elements of the study of Callahan (2005)

Callahan (2005)			**Design**				**C**	**O**
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
Entry page	A page that does not contain any links except of the link to the home page. Also pages that contain only links to multiple linguistic versions of the home page.						x	
Page orientation (vertical horizontal)	The web page design is organized to fit the screen (horizontal), or allows vertical scrolling. (Since the screen sizes vary, the page orientation was determined on the basis of the intention of the designer to fit the information on one screen, rather than physical properties of the site.)	x	X					
Symmetry (yes/no)	The web page design is symmetrical or not.		X					
Page orientation	Description of how the information on the page is organized.		X					
Menus	Description of the menus on the page.		X					
Number of links	Total number of links (including those on the menus) are counted for each page.	x		X				
Number of Pictures	Total number of pictures (photos and graphics) on the homepage. Buttons or menus do not count as graphics, but photos used as links do.					X		
Color scheme	The color of the background and the most prominent colors on the page are noted.	x			X			
Collage (yes no)	A photo composed of photos or graphics in which separate border for each of the components cannot be distinguished. Pictures composed of several photos or graphics when the borders of each photo can easily be seen would be counted as single pictures.						X	
Animated (yes no)	All animated pictures as well as slideshows activated on download or mouse click.	x				X		
Modality of pictures (high medium low)	Degrees of modality: High — highly saturated colors, clear pictures Medium — medium and low saturated colors, blurred pictures Low — black and white or two tonal images							S
Pictures (logo person building art nature artifact)	If the picture depicted a human it was also categorized as ‘‘figurative.’’ This category included persons as well as logos and art pieces that depicted a human being. Figurative images were analyzed further according to the number (single, group), gender (male, female, mixed, unidentified), status(student, faculty, mixed, unidentified), activity (descriptive) and social distance (intimate, close personal, far personal, close social, far social, public) of the figures.						X	

Table B-5.4
Classification of the graphical design elements of the study of Juric et al., (2003)

Juric et al., (2003)		**Design**					**C**	**O**
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
Verbal attributes:								
Language							X	
Formats							X	
time date							X	
telephone numbers							X	
addresses							X	
currency							X	
printing format							X	
size							X	
units of measurement.							X	
Visual attributes:								
Image						X		
photographic						X		
symbolic						X		
Iconic						X		
indexical						X		
Others						X		
Colour					X			
Background colour					X			
text colour					X			
Title/ body colour				X	X			
link: unvisited colour				X	X			
link: visited colour				X	X			
graphics						X	X	
others					X			
Text				X				
typeface				X				
size				X				
others				X				
Layout			X					
menu		X	X					
tables			X					
Placement of menus		X	X					
Logos			X			X		
Graphics			X					
Images			X			X		
Audiovisual attributes:								
Sound							X	
music							X	
voice							X	
others							X	
Animation		X				X		
3D						X		

Table B-5.5
Classification of the graphical design elements of the study of Kim & Kuljis (2007)

Kim & Kuljis (2007)		**Design**					**C**	**O**
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
Information								
Job openings		x					X	
Volunteer demand		x					X	
Last update indicator							X	
What the donation is used for		x					X	
Donators' list		x					X	
Secure access information							X	
Text only version							X	
Links to other sites.							X	
Visual design								
Colour					X			
Background					X			
Frame								X
Hyperlink				X				
Logo			X			X		
Text.				X				
Images: # of images						X		
Screen resolution: 1024*768			X					
Page Lay-out			X					
Type of menu			X					
static/drop down / drop down when mouse over		X	X					
The position of main menu on the grid			X					
The position of donation on the grid		X						TS
Navigation of main menu	Horizontally focused / Vertically focused		X					
User input								
Message board		X					X	
Online community		X					X	
Personalisation		X					X	
Online poll							X	
Email/ location address.		X					X	
Multimedia							X	
Use of multimedia		X				X		

Table B-5.6
Classification of the graphical design elements of the study of Kim, Coyle & Gould (2009)

Kim, Coyle & Gould (2009)		**Design**					**C**	**O**
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
Interactive Features								
Rollovers		X						I
Pull-downs		X						I
Pop-up windows		X						I
Splash pages		X						I
Hypertext Links.				X				
Graphic Features								
Clickable images		X				X		
Animated images		X				X		
Streaming video.		X				X		

Table B-5.7
Classification of the graphical design elements of the study of Robbins & Stylianou (2003)

Robbins & Stylianou (2003)		**Design**					**C**	**O**
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
Content features								
Corporate information							X	
Biographical sketches		X					X	
History		X					X	
Message from CEO		X					X	
Mission statement							X	
Organizational charts							X	
Press releases		X					X	
Vision statement							X	
Communication/cust. Sup.							X	
Corporate phone number							X	
E-mail opportunity		X					X	
Frequently asked questions		X					X	
Headquarters address		X					X	
On-line chat with an expert.							X	
Currency							X	
Current content		X					X	
Last updated indicator.							x	
Financial information							X	
Annual report		X					X	
Financial highlights.		X					X	
Employment opportunities							X	
Employment overview		X					X	
Job openings.		X					X	
Social issues							X	
Cookie disclosure		X					X	
Cultural sensitivity		X					X	
Language translation		X					X	
Privacy issues		X					X	
Social responsibility							X	
Design features								
Presentation			X			X		
Animation						X		
Frames								TS
Graphics						X		
Sound							X	
Video							X	
Navigation								
Hyperlinks to other sites							X	
Protected contents			X				X	
Search engine		X	X				X	
Site/map/index							X	
Security								
Secure access.		X						I
Speed								
Download time of home page								I
Download time between page.								I
Tracking								
Use of cookies		X						I

Table B-5.8
Classification of the graphical design elements of the study of Tong & Robertson (2008)

Tong & Robertson (2008)			**Design**				**C**	**O**
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
Language								
Bahasa Malay							x	
English							x	
Mandarin.							x	
Layout								
Banner Top			X					
Menu	Top/Left/Top-left/		X					
Button	Text							TS
Search	English/Bahasa Malay		X					
Orientation	Left-right / Center		X					
Shape	Square		X					
Grouping	Symmetrical.		X					
Symbol								
Logotype						X		
Logo symbol						X		
byline	English			X			X	
Position	Top-right/top-left							
Color					X			
white								TS
red								TS
blue								TS
background	white.							TS
Image						X		
group								TS
malay								TS
Chinese								TS
Indian								TS
Architecture	building							TS
Texture | Malay.								TS
Sound/music								
Bahasa Malay							X	
English							X	

Table B-5.9
Classification of the graphical design elements of the study of Würtz (2005)

Würtz (2005)			**Design**				**C**	**O**
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
Animation		X				X		
Promotion of values		X					X	
Individuals separate or together with the product		X					X	
Level of transparency		X					X	
Linear vs. parallel navigation on the web site		X					X	

Table B-5.10
Classification of the graphical design elements of the study of Würtz (2005)

Zhao et al., (2003)			**Design**				**C**	**O**
Item	**Operationalization**	**Diff.**	**SO**	**T**	**C**	**M**		
Design-structure attr.								
Search engine			X					
Site map							X	
Help function							X	
Animated content		x				X		
Floating banner		x	X			X		
Content attr.								
Personalisation		x					X	
Organisational history		x					X	
Organisational achievements		x					X	

6. Group the graphical elements and eliminate double elements

After all the graphical elements were divided into one of the four design categories or content or other category, here the design graphical elements are grouped into four tables; these tables represent the four categories that provide the graphical element, the author and whether a difference was found in that study. This gives us a better overview of the graphical elements in all the categories.

Table B-6.1
Overview of elements in the spatial organization category

Item	Author	Diff.	Item	Author	Diff.
# of lines	Barber & Badre		Menu	Juric	x
#of centers	Barber & Badre		Tables	Juric	
Horizontal bars	Barber & Badre		Placement of menu	Juric	x
Tables	Barber & Badre		Placement of logo	Juric	
Frames	Barber & Badre		Placement of graphics	Juric	
Borders	Barber & Badre		Placement of images	Juric	
Symmetrical	Barber & Badre		Logo	Kim & Kuljis	
Asymmetrical	Barber & Badre		Screen resolution	Kim & Kuljis	
Proximity	Barber & Badre		Page lay-out	Kim & Kuljis	
Alignment	Barber & Badre		Type of Menu	Kim & Kuljis	x
Boundary	Barber & Badre		Position of the main menu on the grid	Kim & Kuljis	
Enclosure	Barber & Badre		Navigation of the main menu	Kim & Kuljis	
Connection	Barber & Badre		Protected content	Robbins & Stylianou	
Orientation	Barber & Badre	x	Search engine	Robbins & Stylianou	x
Centered	Barber & Badre		Banner placement	Tong	
Left-Right	Barber & Badre		Menu Placement	Tong	
Right-Left	Barber & Badre		Button text	Tong	
Page orientation	Callahan	x	Search	Tong	
Symmetry	Callahan		Orientation	Tong	
Page Orientation	Callahan		Shape of the Website	Tong	
Menus	Callahan		Grouping / Symmetrical	Tong	
Lay-out	Juric		Search Engine	Zhao	

Table B-6.2
Overview of elements in the text design category

Item	Author	Diff.	Item	Author	Diff.
# of lines	Barber & Badre		Number of links	Callahan	x
# of links	Barber & Badre		Text colour	Juric	
# of external links	Barber & Badre	x	Title / body colour	Juric	
# of internal links	Barber & Badre		Link:unvisited colour	Juric	
Bold	Barber & Badre		Link:visited colour	Juric	
Italic	Barber & Badre		Text	Juric	
Underlines	Barber & Badre		Typeface	Juric	
Text color	Barber & Badre		Typesize	Juric	
Cursive	Barber & Badre		Hyperlink	Kim & Kuljis	
Italics	Barber & Badre		Text	Kim & Kuljis	
Bold	Barber & Badre		Hypertext links	Kim, Coyle & Gold	
Size	Barber & Badre		Logo type	Tong	
Shading	Barber & Badre				

Table B-6.3
Overview of elements in the color category

Item	Author	Diff.	Item	Author	Diff.
Link color	Barber & Badre		Colour	Juric	
Visited link color	Barber & Badre		Background colour	Juric	
Background image	Barber & Badre		Text colour	Juric	
Background color	Barber & Badre		Title / body colour	Juric	
Text color	Barber & Badre		Link:unvisited colour	Juric	
Colors	Barber & Badre	x	Link: visited colour	Juric	
Border color	Barber & Badre		Other Colours	Juric	
Background color	Barber & Badre		Colour	Kim & Kuljis	
Link color	Barber & Badre		Background	Kim & Kuljis	
Color scheme	Callahan	x	Color	Tong	

Table B-6.4
Overview of elements in the multimedia category

Item	Author	Diff.	Item	Author	Diff.
Graphic orientated	Baack & Singh		Animation	Juric	
# of images	Barber & Badre	x	3D	Juric	
Video	Barber & Badre		Logo	Kim & Kuljis	
Background image	Barber & Badre		Number of images	Kim & Kuljis	
Number of pictures	Callahan		Clickable images	Kim, Coyle & Gold	x
Animated	Callahan	x	Animated images	Kim, Coyle & Gold	x
pictures	Callahan		Streaming video	Kim, Coyle & Gold	x
Images	Juric		Animation	Robbins & Stylianou	
Photographic	Juric		Graphics	Robbins & Stylianou	
Symbolic	Juric		Video	Robbins & Stylianou	
Iconic	Juric		Logo symbol	Tong	
Indexical	Juric		Image	Tong	
Others	Juric		Animation	Wurtz	x
Graphics	Juric		Animated content	Zhao	x
Logos	Juric		Floating banner	Zhao	x
Images	Juric				

After all the elements were grouped into the four categories as shown in the tables above, a further division was made to divide the graphical elements into smaller groups while both the spatial organization and multimedia categories were too big to cluster as one category and still make sense as a category due to the differences of the graphical elements. The tables below represent all the graphical elements split into the categories as used in this study. Here the classification into subcategories is made; this is done by dividing the total category by four subcategories. When making this division it's important to note that some elements

overlap between categories, e.g. animation, which is both taken up in spatial organization as in multimedia, these graphical elements will be included in one group and excluded in the other, in the example of animation this will be taken up by the multimedia category. Furthermore, some variables were excluded while we believe these do not fully suit this research, e.g. architecture, while the amount of websites is too small to have a good representation of this as a graphical element.

Table B-6.5
Overview of the groups of the spatial organization category

Lay-out	**Orientation**	**Placement**	
# of lines	Orientation*	Menus	
# of centers	Centered	Menu*	
Horizontal bars	Left-Right	Placement of menu*	
Tables	Right-Left	Placement of logo	
Frames	Page orientation*	Placement of graphics	
Borders	Page Orientation	Placement of images	
Symmetrical	Orientation	Type of Menu*	
Asymmetrical		Position of the main menu on the grid	
Proximity		Position of the donation grid*	
Alignment		Navigation of the main menu	
Boundary		Protected content	
Enclosure		Search engine*	
Connection		Banner placement	
Symmetry		Menu Placement	
Lay-out		Search	
Tables		Search Engine	
Logo			
Screen resolution			
Page lay-out			
Shape of the Website			
Grouping / Symmetrical			

Table B-6.6
Overview of the groups of the text design category

Text presence	**Text**	**Links**	**Text color**
# of lines	Bold	Link:visited colour	Text color
# of links	Italic	Link:unvisited colour	Text colour
# of external links*	Underlines	Link text	Title / body colour
# of internal links	Text color	Link Typeface	Visited link color
Number of links*	Cursive	Link Typesize	Link color
Hypertext links	Italics	Hyperlink	Link:unvisited colour
	Bold		Link: visited colour
	Size		Link color
	Shading		
	Text		

Table B-6.7
Overview of the groups of the color category

Color scheme	Background
Colors*	Background image
Border color	Background color
Color scheme*	Background color
Colour	Background colour
Other Colours	Background
Colour	
Color	

Table B-6.8
Overview of the groups of the multimedia category

Images	Animation	Video	Logo
Graphic orientated	Animated*	Video	Logos
# of images*	Animation	Video	Logo
Number of pictures	Animation	Streaming video*	Logo symbol
pictures	Animation*		Logo type
Images	Animated content*		
Photographic	Floating banner*		
Symbolic			
Iconic			
Indexical			
Others			
Graphics			
Images			
3D			
Number of images			
Clickable images*			
Animated images*			
Graphics			
Images*			

After the items were classified into sub categories, they were regrouped to prevent overlap between items. The following tables will present the items as gathered from the content analysis in the first column, the second column will provide the name that describes the similar items and will be used throughout the rest of this study.

Table B-6.9
Overview of the spatial organization items of the content analysis and their new item names.

Lay-out		**Placement**	
# of lines	Number of lines	Menus	**Menu placement**
# of centers	Number of centers	**Menu**	
Horizontal bars	Division of content	**Placement of menu**	
Tables		Menu Placement	
Tables		Position of the main menu on the grid	
Frames		**Type of Menu**	Type of menu
Borders		Navigation of the main menu	Menu orientation
Symmetrical	Symmetry	Placement of logo	Logo placement
Asymmetrical		Logo	
Symmetry		Placement of graphics	Placement of images
Grouping / Symmetrical		Placement of images	
Screen resolution	Dimensions of website	Protected content	Placement of protected content
Proximity	Content alignment	Search engine	Position of search engine
Alignment		Search	
Boundary		Search Engine	
Enclosure		Banner placement	Banner placement
Connection			
Lay-out	Page lay-out		
Shape of the Website			
Page lay-out			
Orientation			
Orientation	**Orientation**		
Centered			
Left-Right			
Right-Left			
Page orientation			
Page Orientation			
Orientation			

Table B-6.10
Overview of the text design items of the content analysis and their new item names.

