A study of healthcare websites' visual information in service design

Hye Jeong Park
Iowa State University
A study of healthcare websites’ visual information in service design

by

Hye Jeong Park

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF FINE ARTS

Major: Graphic Design

Program of Study Committee:
Sunghyun R. Kang, Major Professor
Paul Bruski
Seda Yilmaz

Iowa State University
Ames, Iowa
2016

Copyright © Hye Jeong Park, 2016. All rights reserved.
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>LIST OF FIGURES</th>
<th>iv</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>vii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>viii</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHAPTER 1</th>
<th>INTRODUCTION</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>1.2.</td>
<td>Purpose of Research</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHAPTER 2</th>
<th>LITERATURE REVIEW</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.</td>
<td>Introduction</td>
<td>4</td>
</tr>
<tr>
<td>2.2.</td>
<td>Service Design</td>
<td>4</td>
</tr>
<tr>
<td>2.2.1.</td>
<td>What is Service Design</td>
<td>4</td>
</tr>
<tr>
<td>2.2.2.</td>
<td>Short History of Service Design</td>
<td>6</td>
</tr>
<tr>
<td>2.3.</td>
<td>Five Principles of Service Design</td>
<td>7</td>
</tr>
<tr>
<td>2.4.</td>
<td>Process of Service Design</td>
<td>8</td>
</tr>
<tr>
<td>2.5.</td>
<td>Trilogy of Service Design for Website Main Page Design</td>
<td>9</td>
</tr>
<tr>
<td>2.5.1.</td>
<td>Service</td>
<td>11</td>
</tr>
<tr>
<td>2.5.2.</td>
<td>Experience</td>
<td>12</td>
</tr>
<tr>
<td>2.5.3.</td>
<td>Design</td>
<td>13</td>
</tr>
<tr>
<td>2.5.3.1.</td>
<td>Design Elements for Website</td>
<td>13</td>
</tr>
<tr>
<td>2.6.</td>
<td>A Website</td>
<td>14</td>
</tr>
<tr>
<td>2.6.1.</td>
<td>Understanding of A Website</td>
<td>14</td>
</tr>
<tr>
<td>2.6.2.</td>
<td>The Basic Structure of A Website</td>
<td>15</td>
</tr>
<tr>
<td>2.6.3.</td>
<td>Two Kinds of Layout of A Website</td>
<td>16</td>
</tr>
<tr>
<td>2.7.</td>
<td>A Website Main Page Design</td>
<td>19</td>
</tr>
<tr>
<td>2.7.1.</td>
<td>Use of Color</td>
<td>20</td>
</tr>
<tr>
<td>2.7.2.</td>
<td>Use of Image</td>
<td>21</td>
</tr>
<tr>
<td>2.7.3.</td>
<td>Use of Typography</td>
<td>22</td>
</tr>
<tr>
<td>2.8.</td>
<td>Impression</td>
<td>22</td>
</tr>
<tr>
<td>2.8.1.</td>
<td>Human Cognition and Impression</td>
<td>23</td>
</tr>
<tr>
<td>2.8.2.</td>
<td>Impression of Website Design</td>
<td>24</td>
</tr>
<tr>
<td>2.8.3.</td>
<td>First Impression</td>
<td>24</td>
</tr>
<tr>
<td>2.8.4.</td>
<td>Importance of First Impression of Website’s Main Page</td>
<td>25</td>
</tr>
</tbody>
</table>
2.9. Kansei Engineering .......................................................... 26
   2.9.1. Application of Kansei Engineering .............................. 26
   2.9.2. Methodology of Kansei Engineering ........................... 27
   2.9.3. Kansei Words ...................................................... 28
   2.9.4. Construction of Semantic Differential (SD) Scale .......... 29

CHAPTER 3  CASE STUDY OF HEALTHCARE.GOV ..................... 31
3.1. Overview .......................................................................... 31
3.2. HealthCare.gov ............................................................. 31
3.3. Study of HealthCare.gov Website Main Page Design .......... 33
   3.3.1. Analysis of The Main Page Colors ............................. 33
      3.3.1.1. Colors in the HealthCare.gov Site ...................... 33
   3.3.2. Typography of HealthCare.gov Site ............................ 35
   3.3.3. Photos on HealthCare.gov Site ................................ 36
   3.3.4. Layouts and Grid Systems of HealthCare.gov Site ....... 36
      3.3.4.1. Main page .................................................. 37
      3.3.4.2. Global Modules (header and footer) ..................... 38
3.4. Analyzing HealthCare.gov Site ........................................ 38
   3.4.1. Analyzing June 2014 HealthCare.gov MPD with Regard to
      Specific Elements ..................................................... 42
   3.4.2. Analyzing October 6, 2014, HealthCare.gov MPD with Regard to
      Specific Elements ..................................................... 43
   3.4.3. Analyzing February 13, 2015, HealthCare.gov MPD with Regard to
      Specific Elements ..................................................... 44
   3.4.4. Analyzing July 23 2015, HealthCare.gov MPD with Regard to
      Specific Elements ..................................................... 45

CHAPTER 4  RESEARCH METHODOLOGY .................................... 47
4.1. Overview .......................................................................... 47
4.2. Selection of Kansei Words ............................................... 47
4.3. Three Main Page Designs ................................................ 48
   4.3.1. Design 1 .................................................................. 48
   4.3.2. Design 2 .................................................................. 50
   4.3.3. Design 3 .................................................................. 53
4.4. Survey ............................................................................. 56
   4.4.1. Online Survey ....................................................... 57
   4.4.2. Participants .......................................................... 58

CHAPTER 5  DATA ANALYSIS AND RESULTS ............................. 59
5.1. Part A .............................................................................. 59
   5.1.1. Ranking Analysis ..................................................... 59
5.2. Part B .............................................................................. 66
   5.2.1. Five-Level Rating Semantic Differential Scale Analysis .... 66
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Service design diagram for website MPD</td>
<td>10</td>
</tr>
<tr>
<td>2.2</td>
<td>Basic structure of a website main page</td>
<td>16</td>
</tr>
<tr>
<td>2.3</td>
<td>Example of a liquid layout</td>
<td>18</td>
</tr>
<tr>
<td>2.4</td>
<td>Construction of Semantic Differential (SD) scale, Nagamachi &amp; Lokman, 2011</td>
<td>30</td>
</tr>
<tr>
<td>3.1</td>
<td>Primary color palette of HealthCare.gov, Styleguide.HealthCare.gov, n.d.</td>
<td>34</td>
</tr>
<tr>
<td>3.8</td>
<td>July 23, 2015, HealthCare.gov MPD, HealthCare.gov, n.d.</td>
<td>41</td>
</tr>
<tr>
<td>4.1</td>
<td>Design 1</td>
<td>49</td>
</tr>
<tr>
<td>4.2</td>
<td>Design 2</td>
<td>50</td>
</tr>
<tr>
<td>4.3</td>
<td>CTA of design 2</td>
<td>51</td>
</tr>
<tr>
<td>4.4</td>
<td>Design 3</td>
<td>54</td>
</tr>
</tbody>
</table>
Figure 4.5 CTA of design 3 .................................................................................. 55
Figure 5.1 Percent of 1st ranking of three designs in the service category .......... 60
Figure 5.2 Percent of 1st ranking of three designs in the experience category ....... 61
Figure 5.3 Percent of 1st ranking of three designs in the design elements category .. 62
Figure 5.4 Number of 1st rankings of design 1 ................................................... 64
Figure 5.5 Number of 1st rankings of design 2 ................................................... 64
Figure 5.6 Number of 1st rankings of design 3 ................................................... 65
Figure 5.7 Mean value of design A, B and Cs .................................................... 67
Figure 5.8 Mean value of design 1 ...................................................................... 69
Figure 5.9 Mean value of design 2 ...................................................................... 69
Figure 5.10 Mean value of design 3 .................................................................... 70
LIST OF TABLES

Table 2.1 Service design process of worldwide service design providers, Jeon, 2014; Jung, 2011 ................................................................. 9

Table 3.1 Number of visitors, Health and Human Services report, 2013a, 2013b, 2014a, 2014b, 2014c, 2014d, Conner, 2013 ........................................ 32

Table 3.2 Number of enrollees, Health and Human Services report, 2014a, 2014b, 2014c, 2014d ................................................................. 32

Table 4.1 Three categories of kansei words from service design for website MPD 48

Table 5.1 Considered design elements contributing 10 impressions .................. 63

Table 5.2 Mean values of the three designs ............................................. 65

Table 5.3 Considered design elements contributing 10 impressions ................. 68

Table 5.4 Mean values of the three designs ............................................. 70

Table 6.1 Summarized considered design elements contributing to 10 impressions from two surveys .................................................. 73
ACKNOWLEDGMENTS

I would first like to thank my major professor Sunghyun Kang for her masterly guidance, profound encouragement and patience with regard to my M.F.A. thesis research. Without her energy, time, guidance and insights, I could not have continued in this step toward building my career.