Text presence		**Text**	
Text	Number of text lines	Bold	Text Typography
# of lines		Italic	
# of links	**Number of links**	Underlines	
# of external links		Cursive	
# of internal links		Italics	
Number of links		Bold	
Hypertext links		Text color	
		Text	
		Size	Text size
		Shading	Text shading
		Text colour	Text color
		Title / body colour	Title color
Links		**Text color**	
Link:visited colour	Link color	Text color	Text color
Link:unvisited colour		Text colour	
Link text	Link Typography	Title / body colour	Title / body color
Link Typeface			
Link Typesize			
Hyperlink			

Table B-6.11
Overview of the color items of the content analysis and their new item names.

Color scheme		**Background**	
Colors	**Color**	Background	Background
Colour		Background color	Background color
Other Colours		Background color	
Colour		Background colour	
Color		Background image	Background image
Color scheme	**Color scheme**		
Border color	Border color		

Link color	
Visited link color	Link color
Link color	
Link:unvisited colour	
Link: visited colour	
Link color	

Table B-6.12
Overview of the multimedia items of the content analysis and their new item names.

Images		**Animation**	
Graphic orientated	Graphic orientated	**Animated**	**Animation**
# of images	**Number of images**	Animation	
Number of pictures		Animation	
pictures		**Animation**	
Images		**Animated content**	
Photographic		**Animated images**	
Graphics		**Floating banner**	**Floating banner**
Images			
Number of images			
Clickable images			
Graphics			
Images			
3D	3D		
Video		**Logo**	
Video	Video	Logos	Logo
Video		Logo	
Streaming video		Logo symbol	
		Logo type	

7. Selection of the graphical elements that suit our research goal

The graphical elements that could be useful to study differences were grouped in the previous sections, now we want to exclude the elements that will make the content analysis too strenuous to perform within a reasonable timeframe, for instance number of lines would constitute such an element while counting all the lines on a webpage would be too time consuming. All the elements that do not have a description behind them are taken up in the study. All the ones that are excluded have a reason behind them why they were not included. Some variables will be pointed out as not included, however

Table B-7.1
Graphical item reduction of the spatial organization items

Graphical element	Operationalization	Include	Reasoning	New operationalization
Lay-out				
Number of lines	The number of text lines on a website	No		
Number of centers	The number of centers on a website	No	Too time consuming to count all the lines	
Division of content	How is the lay-out separated through the use of tables, frames borders	No	Due to the use of CSS there is not much use anymore for tables and frames thus this is deprecated	
Symmetry	How symmetrical is the website	Yes	Symmetry was found to be avoided in some countries therefore there might be some countries that use symmetry a lot	
Content alignment	How are the units of content spread over the website	No	Too difficult to categories	
Page lay-out	The shape of the website	Yes	Is the website a square or does it have another shape	
Dimensions of website	The dimensions of the website (mainly height)	Yes		
Placement				
Menu placement	Where the menu is on the website	Yes		
Type of menu	What kind of menu is the menu	No		
Menu orientation	What is the orientation of the menu	Yes		
Logo placement	Where is the main logo placed	Yes		
Placement of images	Where are the images placed	Yes		
Placement of protected content	Where is the button for the protected content placed	No		
Position of search engine	Where is the position of the search engine placed	Yes		
Banner placement	Where are the banners placed	No	Too time consuming	
Orientation				
Orientation	How is the website orientated	Yes		

Table B-7.2
Graphical item reduction of the text design items

Graphical element	Operationalization	Include	Reasoning	New operationalization
Text presence				
Number of text lines	The number of text lines on the website	No	Too time consuming to count all the lines on a website.	Amount of text on the website. High / medium / low
Number of links	The number of links on the website	No	Too time consuming to count all links	
Text				
Text typography	Typography used by the website	Yes		
Text size	Size of the text	Yes		
Text Shading	Text shading	No	Too specific	
Text color	Color of the main text	Yes		
Title color	Text color of the headline	Yes		
Title body color	What is the color of the main title	Yes		
Links				
Link color	Most used link color	Yes		
Link Typography	Typography of the most used links	Yes		

Table B-7.3
Graphical item reduction of the color items

Graphical element	Operationalization	Include	Reasoning	New operationalization
Color scheme				
Color	Color of the website	Yes		
Color scheme	Color scheme of the website	Yes		
Border color	Color of the border	No	Deprecated thus obsolete	
Background				
Background	Is the background an image or merely a color	Yes		
Background color	What is the color of the background	Yes		
Background image	Is there a background image	Yes		

Table B-7.4
Graphical item reduction of the multimedia items

Graphical element	Operationalization	Include	Reasoning	New operationalization
Images				
Graphic orientated	Are there many images on the website	Yes		
Number of images	How many images are on the website	No	Too time consuming	
3D	Are there 3d images on the website	No	Too little use on homepages	
Animation				
Animation	Are there moving images on the website			
Floating banner	Are there may floating banners on a website			
Video				
Video	Are there videos on the website			
Logo				
Logo	Are there logos on the website and how do these look			

8. Graphical elements that were not included in the content analysis

Some additional graphical elements were added which were not found in the relevant literature. These were added because it is believed these will differ between the countries and are not difficult to measure objectively. Table B-8.1 provides the graphical elements that will be added to the comparative content analysis coding book.

Table B-8.1
Graphical item that are taken up in the study that were not found in the content analysis

Spatial organization	**Text**
Number of content areas Number of columns	Number of fonts
Color	**Multimedia**
Menu color	Number of pictures

The spatial organization items that were added after reviewing Dongs' study on users' perception of a webpage with a focus on the cognitive styles (Dong & Lee, 2008). On the basis of Nisbett's theory of cultural cognition (Nisbett, Choi, Peng, & Norenzayan, 2001) Dong (2008) found that there was a difference in viewing patterns between holistically and analytically minded people. Holistically minded people, Koreans in the study, try to obtain a global picture of field and context, in contrast to the analytically minded people, who focused more on different specific objects. Dong (2008) therefore claims that designs for holistically minded people, the content can be placed more freely than for analytically minded people. For analytically minded people the content should be clear and simple. Therefore, we are interested in seeing whether there are more areas of content and columns on the homepages, as this makes the webpage less clear due to the larger division of content. The same reasoning is used to include the item, number of pictures, it would be of interest to learn if homepages for analytically minded people have less pictures than homepages for holistically minded people.

The other items were added as these were not explicitly mentioned in any other content analysis, but we believe that these could be significantly. In table B-8.2 all items are presented, plus the questions we are interested in per item.

Table B-8.2
Study query per graphical web design element

	Query
Spatial organization	
Lay-out	
Symmetry	Is 75% of the vertical alignment of the website divided symmetrically
Page lay-out	What is the reading direction of the website
Dimensions of website	What is the height and width of the images (taken of the website with snapshot ™)
Number of content areas	How many areas of content are there on the homepage
Number of columns	How many columns are used on the website in the largest part of the website.
Placement	
Menu placement	In which section of the website is the menu situated, the website is divided into 9 blocks
Menu orientation	What is the orientation of the menu, horizontal is from left to right, vertical is from top to bottom.
Menu corners	The menu has square or rounded corners
Logo placement	In which section is the main logo of the website situated
Placement of main image	In which section is the main image situated on the website
Placement of protect content	In which section is the login button of the protected content placed
Position of search engine	In which section is the first search field when scanning from top left to bottom right situated.
Orientation	
Orientation	Is the website vertically or horizontally orientated
Text design	
Text presence	
Amount of text	Is the website mainly text more than 60% textual or image more than 60% images driven or both, neither has the upper hand
Text	
Typography	Which type of typography is used for the body text
Text color	What type of color is used for the main body text
Title color	What type of color is used for the main title color
Number of fonts	Are there many different fonts used on the website (ads not taken into account)
Links	
Link typography	What is the typography of the main link
Link size	What is the link size of the main link
Link color	What is the color of the links used on the website
Color	
Color scheme	
Color	What is the main colors used on the website?
Color scheme	What are the three main colors used on the website?
Menu color	
Menu color	What is the color of the main menu, if multiple then choose color of biggest surface
Background	
Background	What type of background does the webpage have? Image or color (fading = image)
Background color	What is the color of the background
Background image	What kind of image does the background contain

Multimedia	
Images	
Graphic orientated /number of pictures	Are there a large number of images on the homepage.
Animation	
Animation	Is there animation on the website (excluding commercials)
Floating banners	Are there floating banners on the website
Video	
Video	Is there a video on the website or a link to a streaming video on the website.
Logo	
Logo	What is the main logo on the website? A text logo, image logo or a combination

9. Initial draft of the operationalization of the graphical elements used in this research.

Table B-9.1 provides the operationalization of the graphical elements that we deem need to be included in the content analysis. If the graphical element was extracted from the relevant literature, the article it stems from is also mentioned in the table.

Table B-9.1
Initial draft of the operationalization of the graphical elements.

	Operationalization	Sourced article
Spatial organization		
Lay-out		
Symmetry	Is the homepage symmetrical	(Barber & Badre, 1998; Callahan, 2005; Tong & Robertson, 2008)
Page lay-out	How is the page aligned in the browser	
Dimensions of website	What are the pixel dimensions of the website	
Number of content areas	How many areas of content are there on the homepage	(Dong & Lee, 2008)
Number of columns	Is the homepage split into 2, 3 or more columns	(Barber & Badre, 1998; Callahan, 2005; Tong & Robertson, 2008)
Placement		
Menu placement	Where is/ are the menu's placed	
Menu orientation	In which part of the website is the menu positioned. Menu item orientation: Horizontally: On the same height Vertically: underneath each other	(Callahan, 2005; Juric, et al., 2003; Tong & Robertson, 2008)
Menu corners	The menu has square or rounded corners	
Logo placement	What is the position of the central logo of the website	
Placement of multimedia	Where are the multimedia items placed	
Position of search engine	What is the position of the first search engine when searching from top to bottom	(Robbins & Stylianou, 2003; Zhao, et al., 2003)
Orientation		
Orientation	How is the webpage orientated, Reading direction. Aspect ratio of the content of the website, Horizontally: thus is the length of the content is longer than the width of the content, or Vertically: the length of the content of the website is shorter than the width of the content. The website arrangement in the browser window	(Barber & Badre, 1998; Callahan, 2005; Tong & Robertson, 2008)
Text design		
Text presence		
Amount of text	The amount of text is 25%, 50% or 75% of the homepage	
Text		
Typography	What is the typeface type, there are five typefaces available in this research. Serif: with decorative details	

	Sans serif: without decorative details Mimicry: this mimics other well known typefaces (such as Arabic for instance) Script: calligraphic font or otherwise looking like a "real" person wrote them	
Text color	Color of the body text	(Barber & Badre, 1998; Juric, et al., 2003)
Title color	Color of the title text	(Barber & Badre, 1998; Juric, et al., 2003)
Number of fonts	How many fonts are used on the website, a font in this definition is accounted for as: Not being an image Not used in a banner of for commercial purposes. A font is counted when it differs in height, weight, style and color from other fonts	
Links		
Link typography	What is the typeface of the links, there are five typefaces available in this research. Serif: with decorative details Sans serif: without decorative details Mimicry: this mimics other well known typefaces (such as Arabic for instance) Script: calligraphic font or otherwise looking like a "real" person wrote them	
Link size	Font size of the hyperlinks	(Barber & Badre, 1998)
Link color	Color of the hyperlinks	(Barber & Badre, 1998)
Color		
Color scheme		
Color	Main color of the website	
Color scheme	Color scheme of the website	(Callahan, 2005; Kondratova & Goldfarb, 2006)
Menu color		
Menu color	The color of the menu	
Background		
Background color	Color of the background	
Background image	Is the background an image or a flat color	(Barber & Badre, 1998)Barber & Badre, Juric, Kim (2007), Tong
Multimedia		
Images		
Graphic orientated /number of pictures	The number of images (photos and drawings on the website, excluding logos)	(Barber & Badre, 1998; Callahan, 2005; Kondratova & Goldfarb, 2009)
Animation		
Animation	The number of animation on the website excluding the commercially used multimedia	(Callahan, 2005)
Floating banners	The number of floating banners on the website	
Video		
Video	The number of video's on the website excluding the commercially used multimedia	
Logo		
Logo	What kind of logo is used on the website	

After the initial draft the instrument was tested to see whether the graphical elements were clear and not time consuming to code. The author and an initial coder were provided with the initial coding scheme, they both coded five websites and compared scores. This lead to several changes in the graphical elements used. Table B-9.2 provides an overview of the initial draft of elements and when the graphical elements were discarded the thought process for this is provided. Some graphical elements were not taken up but an alternative was chosen in favor of the initial graphical element.

Table B-9.2
Revision choices of initial draft of the graphical elements.

	Include	Change
Spatial organization		
Lay-out		
Symmetry	Yes	Specific amount of the homepage should be symmetrical, we chose two thirds as this is more than half of the homepage and still easy to judge.
Page lay-out	Yes	Changed to page alignment
Dimensions of website	Yes	
Number of content areas	No	Too subjective, we came to the conclusion the description of area of interest is too difficult in real websites in comparison to the study of Dong & Lee (2008) were they had full control over the number of areas of interest. No alternative was sought.
Number of columns	No	Too difficult in real websites due to use of multiple column lay-outs
Placement		
Menu placement	Yes	
Menu orientation	Yes	
Menu corners	Yes	
Logo placement	Yes	
Placement of multimedia	Yes	Only the main image would be taken in account, the number of images on a website was too time consuming to classify
Position of search engine	No	Difficult to reach consensus while several homepages had more than one search engine box
Orientation		
Orientation	Yes	
Text design		
Text presence		
Amount of text	Yes	Changed to text to image ratio as counting the number of lines is too time consuming
Text		
Typography	Yes	Changed into the typeface of the main body text
Text color	Yes	
Title color	Yes	
Number of fonts	No	Too time consuming
Links		

Link typography	Yes	
Link size	No	Too difficult
Link color	Yes	

Color		
Color scheme		
Color	Yes	Changed to main color
Color scheme	No	Too difficult to reach statistical inference on while consensus was difficult to obtain, changed to main color, which provided the main color of the website
Menu color		
Menu color	Yes	
Background		
Background color	Yes	Changed to background color and color of the content container
Background image	Yes	

Multimedia		
Images		
Graphic orientated /number of pictures	Yes	Changed to text to image ratio as counting the number of images is too time consuming
Animation		
Animation	No	Cannot be taken up in the study as these will not be able to be used in the stimuli
Floating banners	No	Cannot be taken up in the study as these will not be able to be used in the stimuli
Video		
Video	No	Cannot be taken up in the study as these will not be able to be used in the stimuli
Logo		
Logo	Yes	

10. Graphical web design elements used in this comparative content analysis

The final operationalization of the elements used is presented in table B-10.1. Here all the graphical web design elements that are used in the comparative content analysis are presented as well as their operationalization.

Table B-10.1
The operationalization of the graphical elements used in the comparative content analysis

	Operationalization
Spatial organization	
Symmetry	Two thirds of the container of the website is vertically symmetrical.
Page alignment	The page is aligned on the left, in the center or on the right.
Menu placement	The menu is situated within this part of the container of the homepage.
Menu orientation	The menu is either horizontally orientated, from left to right or vice versa or the menu is vertically orientated thus from top to bottom or vice versa.
Menu corners	Are the corners of the menu angular or rounded or are there no corners
Logo placement	In which section of the website is the logo of the city / newspaper / university situated? Thus not the logo of the website but the logo of the city / newspaper / university
Placement of the main image	In which section is the main image situated? E.g. the most prominent image
Orientation	Is the website vertically or horizontally orientated (thus is the width < length of the homepage)
Dimensions of the website	The dimension of the homepage in pixels in height and width
Text design	
Typography	The most prominent font of the homepage is in: Sans serif, Serif, Sans serif & serif, Mimicry, or other typography.
Text color title	The color of the most prominent title of the homepage
Text colors text	The color of the most used text (body text) of the homepage
Link typography	The most prominent font of the links of the homepage is in: Sans serif, Serif, Mimicry, or other typography.
Link colors	Color of the most used link type of the homepage
Color	
Main color	The color most used on the homepage. customarily, black and white are not colors, unless this really sticks out
Menu color	The color of the menu
Menu gradient	The menu uses a gradient as part of its background
Background color	The background color of the entire homepage
Background image	The website uses a background image or does it merely use a color
Background container color	The color of the background of the container of the homepage
Multimedia	
Text to image ratio	The ratio between text and images 25 to 75, 50 to 50 and 75 to 25
Logo	What kind of logo is used, one with only an image, only text, or a combination of both text and image

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Appendix C

The coding workbook

This appendix provides the coding scheme used to analyze the 90 sleected homepages. First the coding document with which the websites were coded is provided. Thereafter, the description is provided to show what was provided to the coders to assess in which category a homepage would fall when looking at the graphical element in question.

As can be seen on the next page, within the spatial organization category the placement of content items is divided into nine classes. The classes range from 1, being the top left of the homepage to 9, which is the bottom right of the homepage. For a better understanding of this type of scoring see the description of menu placement, which provides a detailed description when a certain number has to be picked when the content element is at a certain location on the website.

Furthermore, with the choices of color in both the text as well as the color category, eleven colors could be chosen to appoint a certain color to that graphical element. The colors are presented under the coding workbook.

NL / SK / USA UNI / NEWS / MUN Name:

Spatial organization	Operationalization
Lay-out	
Symmetry	Yes / no
Page Lay-out	Left / Center / Right
Placement	
Menu placement	1 2 3 4 5 6 7 8 9
Menu orientation	Horizontal / Vertical
Logo placement	1 2 3 4 5 6 7 8 9
Placement of main image	1 2 3 4 5 6 7 8 9
Orientation	
Orientation	Horizontal / vertical

Text	Operationalization
Text	
Typography	Sans serif / serif / Mimicry / other
Text size	
Text color	
Title color	
Menu type color	
Links	
Link typography	
Link size	
Link color	
Text to image ratio	

Color	Operationalization
Color scheme	
Color	
Background	
Background color	
Background image	Yes / No
Background container color	

Multimedia	operationalization
Image	
Text to image ratio	10/90 25/75 50/50 75/25 90/10
Logo	
Logo	1 only an image 2 only text 3 a combination

Colors to choose from

1. White
2. Pink
3. Red
4. Orange
5. Yellow
6. Green
7. Blue
8. Purple
9. Brown
10. Grey
11. Black

Graphical element	Description
Symmetry	Is 66% of the container of the website vertically symmetrical.
Page Alignment	Is the page aligned on the left, in the center or on the right.
Menu placement	Where is the menu situated within the container? The menu is where in most cases the home button is situated. If the left corner of the menu is situated on the extreme left of the container and does not flow until the entire container is filled then it is either 1 - 4 – 7. If the left corner is not situated on the extreme left, then if it does not run until the end of the container then 2 - 5 – 8, the same thing goes if the container takes up the width of the container. If the menu does not start on the extreme left of the container but does end on the extreme right then either 3 - 6 – 9. Pay close attention to visually distinct items in the menu, that might look like menu items but are not (for instance items that are in a different font face or aligned differently from the other menu items
Menu orientation	Is the menu horizontally orientated or vertically orientated.
Menu corners	Are the corners of the menu angular or rounded or are there no corners
Logo placement	In which section of the website is the logo of the City / Newspaper / university situated? Thus not the logo of the website but the logo of the city / newspaper / university
Placement of the main image	In which section is the main image situated? E.g. the most prominent news image
Orientation	Is the website vertically or horizontally orientated (thus is the width < length of the website)
Typography	Sans serif Serif *Mimicry or other* of the most prominent fonts of the website
Text color title	Color of the most prominent title of the webpage
Text colors text	Color of the most used text (body text) of the webpage
Link typography	Sans serif Serif *Mimicry or other* of the most prominent link fonts of the website
Link colors	Color of the most used link type of the webpage
Main Color	Color most used on the website (normally black and white are not colors, unless this really sticks out
Menu Color	The color of the menu
Background Color	What is the background color of the entire website
Background Image	Does the website use a background image
Background container color	What is the color of the container of the website
Text to Image ratio	What is the ratio between text and images (difficult)
Logo	What kind of logo is used, one with 1 only an image only text a combination

Appendix D

Determining country specific graphical web design elements.

Introduction

After checking the reliability of the operationalization of our graphical elements was done, the next step was to perform the comparative content analysis to check whether there were country specific and domain specific graphical web design elements. Normally such an analysis would be performed with a loglinear analysis, as this statistical test also provides information about the interaction effect, however most of the data did not meet the assumption of an expected frequency of at least five. Therefore, instead of the loglinear analysis, Chi-square test and Fisher's exact tests were performed. The chi-square tests were performed when the expected frequency was at least five in 80% of the cells, when this assumption was not met a Fisher's exact test was performed.

Some of the graphical element scores were simplified to make comparisons between countries and domains more useful and to increase the expected cell count. For instance, the placement of several content areas were not divided into nine areas, as done in the intercoder reliability analysis, but into three, left, center, and right. For a better understanding of the coding, see appendix C for the coding workbook used to analyze the homepages. In the next chapter the chi-square test scores will be provided along with whether the scores of the intercoder reliability were kept or if the scores were simplified to increase expected cell count. It will also provide a description as to how the scores were simplified and reveal the reasoning behind it.

1. Results content analysis of the homepages

Table D-1 shows the results of the comparative content analysis. As can be seen, in total 90 homepages were analyzed. Images of these homepages can be viewed on the accompanying USB-stick in the folder.

Table D-1.
The results of the comparative content analysis

			Country		Domain	
	df	*N*	χ^2	*p*	χ^2	*p*
Spatial organization						
Symmetry	2	90	.818	.754	7.476	.027
Page alignment	2	90	1.064	.696	9.274	.010
Menu placement[1]			-	.013	-	.053
Menu orientation	2	90	3.360	.285	1.920	.439
Menu corners	2	90	7.917	.028	12.917	.001*
Logo placement[1]			-	.708	-	.213
Placement of the main image[1]			-	.007	-	.247
Orientation	2	90	8.086	.022	24.037	.000*
Dimensions of the website[2]			(F)5.247	.007	(F)68.044	.000
Type						
Typography[1]			-	.221	-	.000
Link typography	3	90	9.730	.007	15.203	.001
Color						
Text color title[1]			-	.038	-	.037
Text colors text[1]			-	.121	-	.000
Link colors[1]			-	.000	-	.000
Main color [1]			-	.011	-	.096
Color scheme			-		-	
Menu color [1]				.020	-	.293
Menu gradient	2	90	4.822	.114	.394	.886
Background color	2	90	9.989	.005	5.043	.082
Background image	2	90	1.406	.589	7.897	.022
Background container color[1]			-	.031	-	.198
Multimedia						
Text to image ratio[1]			-	.030	-	.002
Logo[1]			-	.857	-	.000

[1] Fisher's exact test, [2]F statistic instead of χ^2

In the next sections, the differences between the countries and domains will be discussed. First, the coding workbook will be discusses as well as which scales were simplified to increase the cell count. Second, the graphical elements that were different merely on the country level will be discussed. These are followed by the graphical elements that were different on both the country and domain level. Last, the graphical elements that were different on merely the domain level will be discussed.

2. Revising the coding workbook for comparative analysis

The coding workbook is used to determine in which category a homepage should fall concerning a specific graphical web design element. The coding workbook was revised several times which resulted in the workbook as seen in appendix C. However, for some of the graphical elements the categorization groups were too small which led to data being too scattered over too many small groups. This made making inference about preferences impossible. Therefore, the output of the analysis was revised for these graphical elements. Here we'll discuss these graphical elements and provide insight into what was changed before conducting the final analysis on these graphical elements. In table D-2.2 the graphical elements are shown that were changed to address the problem of not reaching an expected cell count of five in enough cells. In the same table the new values of the graphical element is presented as well.

Table D-2.2
Changes in values of graphical elements due to not meeting cell count expectations

Graphical element	Old values	New values
Page alignment	Left-center-right	Left-center
Menu Placement	1-9 ranging from top left to bottom right	1-3 left – center - right
Logo placement	1-9 ranging from top left to bottom right	1-3 left – center - right
Main image placement	1-9 ranging from top left to bottom right	1-3 left – center - right
Typography	four choices	Three choices serif, sans-serif or both
Link typography	four choices	Two choices serif or sans-serif
Text color title	Eleven colors	White, blue, black, and other
Text color text	Eleven colors	Blue, black, and other
Link color	Eleven colors	Blue, black, and other
Background color	Eleven colors	White, and other
Background container color	Eleven colors	White, blue, and other
Text to image ratio	Five, ranging from 10-90, 25/75 to 90-10	Three ranging from less than 50/50 to more than 50/50

Within the spatial organization elements it can be seen that these were divided into one of nine categories ranging from the top left of a homepage to the bottom right of the homepage. However, this led to a too scattered pattern which in turn led to low expected cell counts therefore, the division was brought back to either, left, center, or right eliminating the low expected cell count.

With the text design elements we saw that of the typographies that could be chosen, out of the five categories we used, merely two were used in the websites we chose to analyze, therefore the values that were not used were discarded. Furthermore, several type color codes were also brought back to a lesser number of values. The text color of the title was brought back from the eleven colors, to four, white, blue, black, or other colors. 80%

of the colors of the title were captured by the first three colors. The same goes for the colors used for the links. For the text color of the text more than 90% was covered by the two colors used now.

In the category of color, both the background color and background container color white and other colors were selected, however with the background container color, blue was the second color used as background color, this was harder to establish with the normal background color and therefore, it was chosen to be either white or another color.

Last, in the category of multimedia there were very little homepages that had a text to image ratio of 10-90 or 90-10 and therefore we chose to aggregate the groups into three categories instead of five.

3. Elements that are merely statistically different on the country level

Here the graphical elements are presented that were different on the country level. The different chi-square and fisher's exact test statistics of differences between countries will be presented. This gives insight into which country or countries were different from the others. Table D-2 provides the elements that are different on the country level.

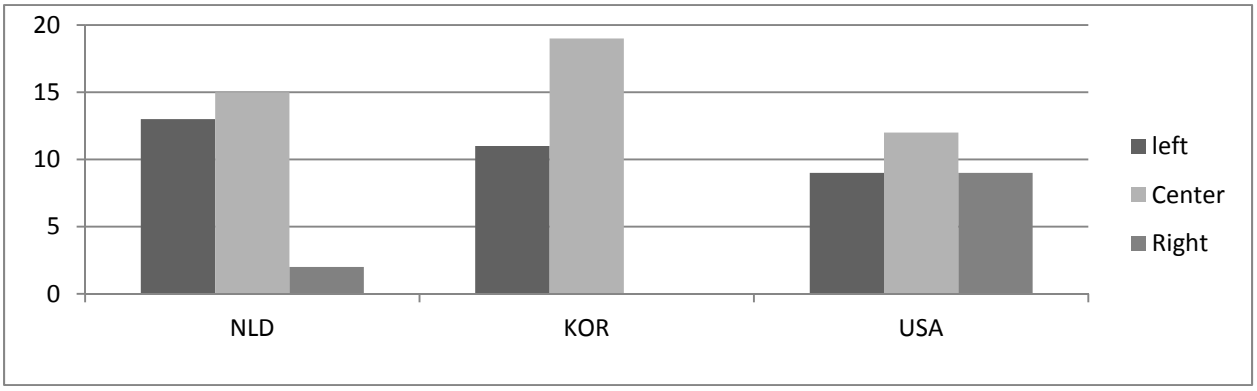
Table D-2.
The graphical elements that are different on merely the country level

	χ^2	*p*
Placement of the main image*		.007
Background color	9.989	.007
Main color*		.011
Background container color	9.082	.031
Menu color	26.861	.020

*Fisher's exact test was used instead of a chi-square when the expected frequency was less than five.

Here a short description will be provided to indicate the differences within the graphical element.

3.1 Placement of the main image:



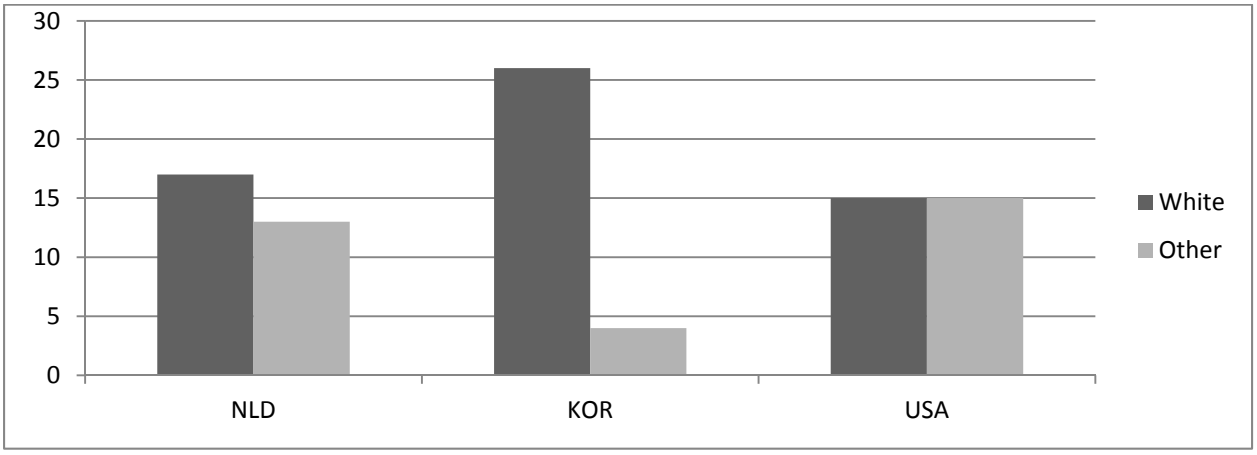
There is a significant association between the homepage's country and the placement of the main image on the website (*p* = .007, Fisher's exact test).The Korean group have no main images on the right side of the homepages, which is in contrast with the US homepages where the main images are equal divided over the website, left, center and right.

Table D-3.
Significant test of placement of the main image

	χ^2	*p*
NLD-KOR*		.385
NLD-USA**	5.515	.080
KOR-USA *		.003

*Fisher's exact test
**Df = 2 , *n* = 60

3.2 Background Color



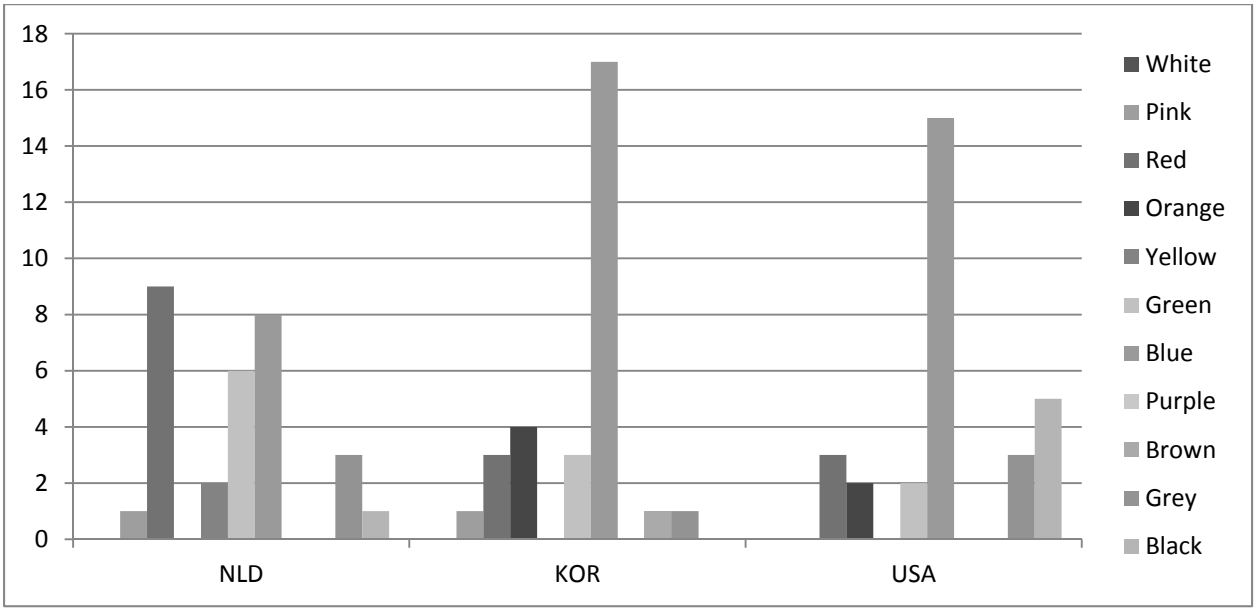
There is a significant association between the homepage's country and the background color χ^2 (2, N = 90) = 9.989, p = .007. The Korean websites most often use white as a background color. The Dutch homepages also use white most often as a background color but grey is also used a fair amount. The American websites also use white the most, but blue and grey are also used as background colors.