In addition, I express my gratitude to my committee members, Professor Paul Bruski and Professor Seda Yilmaz, for their advice and feedback on my thesis, which encouraged me to think deeply in developing my study.

I extend special thanks to my friends and to the department faculty and staff for cheering me on. Especially, without the financial support of Iowa State University Extension Community and Economic Development, I could not have finished my M.F.A. degree.

I express my deepest gratitude to my family. They have enabled me to get wonderful experiences and opportunities and have been willing to be my lifelong cheerleaders. I am forever grateful.

Finally, I offer my appreciation to those who participated in my surveys and observations; without them, this thesis would not have been possible.
Advances in the Internet have changed people’s traditional lifestyles with regard to getting information and buying products at home with only a few clicks. In response to this changed situation, many websites have been launched and are competing with each other. Therefore, since a main page design (MPD) is the first a viewer sees of a website, it is considered a significant factor in attracting people at a glance.

Service design is a form of design that necessary to improving the quality of the service and the provider-customer interactions. An effective website is one such component. This study researched a healthcare website MPD from the perspective of service design. Two new prototypes of MPD are developed, and three MPDs, including an existing MPD (design 1), were evaluated in the context of service design. Design elements such as color, image and typography were evaluated by use of kansei engineering methodology via online surveys. This study includes 677 participants who were recruited from the faculty, staff, and student population at Iowa State University.

In building a successful service design website, service, experience, and design elements should be harmonious. For healthcare websites, various colors, bright images, and appropriate typography need to be used.

Analyses of data from the two surveys recommend that to build “healthcare,” “new benefits,” “useful” and “helpful” impressions, the website structure should be long. For “helpful,” “personal” and “trustworthy” impressions, the length of the website structure, images and colors are all vital. The use of several colors and bright images are recommended for creating “pleasant”
and “attractive” impressions. Although images are not crucial to arousing a “simple” emotion, it appears to be necessary for building a “meaningful” impression.

Design 1 resulted in “healthcare,” “new benefits,” “useful,” “helpful” and “trustworthy” impressions, design 2, service design elements suggested by Dager (n.d.) and produced by the author, produced “helpful,” “trustful,” “pleasant,” “meaningful” and “attractive” impressions, and design 3, type-dominant, gave a “simple” impression.
1

CHAPTER 1

INTRODUCTION

1.1. Introduction

Advanced technologies can provide information, improve people’s quality of life and enable them to live a long life. Among technologies, the Internet can be considered the most innovative ones during the past several decades. The Internet offers much information through websites, which people can easily and quickly access to learn almost everything they might want to know. People research healthcare information in particular to learn about living long, healthy lives.

According to the Pew Internet & American Life Project (2006), 113 million young adults have searched for healthcare information on the Internet in the U.S. In addition, according to a study of the Pew Internet & American Life Project (2009), 42% of these individuals or 60% of e-patients indicated that they believe the Internet’s medical advice and health information and that they follow the advice (Pew Internet & American Life Project, 2006, 2009; Sharit, Hernandez, Nair, Kuhn, and Czaja, 2011). Seventy–two percent of Internet users searched more than two healthcare information sites at least once in 2012, and 72% of users use Google, Bing, and YAHOO! search engines (Pew Internet & American Life Project, 2013). These research results show that many people rely on the Internet to obtain information, and the role of the Internet is important (Pew Internet & American Life Project, 2006, 2009; Sharit et al., 2011).

Although Internet usage is extensive, some websites fail to attract attention. Generally, people visit the main page of the website first; if the main page fails to give a satisfactory impression, visitors will leave the site. Accordingly, the main page design (MPD), which is the
design of the first page people will encounter of a website, is a core design aspect to attract people and induce them to stay on a website. In addition, the first impression is significant in making people decide quickly (Gladwell, 2005) whether to spend time on the website or not.

There are abundant methods of catching visitors’ attention on the website, such as user-based design methods and design elements such as the grid system, color, images. To improve design methods such as user-based design and to give people visiting the website a positive experience and impression, a service design based on both user- and provider-centered perspectives rather than other common design methodologies, is becoming a popular design approach.

This paper, which focuses on a healthcare website from the U.S. federal government, investigates its main page design and compares it with two other design prototypes to evaluate how each design is received by people.

1.2. Purpose of Research

The Internet has emerged as one of the most important aspects of modern society. If the main page of a website can result in a positive emotional impression, such as trustworthy, pleasant, etc., at a glance, the author expects that people will be willing to spend their time on that site.

The purpose of this study is to investigate which design elements can produce a positive impression in the framework of service design.

The three research questions designed to achieve the goals of this paper are as follows:

Q1. What are the considerations of service design website?

Q2. What design elements should be considered in healthcare websites?
Q3. Which design elements affect emotional impressions in healthcare websites?

To answer these questions, this study surveyed the existing literature of service design, design elements, and the kansei evaluation method; investigated the HealthCare.gov site and then created two prototypes of a website main page based on the same content as the HealthCare.gov website and conducted online surveys. The HealthCare.gov website was selected because it was launched in 2013, and because of its design problems, its design has kept changing.
2.1. Introduction

Service design approaches include various activities, from planning to testing. Since service design is a practical problem-solving approach, it can be adopted in various places and can involve collaboration with people in many different fields. If the service design approach is applied successfully, both users and service providers can be satisfied with the outcome. The literature review therefore starts with a study of service design.

2.2. Service Design

2.2.1. What is service design?

Service can be traced back to the start of civilization, although it can be interpreted differently in various areas. For example, in the interaction design area, “Services are a series of interactions between customers and the service system through many different touch points during the customer journey” (Stickdorn & Schneider, 2011, p. 80). From the points of view of the American Marketing Association, “Services, as a term, is also used to describe activities performed by sellers and others that accompany the sale of a product and aid in its exchange or its utilization.”

The main concept of these two ideas is that service design can improve the quality of people’s lives. Service design is based on interaction between customers and service providers and can provide benefits to all who are involved in the service design process.
Service design also has various meanings depending on the fields. The following definitions of service design were summarized by Stickdorn and Schneider (2011), who divided the area into two large realms, academic and agency, as to approach:

1. Academic approach

- Moritz: Service design leads to a service that is helpful, usable, and valuable for associations and customers, with innovative and improved ideas. According to Mortiz (2005), “It is a new holistic, multi-disciplinary, integrative field” (Stickdorn & Schneider, 2011, P. 31).
- Design Council: Service design has everything to do with creating service that is profitable, usable, helpful, effective and productive (Design Council, 2010).
- Birgit Mager: “Service design aims to ensure service interfaces are useful, usable and desirable from the client’s point of view and effective, efficient and distinctive from the supplier’s point of view” (Stickdorn & Schneider, 2011, P. 31).

2. Academic approach

- live │ work: Service design is a tool for building design processes and techniques for the advancement of service. It is an innovative and functional way to enhance existing services and create new ones (live │ work, 2010).
- Engine: Service design is a professional design methodology to improve and convey service. Engine (2010) says, “Service design projects improve factors like ease of use, satisfaction, loyalty and efficiency right across areas such as environments, communications and products – and not forgetting the people who deliver the service” (Stickdorn & Schneider, 2011, p. 32).
Volts: Service design can cause a customer to choose one coffee shop rather than another faced with two coffee shops offering the exact same coffee at the same price (Volts, 2008).

In the design process, service designers can visualize a service, converting an intangible to a tangible form with diagrams, charts and drawings to build a better service industry. Service design can not only produce changes and improvements to existing services but also create new ones.

2.2.2. Short history of service design

In 1982, G. Lynn Shostack, a pioneer of service design, suggested a new design area that combined products and service. According to Shostack (1984), this method could be shown and documented as a “service blueprint,” and one of its important functions would be to solve society’s problems by means of design (Jeon, 2014). In 1991, service design was introduced into the academic area by professor Michael Erlhoff and Birgit Mager. In 2001, ‘live | work’ was established as a service design consulting company in London (Moritz, 2005). With this company at the head, many universities, associations and design consulting companies have established departments of service designs, as well as researching and studying service design. Textbooks of service design because of the short history of the topic, even though it is being actively studied from various perspectives.
2.3. Five Principles of Service Design

Stickdorn and Schneider (2011) present five basic principles of service design: “User-centered, Co-creative, Sequencing, Evidencing, and Holistic” (Stickdorn & Schneider, 2011). Information on these is as follows:

1. User-centered

   The goal of user-centered design is to put human needs, abilities, and ways of performing at first. Therefore, understanding people’s demands is the first step toward fulfilling the design goals (Norman, 2013).

   Service design is no different; customers need to be at the center of the service design process, so that designers can understand customers’ needs and expectations, beyond statistical or numeric data (Stickdorn & Schneider, 2011).

2. Co-creative

   Co-creative design examines potential guidelines and collects broad perspectives for use by designers. To achieve the goal, people who are relevant the service have to work and participate together. When an existing or new service investigates and innovates, since it is generated by interaction between providers and customers, the satisfactions of both needs to be met (Stickdorn & Schneider, 2011).

3. Sequencing

   When service which can occur in many places and at any time, takes place, it can be divided into three large steps: pre-service period (when the customer gets in touch with a service), actual service period (when the customer actually receives a service), and the post-service period (Stickdorn & Schneider, 2011, p. 40). Understanding the service timeline is necessary for providing smooth service.
4. Evidencing

The first step of evidencing is to present it as visible objects produced from invisible entities. Evidencing can not only be shown in various product forms such as brochures, posters, and souvenirs but can also be extended to service experiences. Design of service evidence must be consistent with the "inherent story and touch point sequence" of the service (Stickdorn & Schneider 2011, p. 43).

5. Holistic

Service designers should concentrate on the starting point of the service and observe the experiences of both customers and providers. Since this principal goal is improving customer experiences, satisfaction with the work and maintaining a well-designed service process, designers must see all concerns as part of a big picture.

At the holistic level, all parties – providers, customers and employee – should be satisfied with the service (Stickdorn & Schneider, 2011).

2.4. Process of Service Design

Service designers have to observe how service affects and works to the benefit of both providers and customers, how people feel about the service and which parts lead to problems. Table 2.1 shows the service design process from several famous service design companies and associations. Although professionals use different terminology and have their own processes, the basic principles appear to be the same. Task (finding or discovering a problem), Identification (examination and analysis), Idea making (formation, designing, and prototyping), and Delivery (realizing) are the main areas of the process (Jeon, 2014; Jung, 2011).
Table 2.1. *Service design process of worldwide service design providers (Jeon, 2014; Jung, 2011)*

<table>
<thead>
<tr>
<th></th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
<th>Step 5</th>
<th>Step 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Work</td>
<td>Insight</td>
<td>Ideas</td>
<td>Prototype</td>
<td>Delivery</td>
<td>Specifying</td>
<td></td>
</tr>
<tr>
<td>Design Thinkers</td>
<td>Discovering</td>
<td>Concepting</td>
<td>Designing</td>
<td>Building</td>
<td>Implementing</td>
<td></td>
</tr>
<tr>
<td>Moritz</td>
<td>Understanding</td>
<td>Concepting</td>
<td>Generating</td>
<td>Filtering</td>
<td>Explaining</td>
<td>Realizing</td>
</tr>
<tr>
<td>Engine</td>
<td>Identify</td>
<td>Build</td>
<td>Measure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Council</td>
<td>Discover</td>
<td>Define</td>
<td>Develop</td>
<td>Deliver</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To lead processes smoothly, service blueprint is considered to draw an entire service. The concept of a service blueprint was introduced by Shostack in 1984 (Moritz, 2005), who considered it a way to investigate how a process goes, what works and does not work in an existing service, through visualization. The tangible form not only finds hidden errors but also clearly shows the entire process of service and the roles of people who are involved (Yoon, 2011; Jung, 2011).

Therefore, the goal of service design process not only helps transform a service from an intangible to a tangible form but also analyzes the touch point and tries to deliver a positive experience to the customer (Jeon, 2014).

**2.5. Trilogy of Service Design for Website Main Page Design**

Dager (n.d.) presented a lean service design trilogy, divided into three categories, lean, service and design. Lean service design’s main goal is to change providers’ and customers’ thoughts of what companies should emphasize other than their outstanding outcomes.
Dager (n.d.) thinks that the elements of lean consist of “identify value, map value stream, create flow, establish pull, seek perfection; those of service are expectations, understanding, standards, delivery, and perceptions, and those of design are empathize, define, ideate, prototype, and test.”

When lean, service and design are in a close relationship to each other, SD-Logic, which is short for “Service-Dominant Logic,” is generated. According to Vargo and Lusch (2004), in SD-Logic, “knowledge is the fundamental source of competitive advantage,” “all economies are services economies,” and “the customer is always a co-producer” in creating better service design.

Figure 2.1 is based on Dager’s lean service design trilogy in the context of websites.

Figure 2.1. Service design diagram for website MPD
Service, experience and design elements are all important categories of processing in designing a website MPD from the service design viewpoint. These three categories help to create and improve people’s positive experiences, and emotions regarding a website MPD. In addition, each category contains specific elements, and these assist in building a strong concept and idea of the MPD. Accordingly, service, experience and design elements are interrelated with each other even these are presented separately. Therefore, based on figure 2.1, this paper will evaluate and analyze MPDs with regard to these three large categories.

2.5.1. Service

Service is an invisible tool to sustain every economic activity, including production and consumption (American Marketing Association, n.d.; Kim, 2014). Inje University (2014) states “by 2006, the United States had already shown that its service industry accounted for 82% of the entire GDP; while the proportions in the OECD countries, as well, exceeded 60%” Consequently, good service is essential, not optional. In terms of being useful to people, service needs to focus on both customers and service providers. To offer successful services, designers need to understand what service is.

- Touch point: An important concept in service design is to detect a customer’s needs. It takes place when the customer contacts a service in various forms, like user experience, communication and physicality. Consequently, service designers and providers try to determine how they can enhance the customer’s ideas, feelings and experience regarding the service.

- Expectations: When it is based on both customer and provider’s needs, service takes place and works. When people receive a service, they expect a particular service on the
basis of what they think. If the service meets their expectations, their experience is positive, but if not, they may complain.

- Understanding: Studying and researching are the keys to understanding service successfully. Precise understanding of the service and its processes can create a positive impression, provide satisfactory service to all, and make people feel comfortable about the service.

- Delivery: When expectations and understanding of service successfully work together in each function and make for harmony, service may be delivered in a visible or invisible form so as to cause a positive influence.

2.5.2. Experience

Researching experiences of customers is a serious process for designers when they create a new product. Questions such as what and how help to organize target audiences and decide the priority of performance. The following elements are considerations in building a customer experience.

- Desirability: It is strongly related to the emotional part of the customer experience. Desirability takes place through interaction between service (or product) and the customer. When it works successfully, the customer feels the service to be worthwhile.

- Usability: It refers to how customers easily use and interact with a service. Usability can also refer to one of the design process methodologies enhancing “ease-of-use.” When it works well, people feel pleasure, while if it dose not work, people won’t hesitate to leave the product or design (Nielsen, 2012).
• Pleasurability: It refers to the emotion people feel when they experience satisfaction about a design or product. In service design, pleasurability is generated when service and design work together. When they collaborate and pleasurability is felt designers, customers, and providers are all able to enjoy the product.