Table D-4.
Significant test of the background Color

	χ^2	p
NLD-KOR*	6.648	.020
NLD-USA*	.268	.796
KOR-USA*	9.320	.005

*Df= 1 , n = 60

3.3 Main Color



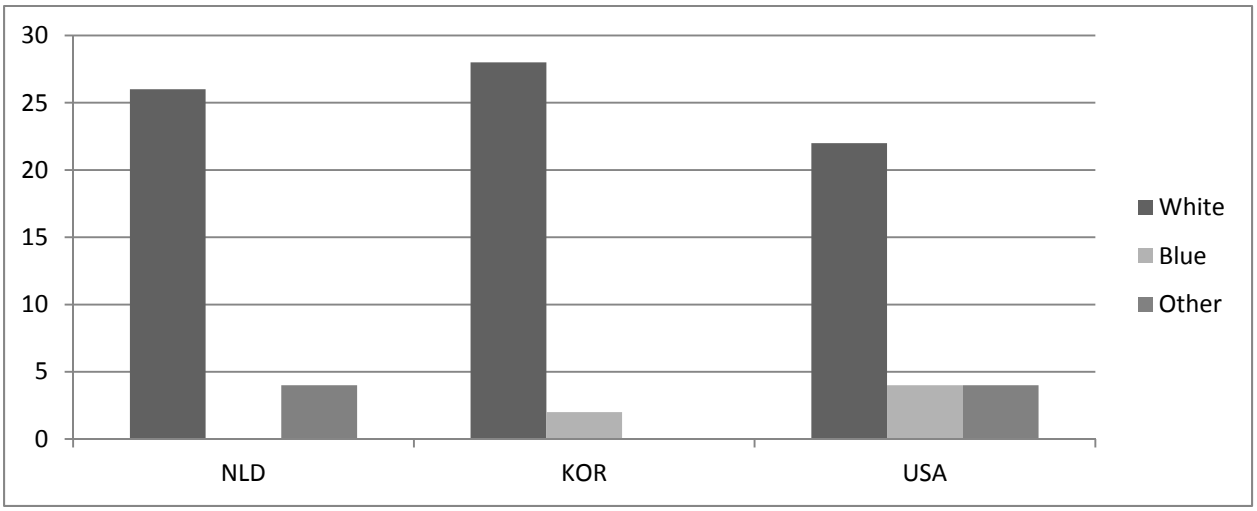
There is a significant association between the homepage's country and the main color (p = .011 , Fisher's exact test). On Korean and US homepages, blue is most often used as the main color of the website, where in the Netherlands red, blue and green are all used and no specific color is used most as the main color of the website.

Table D-5.
Significant test of the main color

	χ^2	p
NLD-KOR*		. 014
NLD-USA*		. 027
KOR-USA*		. 229

*Fisher's exact test

3.4 Background container color

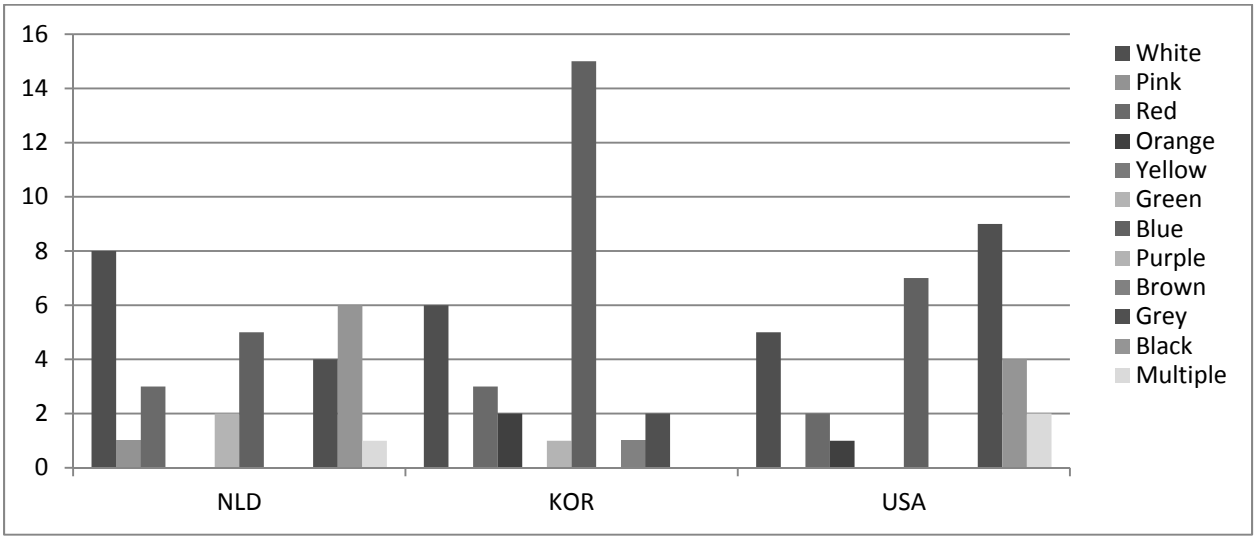


There is a significant association between the homepage's country and the background container color χ^2 (N = 90) = 9.082, p = .031. The consensus of all the countries is that white is chosen as the container color of the homepage, but in both Korea and the US blue is also used as a viable option. Furthermore, Korean homepages only use white and blue as background container color, whereas both the Dutch and U.S. homepages also use other colors.

Table D-6.
Significant test of the background container color

	χ^2	p
NLD-KOR*		
NLD-USA*		
KOR-USA*		

3.5 Menu color



There is a significant association between the homepage's country and the background color of the menu χ^2 (N = 90) = 26.861, $p < 0.05$. In Korea the color most often used as the menu color is blue whereas white and grey are most often used in respectively the Dutch and the US websites.

Table 6-8.
Significant test of the menu color

	χ^2	p
NLD-KOR*		. 014
NLD-USA*		. 027
KOR-USA*		. 229

4. Elements that are statistically different on both the country and domain level

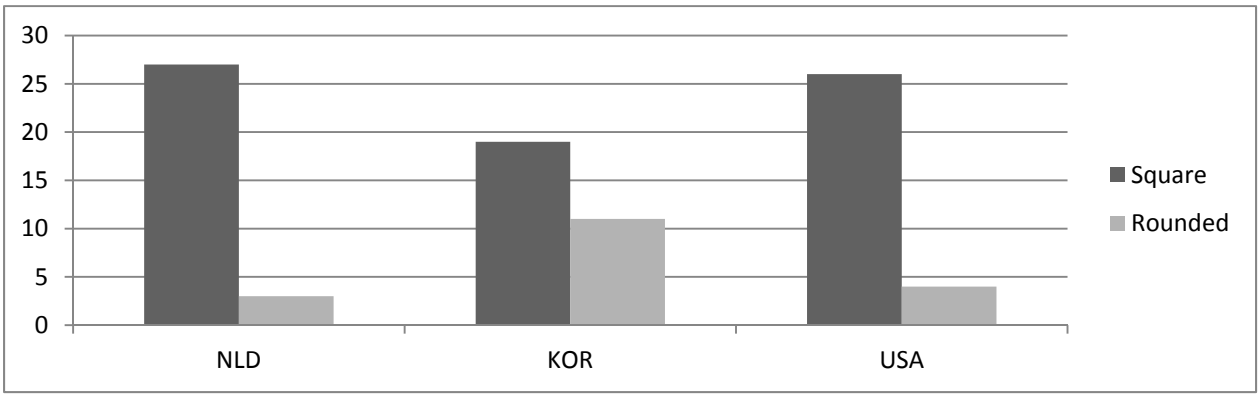
Here the graphical elements are presented that were different on both the country and domain level. The different chi square statistics of the differences between the countries will be presented. This gives insight into which country was different from the other two. Also a short description will be provided to indicate the difference on the graphical element.

Table 6-9.
The graphical elements that are different on both the country level and domain level

	Country level		Domain level	
Graphical element	χ^2	*p*	χ^2	*p*
Menu Corners	7.917	.028	12.917	.001
Orientation	8.086	.022	24.037	< 0.001
Text color title	13.035	< 0.05	13.131	< 0.05
Link typography	9.730	.007	15.203	0.00
Link colors*		.001		.000
Text to image ratio*		.030		.002

* Fisher's exact test

4.1 Menu corners



There is a significant association between the homepage's country and the style of menu corners χ^2 (2 , *N* = 90) = 7.917, p = .028. Furthermore, there is also an association between the homepage's domain and the style of the menu corners χ^2 (2, *N* = 90)= 12.917, *p* =

Table 6-10.
Significant test of the menu corners

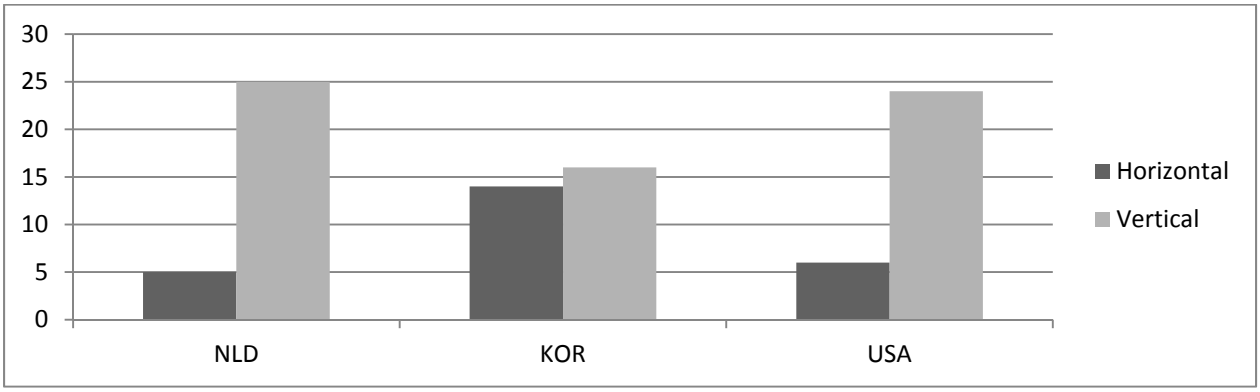
	χ^2	*p*
NLD-KOR*	5.963	. 030
NLD-USA*		1.000
KOR-USA*	4.356	. 072

Df = 1, *n* = 60

0.001.

The rounded corners of the menu are used more often in Korea compared to the other two countries. Furthermore, no university website employ rounded corners on their homepages.

4.2 Orientation



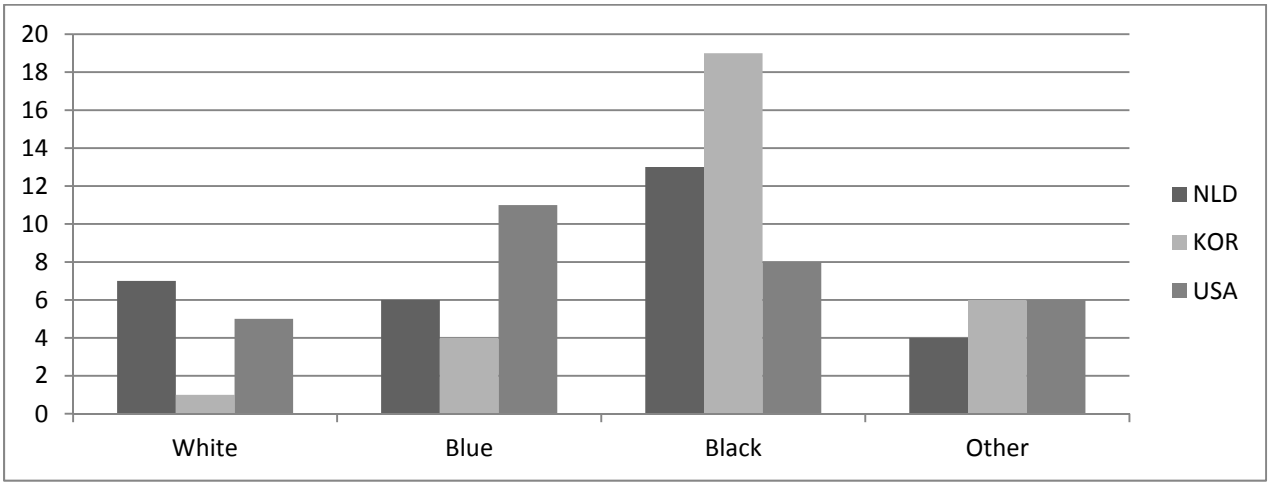
There is a significant association between the homepage's country and the orientation of the homepage χ^2 (2 , N = 90)= 8.086, p = .022. Furthermore, there is also an association between the homepage's domain and the orientation of the homepage χ^2 (2 , N = 90) = 24.037, p < 0.001. Korean homepages are more often horizontally orientated compared to the two other countries. Furthermore, there is a large difference between university and newspaper websites while the former does employs horizontal orientation on homepages, whereas newspaper only employ a vertical orientation.

Table 6-11.
Significant test of the orientation

	χ^2	p
NLD-KOR*	6.239	.025
NLD-USA*	.111	1.000
KOR-USA*	4.800	.054

*Df = 1, n = 60

4.3 Text color of the title



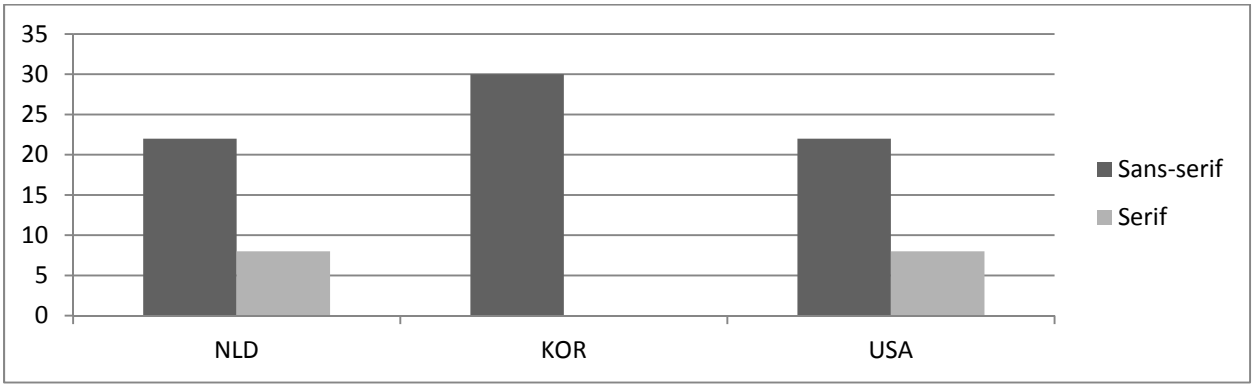
There is a significant association between the homepage's country and the color of the text of the most important title of the homepage (p = .038 Fisher's exact test. Furthermore, there is also an association between the homepage's domain and the color of the text of the most important title of the homepage $\chi^2(6) = 13.131$, p = .037. There is a difference in the use of black and blue as the color that is used for the main title color. In the US blue is used most often whereas in both the Netherlands and Korea black is used the most. When looking at the domains one can distinguish that newspapers use black the most and that universities and city hall homepages have a less pronounced favorability for black and for instance use more white.