2.5.3. Design

To create successful designs, designers first have to understand people, because when designers correctly research their target audiences, they can anticipate customers’ needs, expectations, capabilities, and behaviors, and apply this information to creating a suitable design style.

2.5.3.1. Design elements for a website

To build an attractive design, several design elements are needed:

• Navigation: Lets users know their locations and what they search for.
• Content: The main information of the webpage.
• Layout: Helps to organize the entire page. If layout is complex, it can seem chaotic to visitors. Besides, from an aesthetic point of view, if it is not simple, visitors will leave to visit other websites.
• Color: It is strongly related to human psychology, cognition, and emotion. Therefore, choosing appropriate colors is important for attracting visitors and presenting the theme of the website. It delivers specific messages (Elliot & Maier, 2007) and controls the entire atmosphere of design (Empower-yourself-with-color-psychology.com, n.d.).
• Image: Since images can serve as visual cues in users’ minds (Idler, 2012), selecting relevant images of the website theme is important.

• Typography: Size, color, weight, leading, kerning, font family, etc. are elements of typography. Depending on the target groups and design theme, deciding on these elements must be seriously considered. In addition, since typography conveys a message directly and is heavily related to readability, typeface and type family need to be carefully chosen.

2.6. A Website

Through development of the Internet and Wi-Fi, people are able to connect with the world very easily everywhere and at every time, and a great number of websites have appeared and disappeared. People visit and spend a great deal of time staying on websites.

2.6.1. Understanding of a website

Many people hardly read website texts; instead they look through the page and pick some words and sentences that are related to their interests. One study mentioned that 79% of testees skimmed every new page, but only 16% people read them word-by-word (Heng, 2014).

Krug (2000) came to the same conclusion as Heng (2014), pointing out that people do not read a website carefully when they visit. They scan the web page very quickly and catch what words they need. Therefore, designers must understand the main purposes of websites and design the websites clearly through visitors’ eyes. If users cannot obtain what they seek by scanning they will go to other websites.
2.6.2. The basic structure of a website

The basic structure of websites can be divided into three large parts: header, body and footer. These categories are further divided into sub elements; for instance, the logo, navigation, and search box are included in the header.

- **Header:** Usually, composed of logo, navigation, search box, and login button that visitors most frequently find on the main page.
- **Body:** Main information, important messages and Call to Action (CTA) are included.
- **Footer:** Contains general information of website such as address, copyright information, publication. Generally, it is fixed at the bottom of the web page and can be seen on every page. “Footer navigation” is a term used by Nielsen and Tahir (2001).
2.6.3. Two kinds of layout of a website

A goal of every website is to provide information as well as convenience of use, depending on the users’ situation. Website page design can have one of two layouts, a fixed or fluid layout.
1. Fixed layout

   Neilsen and Tahir (2001) used the term “frozen layout” as a synonym for fixed layout. Since it is set with specific values, it does not need to be modified according to the user’s screen size or purpose.

2. Fluid layout

   Neilsen and Tahir (2001) used “liquid layout” as a synonym for fluid layout. Unlike the size of a fixed layout, the website size of a fluid layout can be changed easily depending on the user’s purpose, which encourages wide use of this layout. Consequently, it is suitable for users of future devices.
Figure 2.3. Example of a liquid layout
2.7. A Website Main Page Design

For a website to survive in competition with many other websites, the design of the main page is extremely important. Website design requires an accurate process, professional skills and production of a favorable impression (Song, Howard, Achiche, and Özkil, 2012). The purposes of website design are to build an unforgettable positive experience and an aesthetic experience.

Designers need to keep many considerations in mind when they design the first page. The logo, a search box and “you are here” cues are the core elements (Krug, 2000).

- **Logo**: This should be recognizable as the logo and should identify the site where visitors are. Typically, it is located in the upper left corner of the site. In addition, logo represents the highest component in websites’ logical hierarchy.

- **Search box**: Generally, people prefer to quick search for their needs. The search box serves as a searching tool of website for visitors. It should be presented on every page and linked to every page.

- **You are here**: This is a visual cue to highlight the current location of visitors on global modules, menus, etc. It should be noticeable and stand out two or more design elements need to be mixed such as different type families and different colors. Tabs are used as indications in ‘you are here.’

Other considerations for the MPD, according to Krug (2000):

- A clear mission of the website must be presented to visitors. It should represent why they are visiting the website.

- A search box should be clearly shown on the site.

- Teases are needed. The website needs to show enticement deals or hints on the first page to attract visitors.
• Short cuts are needed. The most frequently used content or links deserve to have their own buttons or links for people to reach them quickly.
• The starting point must be obvious, so that visitors do not wander around the website to find the starting point.
• The first impression should build reliability and trust. Creating a good impression of the site is also important to make visitors revisit.
• Calculating suitable space portions is a key design element in making people focus on the website main page.
• The layout and design must be kept coherent.
• Buttons must be recognizable and clickable.
• The visual hierarchy should be simple and clear.

2.7.1. Use of color

According to Desmet and Hekkert (2009), color can be the first influential factor to catch visitors’ eyes; the second factor is the choice of images, and the last is typography. Color is a powerful tool in researching people. It greatly influences the user’s memory, experience, knowledge, cognition, performance, and awareness (Elliot & Maier, 2007), guiding visitors to make a decision as well as determining the atmosphere of the website (Empower-yourself-with-color-psychology.com, n.d.).

The following are the key functions of color, according to Elliot and Maier (2007):
• Color delivers particular meanings.
• Even small amounts of color may arouse evaluative processes.
• Evaluative processes may motivate behavior.
• Color exerts its effects on psychological functioning.
• Since color meanings and effects are related to each other, color can provide different emotions, considerations, and actions in different people.

2.7.2. Use of image

Images constitute the second factor that engages people in the design (Desmet & Hekkert, 2009).

Idler (2012) says, “90 percent of all information that we perceive and that gets transmitted to our brains is visual.” According to Idler (2012), 37% of people are visual learners. People can scan images, graphs, or graphics more easily than texts. Images can not only engage people’s emotions and memories but also help maintain feelings and memories. Moreover, images add an aesthetic element, help to communicate the content, and catch visitors’ interest. They induce people to stay on the website for more time.

Selecting human images is a smart way to involve visitors with the website, because human images can convey the feeling that visitors are connecting with humans. In particular, images of human faces not only catch people’s attention but also cause people to follow the line of sight of the images (Idler, 2012).

With regard to background images, these can make a website chaotic or neat. Background images can give a quick impression to visitors as to what kind of site it is, so designers have to carefully choose them (Idler, 2012).

The following items about how to choose appropriate images came from Jiang, Feng, H. Liu, and J. Liu (2008):
• Images should be understandable and show attractive visual effects.
• Aesthetic perceptions of images should create a friendly relationship with website users.
• Image colors should be appealing, interesting, memorable and not be especially dark.
• Content and colors of images should be compatible with each other.

2.7.3. Use of typography

Typography, the third visual factor of design (Desmet & Hekkert, 2009), it directly conveys emotion and feeling and gives messages regarding designers’ or providers’ purposes and concepts. Since typography immediately affects the whole web page, designers should consider its location and characteristics carefully.

For instance, according to Desmet and Hekkert (2009), bold text is related to male characteristics, and is therefore to website design for areas such as machinery and construction. In contrast, since light text is associated with female characteristics, it is preferred for websites in such areas as clothing and food industries.

2.8. Impression

Emotion is integrated with various processes such as opinions, facial expressions, body reactions, frame of mind, action proclivity, and ability in handling situations (Eich, Kihlstrom, Bower, and Forgas, 2000; Kim, Lee, and Choi, 2003; Ortony, Clore, and Collins, 1988; Oliver, 1996; Philippot, 1993).

Impression or emotion is concerned with several elements such as awareness, cognition, and culture (Solli & Lenz, 2010) and has great effects on human decisions and behavior (Kim et al., 2003). It can determine the meaning of numerous experiences (Kim et al., 2003; Ortony et al., 1988), along with intelligence (Desmet & Hekkert, 2009), memory and thoughts (Redzuan,
Lokman, Othman, and Abdullah, 2011). For instance, when people buy products, emotion influences their memories of the products and the process of making their decisions and determinations (J. Kim et al., 2003; K. Kim, 1998; K. Lee, 1998).

2.8.1. Human cognition and impression

According to Norman (2013), there are three separate levels, “visceral, behavioral, and reflective” (Norman, 2013, p. 50), of cognitive and emotional procedures. Although these three levels have totally different functions and may seem to work separately, they interact greatly with each other to determine the cognitive and emotional condition of a person. Therefore, designers must consider all three levels if they are to generate their design effectively. The following is summarized from Norman:

1. The visceral level

The visceral response does not need conscious perception or management but rather allows people to act quickly and subconsciously. Everyone is essentially the same at the visceral level, which is the most fundamental of the three levels. It allows people to respond quickly to their current situation, such as heat or cold, stillness or noise.

This level does not judge products. It involves emotions and reacts as a result of instant awareness, such as temptation or awkwardness. Therefore, designers must consider customers’ sensibilities with regard to beauty in guiding visceral reactions.

2. The behavioral level

This level includes learning skills, and actions are related to people’s expectations. For instance, both positive and negative results come from depending on affective responses. Expectations modify the emotional responses of people. Performance and investigations are
mostly at the level subconscious, so they can be the most important factors that designers need to consider.

3. The reflective level

Conscious cognition falls under the purview of the reflective level. Norman (2013) stated that “As a consequence, this is where deep understanding develops, where reasoning and decision-making take place” (Norman, 2013, p. 53). The reflective response not only brings out the top level of emotions and keeps it for an extended time but also affects future behaviors. In other words, cognition and emotion are interrelated in this level, which therefore may be the most significant of the three levels.

2.8.2. Impression of website design

Many factors go into website design, such as color, image, typography, which deliver not only the webpage’s theme and the designers’ and providers’ goals but also lending impression. A successful website design has to bring joy and pleasure to visitors and persuade them to spend time on the website. When all these factors are in harmony, the design will convey an unforgettable positive impression as well as intention of designers and providers. Hence, studying the relationship between design and impression is important in order to achieve performances that make designers go one more step toward meeting users’ expectations.

2.8.3. First impression

According to Gladwell (2005), the first impression, which may be called “rapid cognition,” has a great impact on people when they need to make a judgment in a very short time with little information. This quick judgment can be generated by people’s personal experiences
and their environments as well as being influenced by bias and people’s unconscious attitudes about products.

The importance of the first impression has been emphasized for a long time with regard to the first meeting between two people, interviews of prospective employees, launching of new products, etc.

2.8.4. Importance of first impression of a website’s main page

There is no doubt that web designers should think of a website’s first impression when they build a website, particularly that of the main page, because of the important role of the main page in giving the first impression of products, companies or organizations to the public (Schenkman & Jönsson, 2000).

Since the first impression leads people to make an initial judgment, it can help them recognize which parts are significant and where the starting point is (Gladwell, 2005). Therefore, the touch point of service design in the first impression of a website can help to discover hidden customers’ needs and refine existing issues.

In how short a time can people make judgments when they first see a website main page? Although results of all studies vary, all are in a range of very short times. Users can judge web page within 500 milliseconds – half a second (Gladwell, 2005; Lindgaard, Fernandes, Dudek, and Brown, 2006; Tuch, Presslaber, Stöcklin, Opwis, and Bargas-Avila, 2012), 50 milliseconds (Lindgaard et al., 2006; Tuch et al., 2012) or 39 milliseconds (Plous, 1993, Rabin & Schrag, 1999; Tuch et al., 2012). Consequently, the first impression is key to building a specific experience in users (Reinecke, Yeh, Miratrix, Mardiko, Zhao, Liu, and Gajos, 2013).
2.9. Kansei Engineering

What is kansei?

Kansei refers to a mental attitude in which knowledge, feeling, and desire are in harmony. Accordingly, “people with rich kansei” react sensitively. For example, “This smart phone is beautiful and neat” is a statement of the kansei impression of the product (Nagamachi & Lokman, 2011). In addition, kansei covers emotions such as pleasure, satisfaction, discontent that are felt when people interact with a product (Nagasawa, 2004; Noor, Lokman, and Nagamachi, 2008).

What is kansei engineering (KE)?

Nagamachi and Lokman (2011) referred to an “intuitive mental action of the person who feels some sort of impression from an external stimulus” (Nagamachi & Lokman, 2011, p. 5). In other words, since KE is a customer-oriented design method that includes emotional as well as functional aspects of product design, designers must observe as much as possible about consumers. KE is strongly related with not only impressions but also demands (Hartono, 2012; Nagamachi, 1995; Schutte, 2004), needs (Hartono, 2012; Nagamachi, 1995), psychological feelings, and images produced in customers by seeing products.

2.9.1. Application of kansei engineering

Technology has become more sophisticated and involves professional skills and methods that allow it to survive in huge market places. Focusing on only functionality and usability cannot provide positive outcomes anymore (Hartono, 2012). Since customers seek more
sensitive and satisfying products that they can enjoy, beyond more functionality, kansei engineering and kansei-based products have been studied intensively.

There are many examples can be found, and one of examples is Grimaeth’s battery drills. Grimsaeth (n.d.) studied battery drills that can be found in markets to examine the connection between emotions and product characteristics. Particularly, he tried to use kansei engineering to investigate how participants’ emotions are related to product properties when kansei words are used to describe a product. He presented 14 images of battery drills measured by 25 kansei words, with seven scale semantic differential (SD) scale boxes. From the results, Grimsaeth (n.d.) concluded that although emotions cannot be described perfectly, kansei engineering helps to link emotions and product properties mathematically. Therefore, kansei engineering is beneficial for studying of certain emotions and is an appropriate design tool for emotional design.

Brassieres of Wacoal, electric pots, mechanical pencils, skirts shapes (Nagamachi & Lokman, 2011), and websites (Noor et al., 2008, Song et al., 2012), etc. are other examples.

2.9.2. Methodology of kansei engineering

The following information on type I and II of KE came from Nagamachi and Lokman (2011); the information on III, IV and V were drawn from Grimsaeth’s (n.d.) summary:

1. KE type I: This is the easiest of KE type to understand and follow. Type 1 guides a main idea of a product broken down to more specific ideas, and spread out to several levels, after which it is translated to physical product design properties.

2. KE type II: “The Kansei engineering Type II is a technique of translating the image or Kansei of a product that consumers hold in their minds into tangible product design
elements” (Nagamachi & Lokman, 2011, p. 32). Consumers’ kansei words are gathered and the meanings will be examined by means of statistical analysis.

3. KE type III: A mathematical model is devised, and the input to output relationship is calculated.

4. KE type IV: This type, called hybrid kansei engineering, has method a similar to that of type II. Designers can put their own creativity by use of kansei words, into the product, thus they creating a product to which a perfect fit of the kansi with their creativity.

5. KE type V: This type, virtual kansei engineering, combines the virtual reality of the physical product with kansei engineering. It offers an indirect experience of the product to customers before they decide to purchase.

This study will focus on Kansei Engineering type II methodology to investigate emotions related to three website MPDs.

2.9.3. Kansei words

With regard to kansei words, Nagamachi and Lokman (2011) say, “in Kansei engineering, an indirect measurement method has been adopted through words that are closest to Kansei expressions, like elegant or flashy” (Nagamachi & Lokman, 2011, p. 53). In other words, kansei words describe a product in specific words and accordingly, must not be restricted to adjectives.

There are several methods of extracting kansei words, according to Nagamachi and Lokman (2011):

1. Document dialogues between customers and employees.
2. Search books such as dictionaries, posters, catalogs, publications, folders, booklets related to the product, and make lists of words.

3. Ask experts about the product.

4. Ask users who have experience with the product.

Extracting 600 to 800 kansei words (Nagamachi & Lokman, 2011) is recommended, because it is easy to select the largest number of required words when designers have many kansei words from which to choose.