Table 6-12.
Significant test of the text color of the title

	χ^2	p
NLD-KOR*		.085
NLD-USA*		.357
KOR-USA*		.013

*Fisher's exact test

4.4 Link typography



There is a significant association between the homepage's country and the typography of most of the links on the homepage χ^2 (2 , N = 90) = 9.730, p = 0.007. Furthermore, there is also an association between the homepage's domain and the typography

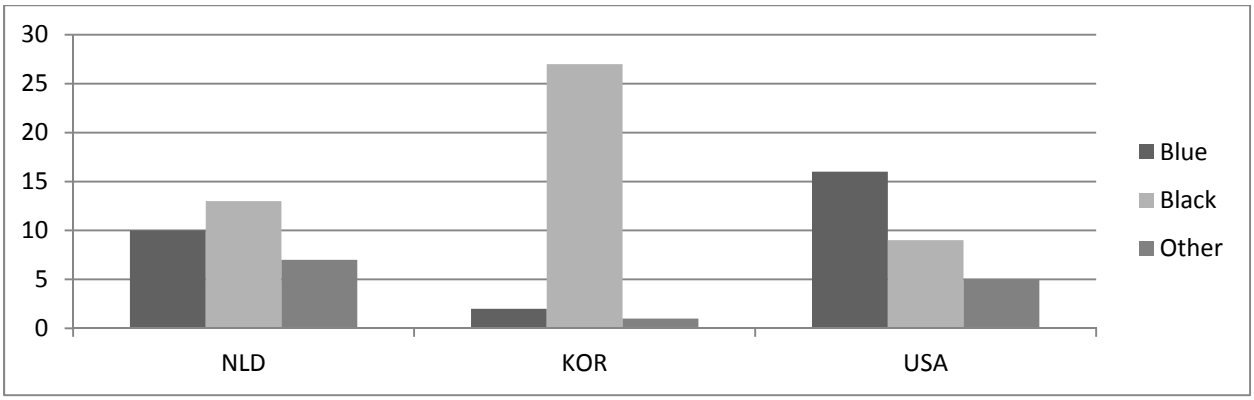
Table 6-13.
Significant test of the orientation

	χ^2	p
NLD-KOR*		.005
NLD-USA**	.111	.000
KOR-USA*		.005

*Fisher's exact test
**Df = 1, n = 60

of most of the links on the homepage χ^2 (2 , N = 90) = 15.203, p = 0.00. Korean homepages do not use serif fonts on their homepages in contrast to the other two countries. Furthermore, newspapers have a far higher use of serif fonts in comparison to the other two domains.

4 .5 Link color



There is a significant association between the homepage's country and the color used for most of the links (p < 0.001, Fisher's exact test). Furthermore, there is also an association betweenthe homepage's domain and the color used for most of the

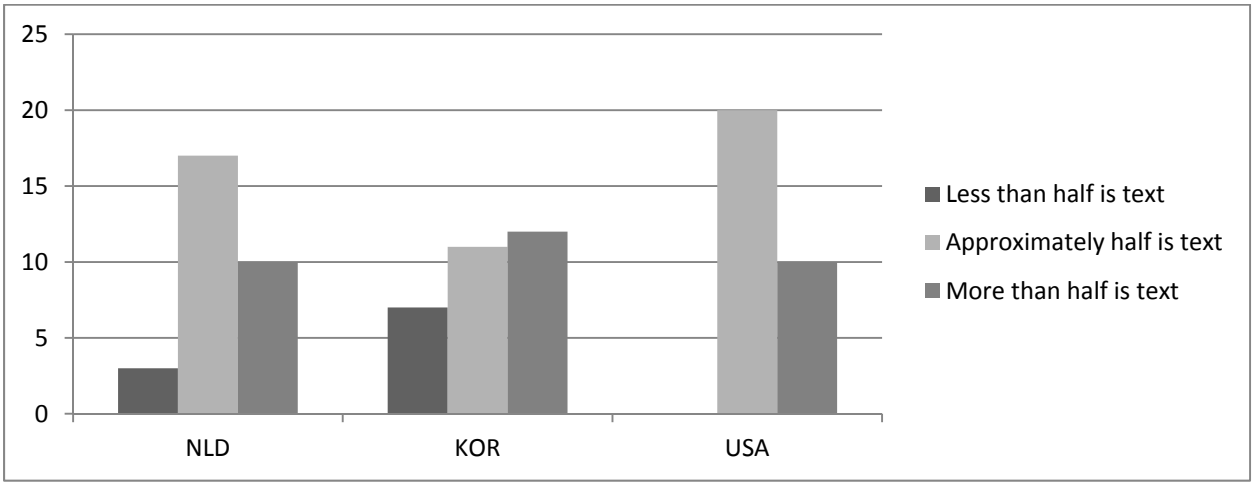
Table 6-14.
Significant test of the link color

	χ^2	p
NLD-KOR*		.000
NLD-USA**	2.445	.331
KOR-USA*		.000

*Fisher's exact test
**Df = 2, n = 60

links. Korean homepages seemed to use a lot more black for the color of their links as opposed to the other two countries. Furthermore, city hall websites use a lot more other colors than black and blue for their link colors than did the other two domains. Also, university homepages used a lot more blue links in comparison to homepages for city halls

4.6 Text to image ratio



There is a significant association between the homepage's country and the text to image ratio (p = 0.030 , Fisher's exact test). Furthermore, there is also an association between the homepage's domain and the text to image ratio (p = 0.002 , Fisher's exact test). US websites used a seemed to have no homepages where the amount of text was less than half of the amount of content. With the domains the same thing seemed to be the case for the newspapers.

Table 6-15.
Significant test of the text to image ratio

	χ^2	p
NLD-KOR**	3.068	.215
NLD-USA*		.263
KOR-USA*		.006

*Fisher's exact test
**Df = 2, n = 60

5.Elements that are merely statistically different on the domain level

5.1 Symmetry

There is a significant association between the homepage's domain and the symmetry of the homepage $\chi^2()= 7.48$, $p = 0.03$

5.2 Page Alignment

There is a significant association between the homepage's domain and the page alignment of the homepage $\chi^2()= 9.27$, $p = .01$

5.3 Dimensions of the website

There is a significant association between the homepage's domain and the vertical dimension of the homepage $F= 58.71$, $p = 0.00$

5.4 Typography

There is a significant association between the homepage's domain and the typography used on the homepage $\chi^2 = 19.99$, $p = 0.00$

5.5 Text colors text

There is a significant association between the homepage's domain and the color of the text used on the homepage $\chi^2 = 17.71$, $p = 0.00$

5.6 Background Image

There is a significant association between the homepage's domain and if there is a background image on the homepage $\chi^2 = 7.90$, $p = .02$.

5.7 Logo

There is a significant association between the homepage's domain and the type of logo used on the homepage $\chi^2 () = 32.23$, $p = .00$

Appendix E

Protocol

Welkom

Ten eerste hartelijk welkom en alvast bedankt voor het meedoen aan mijn onderzoek. Welkom in het GW-lab. Ik ben Yassine Mountassir en doe onderzoek naar de aantrekkelijkheid van website, maar hierover zometeen meer.

Sociale interactie / spullen neerleggen

Introductie

Ik zal eerst vertellen wat de bedoeling is. Ik lees dit voor , om er zo zeker van te zijn dat ik die bij iedereen op dezelfde manier doe.

Ik ben (dus) Yassine Mountassir en doe voor mijn master thesis onderzoek naar de aantrekkelijkheid en beoogde gebruiksvriendelijkheid van websites. Hierin maak ik gebruik van afbeeldingen van fictieve websites welke gemaakt zijn om te beoordelen wat aantrekkelijk, dan wel bruikbaar is.

Dit onderzoek zal uit twee delen bestaan, namelijk:

- Het eerste deel, hierin zal je worden gevraagd om tien plaatjes van website te beoordelen op aantrekkelijk en beoogd gebruiksgemak. De websites zijn voor het grootste gedeelte gevuld met dummy tekst.Het gaat dus daadwerkelijk alleen om het uiterlijk van de website. De beoordeling in deel een vindt plaats door middel van een vragenlijst die per afbeelding moet worden ingevuld.
- Het tweede deel, waar dezelfde afbeeldingen gebruikt zullen worden, bestaat uit een plus/min method. Dit houdt in dat je door middel van plussen en minnen mag aangeven wat je positief en negatief vind aan het design van de fictieve website. Hierbij wordt gevraagd of je jouw keuze verbaal wil bijstaan. Dus of je hard op wil aangeven waarom je juist daar een plus of min neerzet. Bij het tweede deel zit ik naast je en zal wat je zegt ook worden opgenomen. Dit om zo achteraf nog te kunnen beoordelen wat er door jou gezegd is over de website. (ik schrijf namelijk minder snel dan jij kan spreken), maar ik maak tijdens deel twee wel aantekening.

Duur test

Het eerste deel van de test duurt ongeveer 30 minuten en het tweede deel , duurt ongeveer 15 minuten, dus in totaal ben je ongeveer drie kwartier bezig.

Garantie vertrouwelijk

Verder is het zo dat de opnames ALLEEN worden gebruikt voor dit onderzoek verder zal er vertrouwelijk omgegaan worden met je gegevens. Tevens is het zo dat voordat je kan beginnen met deel 1 van het onderzoek er ook nog wat demografische gegevens gevraagd worden. Met deze gegevens zal uiteraard ook vertrouwelijk omgegaan worden.

Stoppen mag

Als je, om welke reden dan ook, wilt stoppen vóór het eind van de test, laat het me dan gewoon weten, en dan stoppen we ermee.

Vragen

Heb je nog vragen?

Toestemming

Nu je weet wat de test inhoud, ga je akkoord om mee te doen, in acht nemend dat je gegeven vertrouwelijk behandelt worden.

Toestemming vastleggen d.m.v toestemmingsformulier

Getekend?

Website opstarten

Hier staat nogmaals een korte beschrijving van mijn onderzoek en uitleg over de test zelf. Wanneer je klaar bent met deel 1 zal er een verzoek komen op het scherm om mij (de onderzoeksleider) erbij te roepen om daarna te beginnen met het tweede deel. Wanneer je dit verzoek te zien krijgt graag mij erbij roepen. Ik ga nu weg , dus succes zometeen

Loop uit de ruimte

Wacht op proefpersoon

Proefpersoon komt

Nu kunnen we dan verder met deel 2: Zoals ik al had aangegeven, krijg je nu dezelfde websites te zien welke je door middel van plussen en minnen kunt gaan beoordelen. Je zult zo de volledige website te zien krijgen, dus niet meer in een monitor. Boven de website staan 3 plusjes en 3 minnetjes. Deze bolletjes kun je verslepen en op een plek neerzetten op de website die jij aantrekkelijk, met een plusje of juist niet aantrekkelijk met een minnetje vind. Wanneer je dit doet, vraag ik je om ook te verwoorden waarom je juist daar een plus of min neerzet, zodat we ook weten wat precies op die plek aantrekkelijk of juist niet aantrekkelijk is. Je hoeft niet alle bolletjes te gebruiken, stel je hebt alleen maar 1 ding dat je echt negatief vond en verder vond je het allemaal ok. Dan kun je na een opmerking op verder drukken. Ik vraag je wel om eerst het bolletje ergens op te zetten en dan pas om er een opmerking over te maken.

Goedkeuring

Heb je dit allemaal begrepen?

Wacht op goedkeuring

Recorder aanzetten

Start tweede deel onderzoek

Opschrijven keynotes van de opmerkingen over de website (back-up)

Proefpersoon klaar met tweede deel

Alvast hartelijk dank voor je medewerking, je hebt het echt super gedaan.

Doel van de studie

Maar wat denk je dat het doel was van dit onderzoek?

Vastleggen wat ze denken dat het doel is.

Recorder uitzetten

Vertellen wat het onderzoek inhoudt

Het onderzoek richt zich op grafische ontwerp variabelen van websites en hun effect. Er wordt gekeken of het localiseren van deze grafische ontwerp variabelen een invloed heeft op de beoordeling van de aantrekkelijkheid dan wel beoogd gebruiksgemak. Wat er is gedaan is dat we drie varianten hebben gemaakt van drie websites, namelijk een Nederlandse, een Amerikaanse en een Zuid-Koreaanse variant. Deze heb je zojuist voorgelegd gekregen en beoordeeld. De websites worden in dit onderzoek voorgelegd aan een groep uit een van deze landen (nederland), zodat we kunnen bepalen of mensen websites uit hun eigen land beter beoordelen dan uit andere landen. Hieruit kunnen we dan de conclusie trekken of het localiseren van websites daadwerkelijk van invloed is op de gebruiker en of localiseren dus daadwerkelijk nodig is. Daarnaast zal het tweede deel (het think aloud deel) inzicht geven in het waarom er bepaalde

keuzes zijn gemaakt m.b.t. de aantrekkelijkheid of beoogd gebruiksgemak. Hierdoor kunnen we straks beter aangeven wat de aantrekkelijkheid c.q. beoogd gebruiksgemak beinvloed. Hierdoor kun we dan beter verklaren wat er gelocaliseerd moet worden wanneer men wil localiseren voor aantrekkelijkheid/beoogd gebruiksgemak. Dit onderzoek zou bijvoorbeeld goed aansluiten bij een vak als Ontwerpen van Nieuwe Media Toepassingen. Het geeft namelijk inzicht in hoe er verschillen zijn in websites m.b.t. wat er in landen gebruikelijk is. Wanneer je bijvoorbeeld een website maakt kun je daar rekening mee houden, zodat mensen zich sneller op hun gemak voelen. Tevens is het uit methedologisch oogpunt interessant omdat het niet alleen een verschil meet tussen verschillende groepen, maar dat het daar ook op voortboorduurt en dus probeert te verklaren waar die verschillen daadwerkelijk vandaan komen. Iets waar je over kunt nadenken wanneer je zelf onderzoek doet.

Appendix E

Toestemmingsformulier

Ik, …….. (*naam proefpersoon)*

Stem toe mee te doen aan een onderzoek dat uitgevoerd wordt door

Yassine Mountassir

Ik ben me ervan bewust dat deelname aan dit onderzoek geheel vrijwillig is. Ik kan mijn medewerking op elk tijdstip stopzetten en de gegevens verkregen uit dit onderzoek terugkrijgen, laten verwijderen uit de database, of laten vernietigen.

De volgende punten zijn aan mij uitgelegd:

1. Het doel van dit onderzoek is de aantrekkelijkheid van websites
   Deelname aan dit onderzoek zal meer inzicht geven omtrent aantrekkelijkheid van websites.
2. Er zal mij gevraagd worden mee te doen.
   Het hele onderzoek zal maximaal 60 minuten duren. Aan het einde van het onderzoek zal de onderzoeker uitleggen waar het onderzoek over ging.
3. Er behoort geen stress of ongemak voort te vloeien uit deelname aan dit onderzoek.
4. De gegevens verkregen uit dit onderzoek zullen anoniem verwerkt worden en kunnen daarom niet bekend gemaakt worden op een individueel identificeerbare manier.
5. De onderzoeker zal alle verdere vragen over dit onderzoek beantwoorden, nu of gedurende het verdere verloop van het onderzoek.

Handtekening onderzoeker: …… Datum: ……..

Handtekening proefpersoon: …… Datum: ……..