2.9.4. Construction of semantic differential (SD) scale

The semantic differential scale was developed by Osgood and his colleagues (Nagamachi & Lokman, 2011). The idea came from studying and measuring words as an image scale, because when each word is on one straight line with dimensional scales, humans can think that words can be measured with scale boxes. Thus, this method allows people to think that they can measure everything in their mind (Nagamachi & Lokman, 2011).

KE is consistent with Osgood’s theory that adjectives can be measured on an images scale. On the other hand, Nagamachi and Lokman’s (2011) idea is somewhat different. They believe: “Elegant and crude are not necessarily expressible using a straight line (a symmetric line that has a 180 degree angle), and in regard to product design, a measuring method using a sensor of crude is inappropriate. Words like bad, crude, or dirty are words expressing a lack of value; their negative side is not good in itself. These are not appropriate for evaluating products or comfort” (Nagamachi & Lokman, 2011, p. 54).

Therefore, kansei engineering does not use antonyms words such as elegant – inelegant, rather than elegant - crude.
Generally, a five-level rating system is preferred because it is commonly used for ratings in many fields (Nagamachi & Lokman, 2011), so evaluators may feel comfortable with it. Too many rating levels may cause test subjects to become bewildered and give unclear evaluations.

Figure 2.4 is an example of what the five-level rating system looks like.

Figure 2.4 Construction of semantic differential (SD) scale, Nagamachi & Lokman, 2011
CHAPTER 3
CASE STUDY OF AN EXSISTING HEALTHCARE WEBSITE

3.1. Overview

According to the Pew Internet & American Life Project (2006, 2009), many people search for healthcare information and follow the advice given on websites.

Many healthcare information and insurance websites exist, all trying to introduce and sell their information, ideas and products, and the government is no different. As the same topic interest both people and government, the federal government shares various kinds of information of healthcare, and tries to benefits as many people as possible. In this study, an existing healthcare website, HealthCare.gov, will be investigated.

3.2. HealthCare.gov

The purpose of HealthCare.gov is to provide information on various insurance options and subsidies for 36 states. It was launched on October 1, 2013 and has become a main online hub under the Obama administration; its policy is called the Patient Protection and Affordable Care Act (ACA) or ObamaCare (Ballotpedia, n.d.). Ballotpedia (n.d.) states: “The federal government expected that seven million Americans who were previously uninsured would buy a health insurance plan by March 31, 2014. The White House hoped to have about 2.7million of the enrollees be a young adult in order to offset the costs of insuring those with preexisting conditions. The administration expected about 500,000 enrollees by the end of October 2013, but only 106,185 were enrolled” (Website usage, para. 1).
Table 3.1 is generated from information in a Health and Human Services (HHS) report. It shows how many people visited HealthCare.gov from October 21, 2013 to May 1, 2014.


<table>
<thead>
<tr>
<th>Date</th>
<th>The state and federal exchanges</th>
<th>Call center</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 1, 2014</td>
<td>98.3 million</td>
<td>33.3 million</td>
</tr>
<tr>
<td>March 11, 2014</td>
<td>75 million</td>
<td>19 million</td>
</tr>
<tr>
<td>February 12, 2014</td>
<td>64 million</td>
<td>16 million</td>
</tr>
<tr>
<td>January 13, 2014</td>
<td>53.2 million</td>
<td>11.3 million</td>
</tr>
<tr>
<td>December 11, 2013</td>
<td>39.1 million</td>
<td>5.2 million</td>
</tr>
<tr>
<td>November 13, 2013</td>
<td>26,876,527</td>
<td>3,158,436</td>
</tr>
<tr>
<td>October 21, 2013</td>
<td>20 million</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Table 3.2 shows that most of the enrollees, according to a Health and Human Service report, are people age 45 to 64.

Table 3.2. *Number of enrollees, Health and Human Services report (2014a, 2014b, 2014c, 2014d)*

<table>
<thead>
<tr>
<th>Date</th>
<th>Age 34 and under</th>
<th>Age between 45 and 64</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 1, 2014</td>
<td>34%</td>
<td>48%</td>
</tr>
<tr>
<td>March 11, 2014</td>
<td>31%</td>
<td>N/A</td>
</tr>
<tr>
<td>February 12, 2014</td>
<td>31%</td>
<td>53%</td>
</tr>
<tr>
<td>January 13, 2014</td>
<td>30%</td>
<td>55%</td>
</tr>
</tbody>
</table>

According to Klein (2013), when the ratio of young and healthy enrollees to total enrollees is 39%, HealthCare.gov considers that a success.
3.3. Study of HealthCare.gov Website Main Page Design

The information on color, photography (images), typography, and layout came from Styleguide.HealthCare.gov.

3.3.1. Analysis of the main page colors

HealthCare.gov has three major colors, blue, white, and grey (figure 3.1). The function of these colors is to distinguish each section, such as clarifying links, call to action, and any other potential accessibility problems related to color blindness (Jones & Tannen, 2014).

The terminology of “primary palette” and “accent palette” came from Styleguide.HealthCare.gov (n.d.).

3.3.1.1. Colors in the HealthCare.gov site

The primary color of HealthCare.gov website is blue (#046791 and #043f59). Styleguide.HealthCare.gov (n.d.) points out “According to basic color theory, blue symbolizes trust, confidence, and sincerity. Blue is also used extensively to represent calmness and responsibility” (Primary palette, para. 1). Furthermore, blue represents as releasing stress (Clarke and Costall, 2007; Long, 2011), financial reliability (J.Eckstut and A. Eckstut, 2013), communication, intelligence (Fraser and Banks 2004; Labrecque and Milne, 2010; Mahnke 1996; Wright 1998), calm (J.Eckstut and A. Eckstut, 2013; Long, 2011), peace, honesty, confidence (Bleicher, 2005), protection (Labrecque and Milne, 2010; Murray and Deabler 1957; Schaie 1961; Wexner 1954) and faith (Bleicher, 2005; J.Eckstut and A. Eckstut, 2013).

White represents all characteristics, negative and positive, of all colors. This is because white light is made up of all the wavelengths corresponding to all the colors of the visible
spectrum, as can be seen when white light is dispersed by passing through a prism. Generally, it is symbolic of medical areas because a doctor’s room, doctor’s gown, etc., to suggest cleanliness and efficiency.

Blamelessness, cleanliness (Long, 2011), and providing a sense of rest and tranquility (Bleicher, 2005) are key words associated with white.

Grey presents a compromise from the viewpoint of psychology. It also suggests maturity, wisdom, calm, and consideration, perhaps because it is related to grey hair of the old (Long, 2011). Since this color is quiet (Long, 2011) and neutral (Bleicher, 2005), it is appropriate for use with various colors.

![Color Palette](image)

Figure 3.1. *Primary color palette of HealthCare.gov, Styleguide.HealthCare.gov, n.d.*

HealthCare.gov has two accent colors (figure 3.2). These two colors are assigned to buttons and notifications, and their functions are to grab visitors’ attentions as well as to emphasize important information on each page. Therefore, these are not used more than once on any single page.

Green is a balancer of the mind and maintains harmony of body and emotions from the viewpoint of psychology (Athen, 2012). In particular, choosing a dark green for money and financial websites is a suitable decision, because green can lead people to correct judgments and

![Call to Action Green](#12890E 26/138/67)

![Notification](#EEFAFE 238/249/253)

Figure 3.2. *Accent color palette of HealthCare.gov, Styleguide.HealthCare.gov, n.d.*

Figure 3.3 presents various blues used in the site.

![Call to Action Bar](#04689B 4/104/155)

![Call to Action Icon](#043f59 4/63/89)

![Tile Hover](#164769 20/72/106)

![Action Bar](#0a5c87 9/93/135)

![Action Bar Hover](#0c6a9c 9/108/157)

![Email Block](#0d76ad 14/118/173)

![Blog Block](#0a5c87 9/93/135)

Figure 3.3. *Various blues of HealthCare.gov, Styleguide.HealthCare.gov, n.d.*

3.3.2. Typography of HealthCare.gov site

Typography directly shows information and gets people’s attentions, integrating them into the page. Hence, it must be readable and recognizable. HealthCare.gov uses two different typefaces, slab serif and sans serif, to complete their purpose.
The first font is Bitter, which is a kind of slab serif. According to Styleguide.HealthCare.gov (n.d.), “Bitter, a slab serif font, offers an approachable, personality-filled style, which is a nice juxtaposition with the more formal sans-serif” (Bitter (slab serif), para. 1). Therefore, according to Styleguide.HealthCare.gov (n.d.), Bitter is available not only for use in the introduction and welcoming headline as the main type but also to lead people easily to the next step, san serif type.

The other font is Open Sans, which is based on sans serif. Since the Open Sans type family has various kinds of weights such as light, regular, it is suitable for use in hierarchies to preserve a visual unification and emotion. Open Sans is classified as a highly legible typeface on screens with multiple display sizes, platforms and browsers.

3.3.3. Photos on HealthCare.gov site

Photos are used as background images with a non-focusing design method, except for people’s faces. Since this design style emphasizes faces, it helps to build friendly feelings in visitors. On HealthCare.gov, the functions of photography are to aid in conveying messages, to engage visitors, to build trust, and to provide a comfortable feeling.

3.3.4. Layouts and Grid systems of HealthCare.gov site

Figure 3.4 indicates the layout of the main page. Its template helps to maintain consistency and present a clear composition.
The website uses Bootstrap, which includes “a responsive and mobile first fluid grid system” and can be extended up to 12 columns (Bootstrap, n.d.).

3.3.4.1. Main page

Through the main page, HealthCare.gov tries to involve a user in the website with an attractive appearance and useful contents. The main page uses the global modules header and footer. Call to action (CTA), action bar, email signup and blog modules are presented to present information clearly.
3.3.4.2. Global modules (header and footer)

The global modules are always in the same place, allowing visitors to easily access the header and footer from every page (Styleguide.HealthCare.gov, n.d.).

The header navigation consists of Individuals & Families (#17415f) and Small Businesses (#046791) tabs. Its intention is to let visitors know their location on the website and show two subtopics on one straight line.

The footer has information on Health Insurance Marketplace and HealthCare.gov. This part is also fixed, so visitors can reach that part from every page, depending on their needs.

3.4. Analyzing HealthCare.gov site

The design of the HealthCare.gov website is changing and being improved constantly. However, design issues can still be found in the service design aspects.

In this section, HealthCare.gov MPD June 2014 to September 2015 will be examined to determine how the website was being revised and improved during this period. Considerations of service design that were mentioned in the literature review are reviewed and evaluated in this section.

The following figures show changes in MPD during the approximately 15 months period. Appendix C has more figures.

- Service
  - Touch point
- Experience
  - Impression
- Design elements
The call to Action (CTA) button, in particular, was chosen to be analyzed as a touch point in the service category. Because the CTA provides short cuts of the main information categories of websites, when it is clicked, it takes people directly to certain information. Because the CTA in websites is presented as a group of clickable buttons with eye catching design and use of active verbs (Soskey, 2013) on the main page, it encourages visitors to act by clicking a button.

Although the experience category includes the factor of usability (see figure 2.1), this study investigates the only the MPD of a website; usability therefore will not be considered in this study. Desirability and pleasurability are involved in impression. Service, experience, and design elements are all interrelated in building website MPD in the service design aspect. Therefore, although each category will be analyzed separately, each can be explained on the basis of its relationships to other categories.
Figure 3.5. June 2014, HealthCare.gov MPD, HealthCare.gov, n.d.

Figure 3.6. October 6, 2014, HealthCare.gov MPD, HealthCare.gov, n.d.
Figure 3.7. February 13, 2015, HealthCare.gov MPD, HealthCare.gov, n.d.

Figure 3.8. July 23, 2015, HealthCare.gov MPD, HealthCare.gov, n.d.
3.4.1. Analysis of June 2014 HealthCare.gov MPD with regard to specific elements

Service

- Touch point: Figure 3.5 shows that the CTA not only shares similar background color with that of the main content part but also has small text sizes and icons without any visual cues to distinguish the main and CTA parts. In addition, figure 3.9 shows a weakness of visual impact because of fewer colors and small icons of the CTA. This lack of interesting features does not motivate visitors to click that part and does not quickly catch users’ eyes.

Figure 3.9. CTA, June 2014, HealthCare.gov MPD, HealthCare.gov, n.d.

Experience

- Impression: Figure 3.5 indicates an absence of interesting visual impacts and motivations for people to stay on the website. The crowded footer design and its larger size compared to the main content part can prevent users from paying attention to the main information.

Design elements

- Color: Blue and grey were the main colors for the website in June. Since only two colors dominant the entire page, without a color spectrum or contrast, people can find it boring.
- Image: There are no images.
- Typography: In the main content part, two different typefaces are used. However, since their sizes are similar, visitors may not recognize quickly what is the core information of HealthCare.gov is. Similarity of sizes and colors make it difficult for a viewer to focus on the main idea.
3.4.2. Analysis of October 6, 2014, HealthCare.gov MPD with regard to specific elements

Service

- Touch point: When the CTA of figure 3.5 is compared to that of figure 3.6, figure 3.6’s CTA is seen to be larger and clickable. Figure 3.10 shows white lines between buttons. These lines help each button to be recognized and be focused on separately. Compared with figure 3.9, the icon designs and its contents were different. The question mark of the “Dates & deadlines” icon produces confusion as to whether it is an error sign or not.

![Figure 3.10](image)

Figure 3.10. CTA, October 6, 2014, HealthCare.gov MPD, HealthCare.gov, n.d.

Experience

- Impression: Figure 3.6 shows that the MPD is improved over that shown in figure 3.5. The small group image is updated enough to affect the trustworthy impression (Ha & Kang, 2010) of HealthCare.gov. In the footer, the light grey color and grouping of similar topics with a three-column grid make this part neat and simple.

Design elements

- Color: Contrasting shades of blue clearly divide section from section and helps to present a simple and clear grid.
- Image: Human faces can catch people’s attention and also make people follow the line of sight (Idler, 2012); however, since the line of sight of figure 3.6 is outward, visitors may
not focus on the information on the screen. In addition, toned down image can give a less interesting and less attractive impression (Jiang et al., 2008).

- Typography: The toned down photo makes the main information pop up, so that people may easily catch it. Contrast of type size helps to lead visitors’ eyes from the top of the main information to the bottom (see figure 3.6).

3.4.3. Analysis of February 13, 2015, HealthCare.gov MPD with regard to specific elements

Service

- Touch point: Figure 3.11 shows that the CTA keeps the same design and format as those of figure 3.10. Although the contents were changed, two icons, “changing plans?” and “tax questions?” are the same as “medicade & chip” and “will you save?” (see figure 3.10). The white lines are still used in an attempt to separate buttons, but the line is too thin and the color is weak.

![Figure 3.11. CTA, February 13, 2015, HealthCare.gov MPD, HealthCare.gov, n.d.](image)

Experience

- Impression: Under the CTA, the white box with a three-column grid appears instead of the e-mail signup and blog module (see figure 3.7). This part separates body from footer. It disturbs the unity of the entire design.
Design elements

- Color: The same color palette is used as in the previous MPD (see figure 3.6). The white information box fails to build color harmony between the main content and the footer.

- Image: Human images can involve visitors to the website because they can convey the feeling that visitors are connecting with humans (Idler, 2012). However, since the female torso is used on the main page, the rustworthy impression of a small group (Ha & Kang, 2010) as seen in figure 3.6 disappears and it does not provide an attractive visual impression (Jiang et al., 2008).

- Typography: Contrast of text size with white color helps people to catch the important information on what they need to learn from the website (figure 3.7).

3.4.4. Analysis of July 23, 2015, HealthCare.gov MPD with regard to specific elements

Service

- Touch point: HealthCare.gov maintained its major website structure and color palette in its MPD from February 24, 2105 to September 30, 2015 (see appendix C). In the CTA part, only the content and icon designs were changed. Although white lines still separate buttons (see figure 3.12), since they are too thin, some visitors may hardly recognize them.