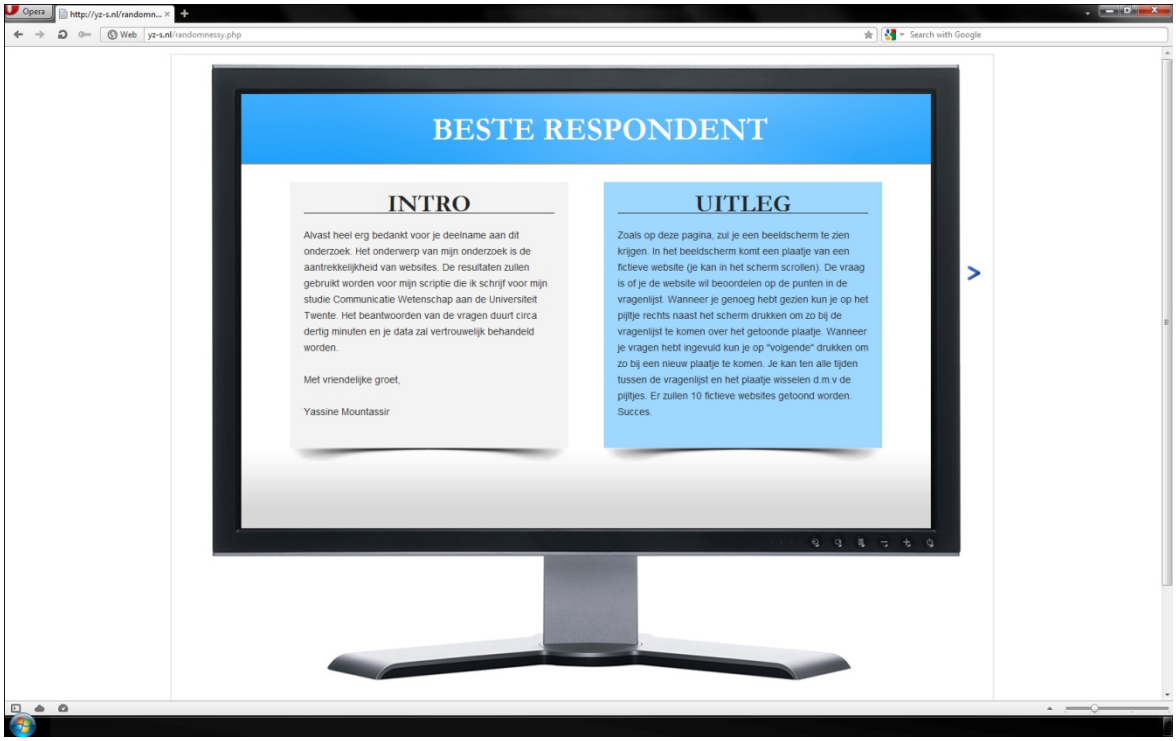
Appendix G

Screenshot of the user experiment

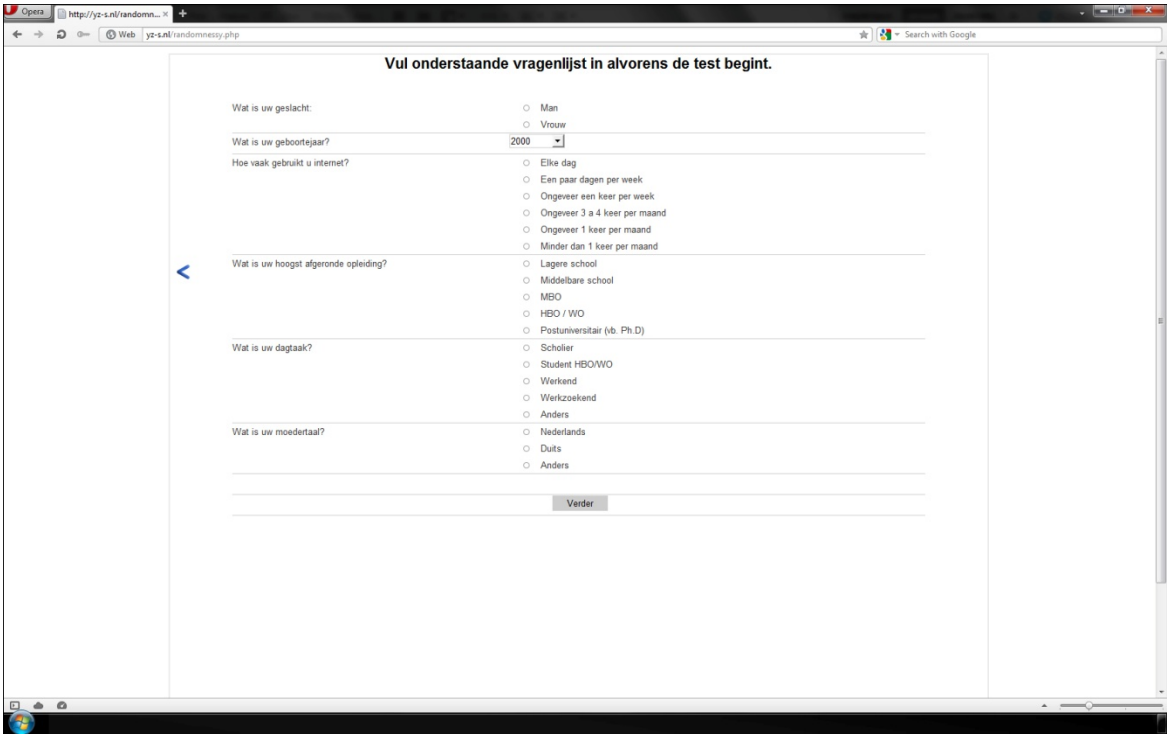
To give an impression of the user experiment, the main screens are presented here.

1. **Introduction screen**.

   Here an introduction is given on the study and the participants are again informed on what they are about to do.



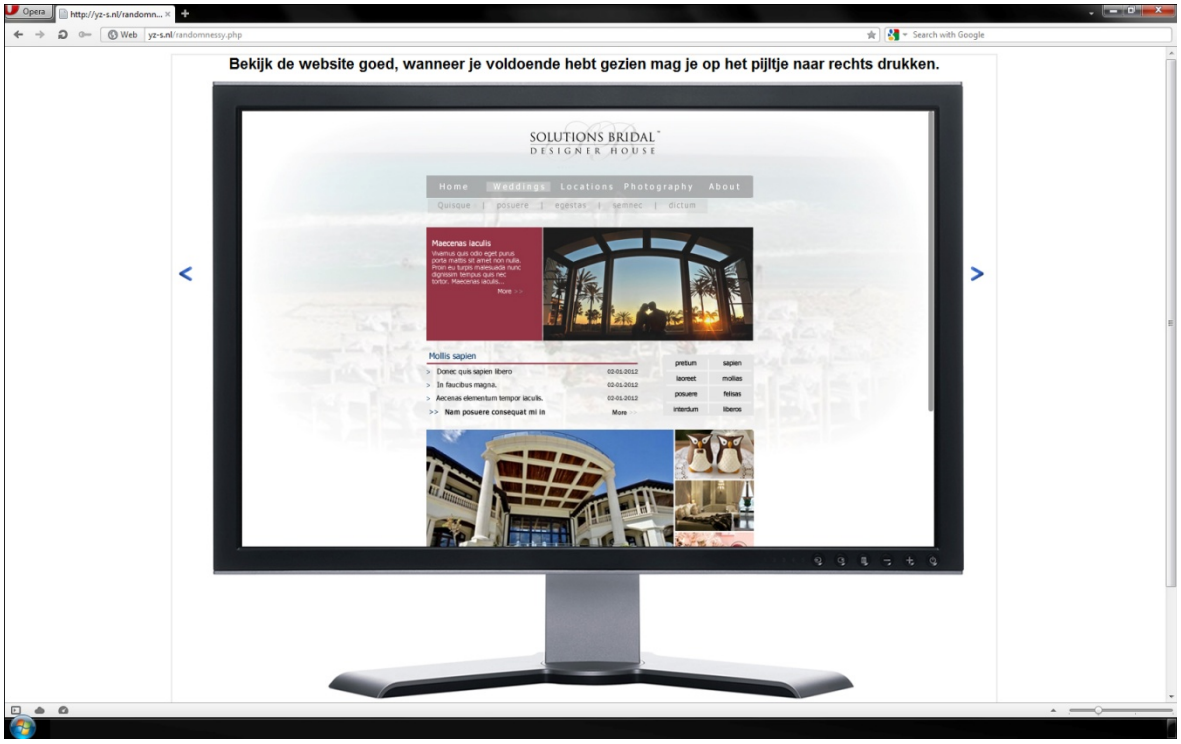
2. The user background information screen



3. The explanation screen of the questionnaire.

Here it is again explained the participant can scroll in the depicted monitor, and that they are able to get to the questionnaire about the homepage by clicking on the arrow on the right of the screen

4. The screenshot of the homepage that the participants needed to analyze

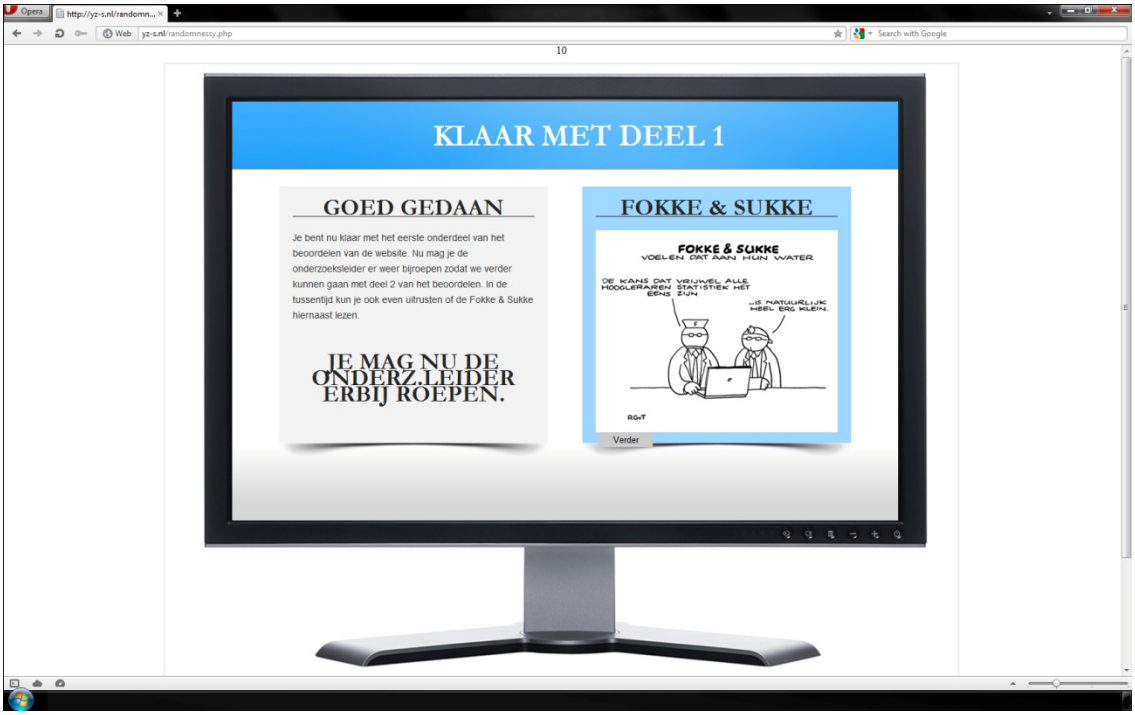


5. The questions of the questionnaire with the Likert scale

Step four and five were repeated nine times so all the homepages were evaluated.

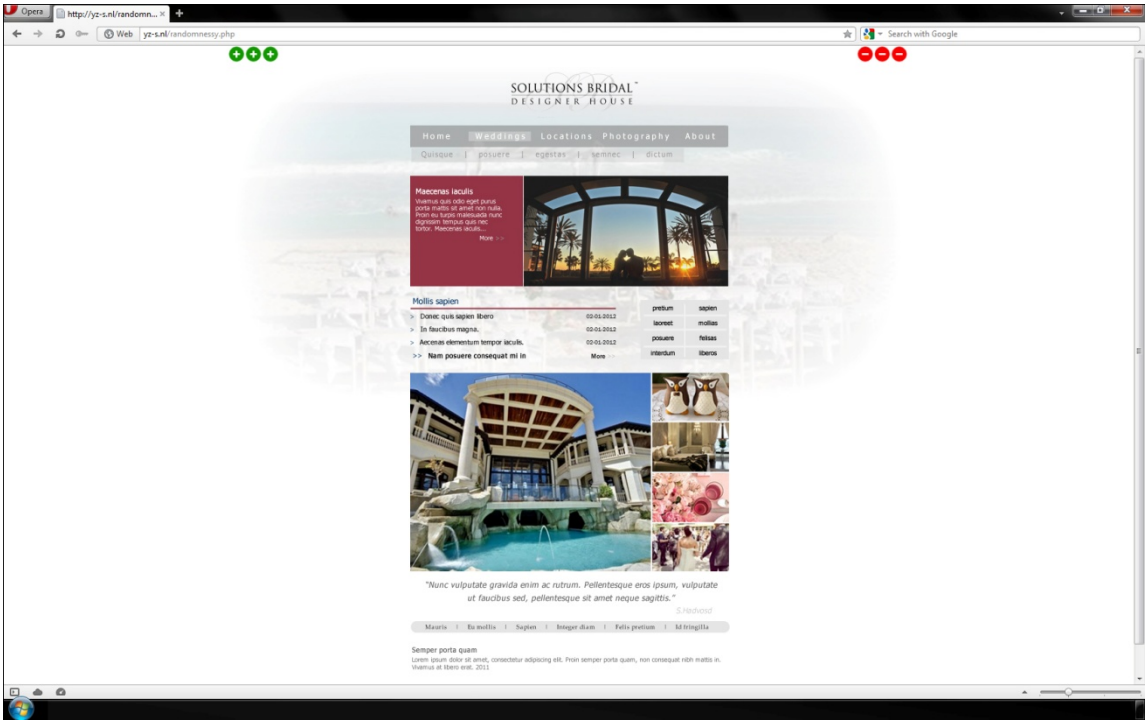
6. Endscreen of the questionnaire

The participants are asked to call the research supervisor before continueing the experiment.



7. Screenschot of the plus-minus usability test with think aloud protocol

Repeated nine times to include all homepages.



8. Endscreen of the user experiment

Appendix H

The stimuli

The development of the stimuli has been done by first looking at the differences in homepage design from study I. There several graphical web design elements seemed to differ significantly, which led to table H-I.1 were one can see the how the preferences were translated to country specific graphical web design element choices.

Table H-I.1
Differences in graphical web design elements between countries

	Countries		
	South-Korea	The Netherlands	The United States
Placement of the main image	Center	Center	Right
Background color	White	Not white	Not white
Main color	Blue	Red	Blue
Background container color	White	White	Blue
Menu color	Blue	White	Grey
Menu corners	Rounded	Angular	Angular
Orientation	Horizontal	Vertical	vertical
Text color title	Black	Black	Blue
Link typography	Sans-serif	serif	serif
Link color	black	blue	blue
Text to image ratio	Not 50%/50%	Not 50%/50%	50%/50%

This document will present the stimuli and will try to explain how the graphical elements were adapted to suit the countries specific design preferences. Note that the websites are not shown in original size, thus due to the need to reduce the homepages in size, the differences in length, and width are not displayed correctly. For a better view of the homepages, see the folder “stimuli” on the accompanying USB-drive.

The Korean homepages

What is most striking with the Korean homepages is the length and width of the pages. This was done while orientation of the homepages differed significantly compared to the Dutch homepages (p = .03) and differed almost significant compared to the American homepages (p = .054). Furthermore, as can be seen the homepages all have blue as their main color and as the menu color. In comparison to the other homepages the Korean homepages also have rounded corners on the main menu, also the most important image is also located in the center of the homepage. Additionally, the link typography is sans-serif and the color of the links is black as is the text of the normal text. The color of the background is white, as is the color of the background of the container. The text to image ratio is in the news homepage and municipal homepage more than 50% text, in the university homepage the ratio is less than 50% text.

Figure H-1 Korean municipal homepage

Figure H-2 Korean news homepage

Figure H-3 Korean university homepage

The Dutch homepages

Most striking for the Dutch homepages is the red main color, the grey background, the white menu color and the text to image ratio. Furthermore, the link typography is serif in contrast to the Korean homepages. Furthermore, the link color is blue, the orientation is vertical and the menu corners are angular instead of rounded. As can be seen in the figures below, the main image is aligned in the center of the homepage. The text to image ratio is less than 50% text.

Figure H-4 Dutch municipal homepage

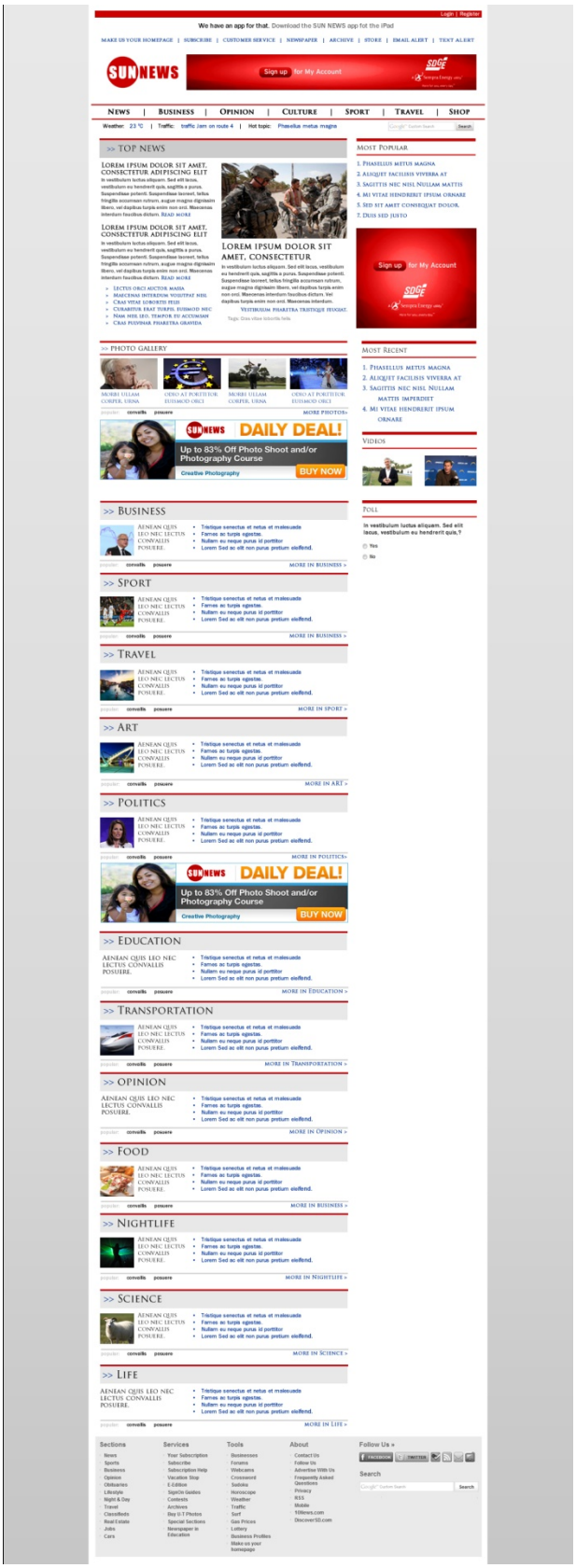


Figure H-5 Dutch news homepage

H-6 Dutch university homepage

The American homepages

Striking with the American homepages is the blue background, blue background of the container, the grey menu, the placement of the main image on the right as opposed to near the center. Furthermore, the text to image ratio of 50% is a difference compared to the other homepages. The website is vertically orientated and uses a serif font for links, the titles of the items are blue as are the links. Last, the menu corners are angular.

Figure H-7 American municipal homepage

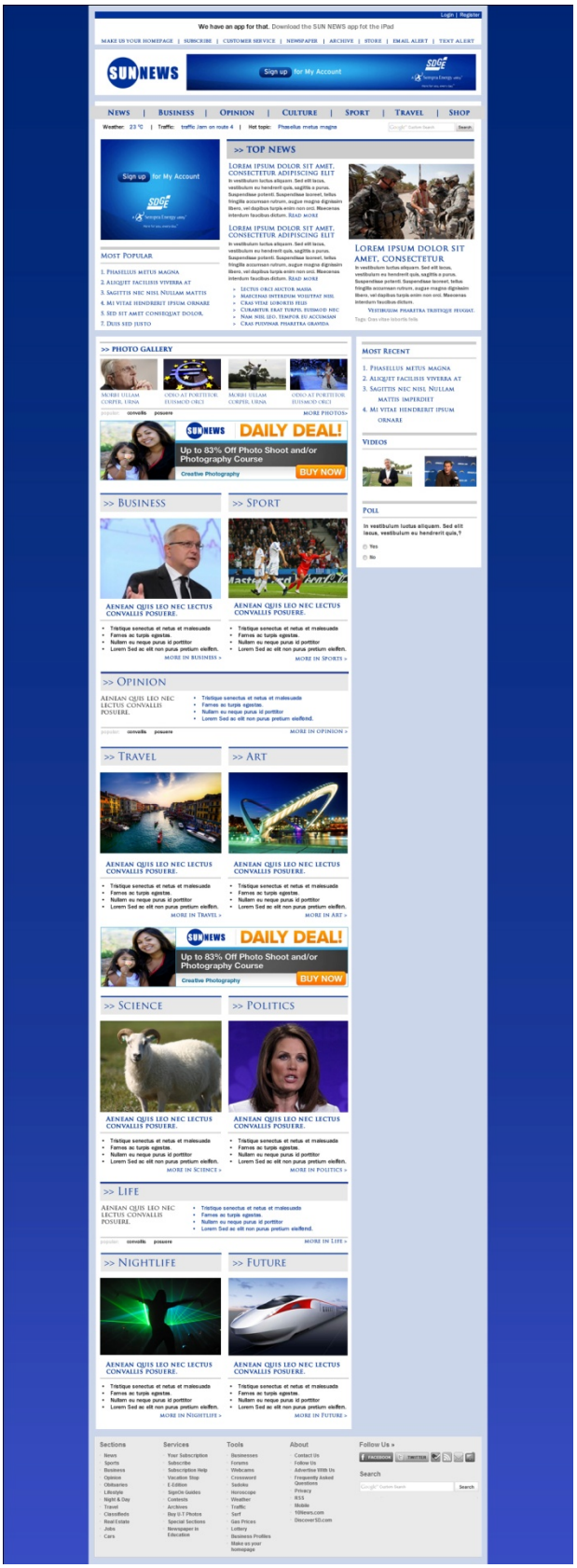


Figure H-8 American news homepage

Figure H-9 American university homepage

Appendix I

The user experiment

Introduction

The user experiment was conducted in two stages, the participant were first asked to fill out a questionnaire, and thereafter partook in a plus-minus usability study with a think aloud protocol. Here the results of both stages will be presented. First the questionnaire will be discussed, thereafter the plus-minus usability study with think aloud protocol.

1. The questionnaire

The questionnaire itself had to measure three distinct determinants of user satisfaction, visual appeal, perceived ease of use, and familiarity. Thus before one could assess differences the instrument had to be assessed on whether it measured the three determinants, this was done in the Confirmatory Factor Analysis. Thereafter, the scores of per determinant per website had to be calculated to make comparisons between the countries and domains possible. Last, the homepages will be compared to see whether country specific graphical web design elements have an influence on the determinants of user satisfaction that are used here.

1.1 The items of the questionnaire

The questionnaire consisted of 17 items using a 7-point Likert scale. The first 14 items were from two validated experiments of which the first six were from the visual appeal questionnaire of Lindgaard (2006). Then eight items, for perceived ease of use were from the Post-Study System Usability Questionnaire (PSSUQ) as used in Koubek & Lee (2010). The last three items were newly developed and served as a manipulation check to see whether the Dutch homepages were more familiar than the other homepages and whether this had an influence on perceived visual appeal and perceived usability. In table 8-1 the items are presented, first in English and then in Dutch, which was used for the experiment.

Table I-1.1
Items of the questionnaire

Original item	Translation
Visual appeal	visueel aantrekkelijk – visueel onaantrekkelijk
Interesting – boring,	Interessant –saai
Good design – bad design,	Goed ontwerp – slecht ontwerp
Good colour – bad colour,	Kleurgebruik is goed – slecht
Good layout – bad layout	Lay-out is goed - slecht
Imaginative – unimaginative	Fantasievol –fantasieloos
Overall, I am satisfied with how easy it will be to use this system	In het algemeen, ben ik tevreden over hoe gemakkelijk het zal zijn om de website te gebruiken.
It will be simple to use this system	Ik denk dat de website eenvoudig te gebruiken zal zijn.
I will be able to effectively complete the tasks and scenarios using this system	Ik denk dat ik effectief taken en scenario's kan uitvoeren met de website.
I will be able to complete the tasks and scenarios	Ik denk dat ik snel taken en scenario's tot een

quickly using this system	goed einde kan brengen met de website.
I will be able to efficiently complete the tasks and scenarios using this system	Ik denk dat ik efficient taken en scenario's kan uitvoeren met de website.
I feel comfortable using this system	Ik denk dat ik me op mijn gemak zal voelen tijdens het gebruik van de website.
It will be easy to learn to use this system	Ik denk dat het makkelijk zal zijn om de website te leren gebruiken.
I believe I can become productive quickly using this system	Ik denk dat ik snel productief kan zijn met de website.
The website looks familiar	De website ziet er herkenbaar uit
The familiarity of the website is large	De herkenbaarheid van de website is groot
I think the website looks familiar	Ik vind dat de site herkenbaar is

To evaluate if the items did load on their intended factors of perceived visual appeal, perceived ease of use, and familiarity, the factor loadings were checked. Table I-1.2 shows the factor loadings after rotation. The items that load on the same components suggest that these components measure the same construct. The table tells us that the items all loaded highly on their expected factors and did not load as high on any other factor, thereby suggesting that the questionnaire reliably measured three components.

Table i-1.2
Rotated Confirmatory Factor Analysis results*

	Determinants		
	Percieved Usability	Visual Appeal	Familiarity
VisualAppeal		.939	
Interesting		.828	
Design		.706	
Color		.790	
Layout		.655	
Inspiration		.741	
Overall	.799		
Simple	.874		
Effectively	.946		
Complete	.966		
Efficiently	.979		
Comfortable	.580		
EasyToLearn	.820		
Productive	.880		
Familiar 0			.866
Familiar 1			.900
Familiar 2			.926

*Rotation converged in 6 iterations / scores under .40 are not shown in the table

After concluding that the questionnaire did measure the intended factors, the item scores were combined into single factor scores for further analysis.

Table I-1.3 provides the mean scores of the three determinants, thereby providing insight into the differences between the groups on both a country as well as a domain level. The determinant scores were calculated by summing the item scores and thereafter dividing these scores by the amount of items of the construct. Therefore, the item scores have a score comparable with a seven point Likert scale.

Table I-1.3.
Calculated determinant scores by country and domain*

	Determinant								
	Visual Appeal			Perceived ease of use			Familiarity		
	News	Uni	Mun	News	Uni	Mun	News	Uni	Mun
Country									
South Korea	3.87	4.52	3.41	4.13	5.02	3.95	4.59	4.60	3.83
The Netherlands	4.28	4.72	3.51	4.90	4.79	4.22	5.12	5.02	3.92
The United states	4.46	4.66	4.53	4.85	5.10	4.81	5.07	4.89	4.53

*7-point likert scale

This table is the input for the following section where we'll see if there are significant differences within the sample.

1.2 Exploratory analysis of determinants

Before performing the Repeated Measurement MANOVA to see whether there are significant differences between both the countries as well as the domains, first it is checked whether the data meets the assumptions for the tests.

1.2.1 Assumption testing

When using a Repeated Measurement MANOVA, the multivariate test is free of assumptions. For the univariate test however sphericity is assumed. Therefore, the Mauchly test of sphericity was inspect to see whether sphericity could be assumed. Although two out of the nine conditions violated the assumption of sphericity, (Domain X familiarity χ^2 (2, N = 65) = 6.95, $p < 0.05$ and Domain*Country's X Percieved ease of use, χ^2 (2, N = 65) = 17.66, $p < 0.05$) this had no effect on the univariate test statistics. These two conditions were significant whether sphericity was assumed or whether the most conservative test statistics were used. Therefore, the test statistics where sphericity is assumed will be reported here as this will be easier to compare with the other test statisctics.

1.3 Significant differences on country, domain and interaction effect level.

First a multivariate test was performed to check whether there the data shows any differences within the dependent variables. A 3 x 3 Repeated Measurement MANOVA was performed on the three dependent variables: Visual Appeal, Perceived ease of use and Familiarity to evaluate differences in these factors. The independent variables were country (South Korea, The Netherland, and The United States) and domain (Municipal, News, and University).

SPSS GLM Repeated Measurement was used for the analyses. Total N was 65, due to the use of a RM MANOVA there are no assumptions that needed to be met.

With the use of Pillai Bartlett trace it was concluded that the dependent variables were significantly affected, as can be seen in table 9-2.

Table I-1.4.
Multivariate results of the Repeated Measurement Manova

	v	F	p	η^2	η_p^2
Country	.38	6.07 (6,59)	< 0.001	0.04	.38
Domain	.60	14.53 (6,59)	< 0.001	0.09	.60
Country X Domain	.42	3.25 (12,53)	0.001	0.02	.42

Therefore, we can conclude that country, as well as domain, but also their interaction effects have a significant effect on the dependent variables. A univariate analysis will be needed to evaluate to see where these differences come from and on which dependent variables these have an effect.

1.4 Exploring the significant differences in the three determinants

Next a description of the univariate analysis will be provided per independent variable as well as providing the results of the Bonferroni post-hoc test of the differences between the countries. This will provide insight into which dependent variables are significantly different and where these differences come from. The following section will discuss the differences on a country level and domain level. This will provide answers to the questions where the significant differences of the dependent variables came from.

1.4.1 Differences on a country level

To answer our question whether country specific web design elements we were interested in whether these elements also lead to a difference in appreciation. As can be seen in the next section this is the case. There was a significant effect of country specific web design elements on visual appeal $F(2,128) = 12.68$ $p < 0.001$, $\eta^2 = 0.15$, as well as on perceived ease of use $F(2,128) = 15.33$ $p < 0.001$, $\eta^2 = 0.14$, and on familiarity $F(2,128) = 11.65$ $p < 0.001$, $\eta_p^2 = 0.11$. Here the three determinants will be discussed to explore where the differences stem from.

Country by Visual Appeal

Bonferroni post hoc test results.

On average the participants found the South Korean websites were visually significantly less appealing than the American websites Mdiff=-.619, $p < 0.01$. Furthermore, the Dutch website were also visually less appealing than the American websites Mdiff=-.378, $p < 0.05$

Table I-1.5
Country by visual appeal

Country	Mean*	Std. Error
South Korea	3.931	.099
The Netherlands	4.171	.098
The United States	4.549	.108

*7-point Likert scale

Country by Perceived ease of use

Bonferroni post hoc test results.

On average the participants perceived the South Korean website significantly less easy to use than both the Dutch Mdiff= -.271, $p = 0.05$, and the American websites Mdiff = -.554 $p < 0.01$. Furthermore, the participant also perceived the Dutch website significantly less easy to use than the American website Mdiff = -.283, $p < 0.05$

Table I-1.6
Country by perceived ease of use

Country	Mean*	Std. Error
South Korea	4.366	.115
The Netherlands	4.637	.108
The United States	4.920	.102

*7-point Likert scale

Country by Familiarity

Bonferroni post hoc test results.

Table I-1.7
Country by familiarity

Country	Mean*	Std. Error
South Korea	4.343	.118
The Netherlands	4.687	.097
The United States	4.831	.102

*7-point Likert scale

On average the participants found the South Korean websites less familiar as the Dutch, Mdiff = -.344, $p < 0.01$, and the American websites, Mdiff = -.487, $p < 0.01$. As can be seen in the tables above, on all three determinants the South Korean homepages scored significantly less than the other two countries homepages. Furthermore, the Dutch homepages scores significantly less on both visual appeal as on perceived ease of use. Only on familiarity the American and Dutch homepages were not statistically different.

1.4.2 Differences on a domain level

Although our primary focus was differences in country specific graphical web design elements and their evaluation, here also is looked at significant differences between the different domains. This while this provides evidence that context might also play an important role in the choice of graphical web design elements. As can be seen below there were significant differences in the determinants between the domains.

There was a significant effect of country on visual appeal $F(2,128) = 12.68$ $p < 0.001$, $\eta^2 = 0.15$, as well as on perceived ease of use $F(2,128) = 15.33$ $p < 0.001$, $\eta^2 = 0.14$, and on familiarity $F(2,128) = 11.648$ $p < 0.001$, $\eta_p^2 = 0.11$. Here the three determinants will be discussed in further detail to see where the differences stem from.

Domain X visual appeal

Bonferroni post hoc test results.

Table I-1.8
Domain by visual appeal

Domain	Mean*	Std. Error
News	4.201	.100
University	4.636	.095
Municipal	3.814	.113

*7-point Likert scale

On average the participant found that all the website domains were significantly different, were the University websites were perceived as most visually appealing in comparison to News Mdiff = .435, $p < 0.01$, and compared to Municipal Mdiff = .822 $p <0.05$. Furthermore, there was a significant

difference between the news and municipal website, where the news websites were perceived as more visually appealing Mdiff = .388, $p < 0.01$

Domain X Perceived ease of use

Bonferroni post hoc test results.

On average the participant perceived the News websites as significantly harder to use than the university websites Mdiff = -343, $p < 0.05$. Furthermore, the university websites were perceived as easier to use than the Municipal websites, Mdiff = .645, $p < 0.01$.

Table I-1.9
Domain by perceived ease of use

Domain	Mean*	Std. Error
News	4.627	.129
University	4.970	.086
Municipal	4.325	.128

*7-point Likert scale

Domain X Familiarity

Bonferroni post hoc test results.

On average the participant found the news websites more familiar than the municipal websites, Mdiff = .831, $p < 0.01$. Furthermore, the university websites As can be seen in the tables above, on two determinants, visual appeal, and familiarity, the municipal homepages scored significantly less than the other two homepage domains. On perceived ease of use municipal homepages were perceived as less easy to use in comparison to university websites. The university homepages were also perceived as easier to use and visually more appealing than the news homepages.

Table I-1.10
Domain by familiarity

Domain	Mean*	Std. Error
News	4.926	.115
University	4.839	.107
Municipal	4.096	.123

*7-point Likert scale

1.4.3 The interaction effects

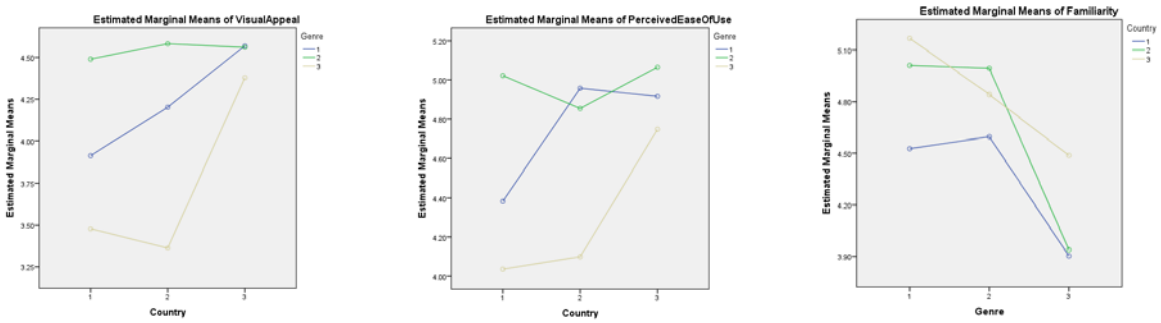
Because the interaction effects have not been discussed in the entire study, we will merely provide a table, table I-1-11, with the interaction effects here and the three graphs that illustrate the interaction effects. There was a significant interaction effect of country*domain on visual appeal F (4,256) = 7.49 p < 0.001, η^2 = 0.09 , as well as on Perceived ease of use F(4,256) = 7.04 p < 0.001, η^2 = 0.09 , and on familiarity F (4,256) = 3.27 p < 0.05, η_p^2 = 0.04 .

Table i-1.11
Interaction effects of the country and domains

Determinant	Domain 1	Domain 2	Country 1	Country 2	F	p
Visual app	News	Mun	KOR	USA	6.83	.01*
			NLD	USA	17.41	.00*
			KOR	NLD	1.93	.17
	Uni	Mun	KOR	USA	15.92	.00*
			NLD	USA	24.11	.00*
			KOR	NLD	.18	.67
	News	Uni	KOR	USA	3.44	.07
			NLD	USA	1.03	.31
			KOR	NLD	.71	.40
Perc eo Use	News	Mun	KOR	USA	.41	.52
			NLD	USA	10.20	.00*
			KOR	NLD	3.69	.06
	Uni	Mun	KOR	USA	15.12	.00*
			NLD	USA	2.21	.14
			KOR	NLD	3.97	.05
	News	Uni	KOR	USA	9.04	.00*
			NLD	USA	3.13	.08
			KOR	NLD	13.95	.00*
Familiarity	News	Mun	KOR	USA	1.20	.28
			NLD	USA	11.39	.00*
			KOR	NLD	3.73	.06
	Uni	Mun	KOR	USA	3.03	.10
			NLD	USA	10.35	.00*
			KOR	NLD	1.69	.20
	News	Uni	KOR	USA	.48	.49
			NLD	USA	.12	.73
			KOR	NLD	.21	.65

* *P* < .05

Figure I-1.1
Graphical representation of the interaction effects



As can be seen in table i-11.1 and figure I-1.1 there are several interaction effects. This is important to highlight while designers should therefore not only worry about country specific design features, but also about domain specific design features. Therefore, the found country specific design features should be studied further to see in which domain they are truly a preferred design choice.

1.5 Test of homogeneity of the sample

To assess whether gender or nationality had a significant influence on the test result the 3 x 3 Repeated Measurement MANOVA was rerun, with the addition of two within subject factors, gender and nationality. The result showed no significant difference for all dependent variables as can be seen in table I-1.11.

Table I-1.11
Results of the homogeneity test of the sample

	Dependent variable				
Within subject factor		df	F	sig	η_p^2
Gender	Visual appeal	1	.753	.389	.012
	Perceived ease of use	1	.273	.603	.004
	Familiarity	1	.035	.852	.001
Nationality	Visual appeal	1	.232	.632	.004
	Perceived ease of use	1	3.570	.064	.055
	Familiarity	1	.552	.460	.009
Gender X Nationality	Visual appeal	1	.226	.636	.004
	Perceived ease of use	1	.079	.780	.001
	Familiarity	1	.179	.674	.003
Error	Visual appeal	61			
	Perceived ease of use	61			
	Familiarity	61			

Therefore, it is concluded that there were no significant differences between male and female participants or between the Dutch and German students within the sample. The sample is therefore seen as a homogenous group, which in this case represents Western European students.

2. The plus minus usability study with think aloud protocol

This section provides a detailed description of the results of the plus minus usability study with think aloud protocol. By evaluating whether there were less negative statements and or more positive statements for homepages that scored higher on our three determinants we hoped to see the same pattern as with our three determinants. Fortunately, the country scores of all the three determinants are in the same order, the American homepages were first in all determinants, the Dutch scores for the determinants were always second, and the Korean scores were always the lowest. In table I-2.1 can be seen that the number of negative statements decreases as the scores of the three determinants rises. Furthermore, the number of positive statements increases as the scores of the three determinants rises.

Table I-2.1.
Determinant scores by number of statements*

	Mean scores determinants			Statements	
	Visual Appeal	Perc. ease of use	Familiarity	Negative	Positive
Country					
South Korea	3.93	4.37	4.34	258	271
The Netherlands	4.17	4.64	4.69	234	302
The United States	4.55	4.92	4.83	230	312

*7-point Likert scale

Even though the statements did follow the same pattern as the means of the three determinants, the differences in the number of statements is not significant χ^2 (1605, 2) = 4.90, p = .09. Although this almost significant we will not search for a correlation between more positive or less negative statements and the score on our three determinants.

However, the data is full of rich information and here the data is used to get preliminary insight into which elements triggered the differences in the evaluation scores. Therefore we are interested in the number of statements made per category per country but of more importance is what has been said. First, table I-2.1 shows the number of statements made per category, as this indicates relative importance to the participants, to later asses the differences between countries within these categories.

Table I-2.2
Number of comments per category

	Score			
	Min	Plus	Total	Exemplary comment
Generic	141	161	302	Yes, I found this one very good
Content	95	195	290	Good menu bar
Multimedia	51	172	223	This image was really dull
Spatial organization	90	105	195	This site is far too long
Color	92	83	175	The colors here are ugly
Perceived ease of use	38	94	132	A search bar is also useful
Advertising	99	3	102	Furthermore, there is advertising, I think that is bad
Text to image	52	9	61	Visually, there were not that many images
Text design	33	16	49	The text is still so small
none	16	25	41	-
Visual appeal	11	17	28	And here it is very ugly
Familiar	4	5	9	This looks very familiar and positive
Total	722	885	1607	-

As can be seen the category with the most comments is the Generic comment category. Thereafter order of the categories is content, multimedia, spatial organization, color, perceived ease of use, advertising, text to image, text design, none, visual appeal and familiar. In table I-2.3 the same data is presented, however now it is split over the countries, as we are interested if there might be significant differences between the countries and the categories. As can be seen merely four of the categories are significantly different between the countries, which are perceived ease of use, advertising, text to image ratio, and text design.

When looking at where the valences were placed table I-2.3 one can see that the menu was used most to add valences to, with the main image not far behind. From this we derive that these were most noticed and elicited the most emotions with the participants, thus designers should carefully select what type of image they use as their main image and what kind of menu they select. However, the menu was one of the few elements that was in English, thus the mere fact that participants were able to clearly understand the menu, might also have played a role in the number of mentions.

Table I-2.3.
Number of valences per category per country with Chi-square statistic

Graphical element new			country			Total	χ^2	*p*
			South Korea	The Netherlands	The United States			
Generic	Score	Minus	66	38	37	141	3.61	.16
		Plus	58	52	51	161		
	Total		124	90	88	302		
Content	Score	Minus	32	36	27	95	3.76	.15
		Plus	57	60	78	195		
	Total		89	96	105	290		
Multimedia	Score	Minus	18	17	16	51	.40	.82
		Plus	53	59	60	172		
	Total		71	76	76	223		
Spatial organization	Score	Minus	24	28	38	90	3.74	.15
		Plus	38	36	31	105		
	Total		62	64	69	195		
Color	Score	Minus	17	40	35	92	.98	.61
		Plus	17	30	36	83		
	Total		34	70	71	175		
Perc. ease of use	Score	Minus	20	5	13	38	6.60	.04*
		Plus	31	31	32	94		
	Total		51	36	45	132		
Advertising	Score	Minus	24	41	34	99	8.59	.04*
		Plus	3	0	0	3		
	Total		27	41	34	102		
Text/Image ratio	Score	Minus	33	12	7	52	6.69	.04*
		Plus	2	3	4	9		
	Total		35	15	11	61		
Text design	Score	Minus	16	7	10	33	7.85	.02*
		Plus	2	9	5	16		
	Total		18	16	15	49		
None	Score	Minus	3	4	9	16	2.47	.29
		Plus	6	11	8	25		
	Total		9	15	17	41		
Visual Appeal	Score	Minus	4	3	4	11	.56	.76
		Plus	4	6	7	17		
	Total		8	9	11	28		
Familiar	Score	Minus	1	3	0	4	1.41	.24
		Plus	0	5	0	5		
	Total		1	8	0	9		
Total	Score	Minus	258	234	229	721	4.90	.09
		Plus	271	302	311	884		
	Total		529	536	540	1605		

*statistically significant at the .05 level

Table I-2.3.
Number of valences per location per country

	country							
	South-Korea		The Netherlands		The United states		Total	
	Score		Score		Score		Score	
Element	Min	Plus	Min	Plus	Min	Plus	Min	Plus
Advert	30	6	49	6	41	6	120	18
Agenda	1	0	7	12	3	8	11	20
Background	3	3	11	8	37	37	51	48
Banner	0	0	1	0	3	2	4	2
Categories	4	0	7	18	6	18	17	36
Container	0	0	4	0	3	0	7	0
Discard	3	1	0	1	2	0	5	2
Footer	10	3	6	14	1	7	17	24
Generic	0	0	0	1	1	0	1	1
Head	1	0	1	2	0	1	2	3
Header	10	2	8	7	5	0	23	9
Icampus	0	1	0	0	0	0	0	1
Image	13	8	4	11	11	27	28	46
Image gallery	6	3	3	5	4	3	13	11
In page menu	10	4	3	0	0	0	13	4
Item bottom	3	0	0	0	3	0	6	0
Link list	8	9	25	29	16	22	49	60
Login	0	0	0	0	0	0	0	0
Logo	6	10	7	11	6	8	19	29
Main ad	7	3	19	2	6	2	32	7
Main image	13	64	15	59	8	43	36	166
Main item	16	19	9	27	22	20	47	66
Main ticker	12	13	6	1	0	0	18	14
Maps	0	0	0	0	0	2	0	2
Menu	17	80	8	56	10	60	35	196
Most popular	3	2	3	2	3	4	9	8
Most recent	2	9	1	2	0	3	3	14
News item	24	2	25	16	30	21	79	39
News roll	29	6	0	0	0	0	29	6
News ticker	21	6	4	4	7	1	32	11
Pink links	0	0	7	0	0	0	7	0
Poll	1	1	0	0	0	1	1	2
Quote	4	2	0	0	0	0	4	2
Search field	5	15	1	9	0	11	6	35
Small time ticker	0	0	0	0	0	0	0	0
Social buttons	0	0	0	0	0	0	0	0
Weather	0	0	0	0	4	6	4	6

Last, we also looked at the number of mentions per category per homepage as can be seen in table I.2.4. This table provides a detailed description of what the differences were between the homepages in total. Hereby we can for instance conclude that the color of the Dutch news homepage got 25 negative mentions, mainly due to the use of a very vibrant red.

Table I.2.4.
Number of valences by category per homepage.

		pageId																	
		Newkor		Newnld		Newusa		Unikor		Uninld		Uniusa		Munkor		Munnld		Munusa	
		Score		Score		Score		Score		Score		Score		Score		Score		Score	
		Min	Plus	Min	Plus	Min	Plus	Min	Plus	Min	Plus	Min	Plus	Min	Plus	Min	Plus	Min	Plus
		Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
Graphical element new	Advertising	11	0	27	0	22	0	0	1	0	0	0	0	13	2	14	0	12	0
	Color	8	10	25	9	12	15	5	3	2	17	15	10	4	4	13	4	8	11
	Content	13	27	10	26	9	34	9	15	8	18	5	16	10	15	18	16	13	28
	Discard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Familiar	1	0	0	2	0	0	0	0	0	3	0	0	0	0	3	0	0	0
	Generic	27	16	10	25	8	19	16	27	13	9	8	15	23	15	15	18	21	17
	Image to text	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Multimedia	3	5	3	8	3	10	2	31	1	42	3	37	13	17	13	9	10	13
	none	1	2	1	6	5	1	1	3	1	1	0	2	1	1	2	4	4	5
	Spatial organization	6	13	19	17	22	14	11	16	4	9	6	12	7	9	5	10	10	5
	Text	7	2	2	2	1	2	0	0	3	5	3	2	9	0	2	2	6	1
	Text to image	8	0	1	0	2	0	5	2	6	2	3	2	20	0	5	1	2	2
	Perceived ease of use	10	6	0	11	6	10	4	15	2	8	3	12	6	10	3	12	4	10
	Visual appeal	2	0	1	1	0	2	2	4	1	1	1	3	0	0	1	4	3	2