Figure 3.12. CTA, July 23, 2015, HealthCare.gov MPD, HealthCare.gov, n.d.
Experience

- **Impression:** The mother and baby image is updated (see figure 3.8). When figure 3.7’s and figure 3.8’s MPDs are compared, the family image of figure 3.8 portrays a more safe, comfortable, honest and friendly feeling (Ha & Kang, 2010) than that of figure 3.7.

Design elements

- **Color:** Color is well balanced, but feels monotonous and boring because of use of less contrast of shades of blue.

- **Image:** The photo of mother and baby brings a comfortable feeling and a safe atmosphere (Ha & Kang, 2010) to the website. However, since the photo is toned down, the positive impression of the family image is weakened (Jiang et al., 2008).

- **Typography:** Contrast of text size with white color help people to catch the important information about what they need to know from the website (figure 3.8).
CHAPTER 4
RESEARCH METHODOLOGY

4.1. Overview

To investigate the effects of design on emotional impressions of healthcare websites, three MPDs were presented to participate: the existing MPD of HealthCare.gov (design 1) and two new prototypes of MPDs. One prototype was developed on the basis of service design elements suggested by Dager (n.d.) and produced by the author (design 2). The other prototype was developed so as to be type-dominant (design 3). For evaluation of each design, 10 kansei words were selected based on the figure 2.1. For data collection, an online survey was sent to the entire Iowa State University population consisting of undergraduate and graduate students as well as faculty and staff members.

4.2. Selection of Kansei Words

Words were chosen from the following sources:

- Articles related to HealthCare.gov
- Opinions and thoughts of HealthCare.gov visitors as expressed in various online forums and polls
- The author’s opinion, as a graphic designer, of the HealthCare.gov website design

After a rough kansei word selection consisting of collecting 264 kansei words, words were carefully chosen that were related to the service design diagram presented in figure 2.1. Table 4.1 shows the final kansei word selection in each category. Additional information on the process is provided in appendix D for all kansei words.
Table 4.1. *Three categories of kansei words from service design for website MPD.*

<table>
<thead>
<tr>
<th>Category</th>
<th>Kansei words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Experience</td>
<td>Healthcare, new benefits, useful, helpful and personal</td>
</tr>
<tr>
<td></td>
<td>Trustworthy, pleasant and meaningful</td>
</tr>
<tr>
<td>Design elements</td>
<td>Attractive and simple</td>
</tr>
</tbody>
</table>

4.3. **Three Main Page Designs**

To give participants a general idea of a healthcare website, the full logo of HealthCare.gov was not displayed.

To investigate which design elements affect the emotional impressions of healthcare websites, three different MPDs were created.

4.3.1. **Design 1**

Design 1 (figure 4.1) was mentioned on Page 45.
Figure 4.1. Design 1
4.3.2. Design 2

Figure 4.2. Design 2
Design 2, based on service design elements suggested by Dager (n.d.) and produced by the author. Unlike design 1, design 2 is image dominant, with bright and warm colors. Through comparing brightness and image size of design 1 and 2, the elements that affect various impressions can be investigated. To reduce the need for scrolling, the footer was reduced, as was the information. Therefore, the length of design 2 was less than that of design 1. While design 1 features only several shades of blue, design 2 uses several colors. Unlike design 3, design 2 focuses on images instead of typography. The purpose of design 2 is to detect how image-dominant design and use of several colors affect the impression given by a design.

Service

- Touch point: Figure 4.3 highlights that the call to action (CTA) button focuses on several bright colors to catch the visitor’s eyes. Different colors clearly indicate different sections and make the CTA clickable (Soskey, 2013). People can miss or may need to scroll down, to see the bottom information, depending on their screen size, as seen in figure 4.1. However, the screen shown in figure 4.2 tries to avoid this issue; the length of the entire website was reduced. In line with this layout, the height of the CTA and two modules was also reduced.

Figure 4.3. CTA of design 2

As another point of concern of design 1 (figure 4.1), people can become confused between “see if you can get coverage” of the main information in the main content part
and “coverage to care” of the CTA because of use of the same word “coverage.” Therefore, “see if you can get coverage” of design 1 (figure 4.1) is changed to “get it” in design 2 (figure 4.2).

Experience

- Impression: To maximize the comfortable and trustful impression of the face of the smiling baby girl in the mother’s arms (Ha & Kang, 2010), a bright and warm color palette is used (Jiang et al., 2008).

Design elements

- Color: In design 2 (figure 4.2), although various colors are used, they produce a feeling of harmony and a positive mood in visitors. The color yellow suggests desire (Long, 2011), knowledge, and lucidity (Bleicher, 2005); according to the Luscher color test, yellow means luminous and delightful thoughts (Bleicher, 2005). The meaning of orange is intimacy, magnanimity, profusion (Gill, 2000), enhancement of happiness (Bleicher, 2005), excitement (Labrecque & Milne, 2010; Wexner, 1954), liveliness, energy, and sociability (Labrecque & Milne, 2010; Mahnke, 1996). Brown suggests the importance of home and feelings of belonging (Gill, 2000), reliability, help (Fraser and Banks 2004; Labrecque & Milne, 2010; Mahnke 1996; Wright 1998), and protection (Labrecque & Milne, 2010; Murray and Deabler 1957; Wexner 1954). Accordingly, three colors are enough to produce a positive feeling about the website. In addition, a large light grey part helps to put the focus on the main part and the CTA, so that people can easily concentrate on the main part.

- Image: The image was purchased from ‘Getty image.’ According to Ha and Kang (2010), family photography gives impressions of guarded, comfortable, secure, trustworthy and
friendly. Unlike the image of design 1, the image is bright and dominant. The baby girl’s eyes face users, so that people can feel they are directly interacting with the girl and can readily be involved in the website. The image also creates natural eye movement; people may interact with the baby’s eyes first; then their eyes will move to the mother’s face, and finally, they will look at the main information.

- Typography: Since ‘Open Sans’ can be easily read with various screen sizes (Styleguide, n.d.), it was chosen as the main font.

4.3.3. Design 3

Design 3 highlights typography and visual punctuations. As was done in the case of design 2, the footer was reduced and information was minimized to avoid unnecessary scrolling. Therefore, the length of design 3 was less than that of design 1. In particular, the CTA part was focused on by use of several colors, large icons, and visual punctuation. Unlike design 1 and 2, design 3 has no images. The purpose of design 3 is to detect how typography, colors and graphical elements affect the impression they give in the absence of any images.
You can still get 2015 health coverage

You can enroll if you have certain life changes - like getting married, having a baby, losing other coverage, or moving - or if you qualify for Medicaid or CHIP

Figure 4.4. Design 3
Service

- Touch point: Division of sections with different color palettes help people to recognize sections from each other immediately (see figure 4.4). Consequently, visitors can quickly see big three sections and can quickly decide which part they need to click on. Figure 4.5 portrays the CTA part highlighted by visual punctuation with large circles and flat colors.

![Figure 4.5. CTA of design 3](image)

Since the short length of the website allows no scrolling, people can easily see the entire main page and the information on it in design 3 (figure 4.4). Krug (2000) and Heng (2014) point out that people do not read a website carefully; they scan the web page very quickly and catch what words they need. Therefore, the least information necessary is presented on the main page, to help people obtain information quickly.

Experience

- Impression: The colorful main page and the big circles that serve as visual punctuation (figure 4.4) are enough to attract people at first glance and get their attention.

Design elements

- Color: Orange, purple, and green are used as the main colors. Meanings of purple are desirability (J.Eckstut & A.Eckstut, 2013), richness, authenticity (Fraser and Banks 2004; Mahnke 1996; Wrignt 1998; Labrecque & Milne, 2010), royalty (Mahnke
Complementary colors create an active atmosphere and guide people to focus on the information in each section. In particular, the huge orange part and white text catch the visitor’s eyes at first glance as well as causing people to focus on the main information on the website.

- Image: An image is not used in this design.
- Typography: Bitter and open sans fonts are used together with different sizes, to distinguish main points from subpoints of information.

### 4.4. Survey

To meet a broad range of participants in a short time, an online survey method, Qualtrics, was chosen. Two online survey links, part A and B, were sent to the ISU population.

#### 4.4.1. Online survey

The purpose of part A was to investigate research question 3 “Which design elements affect emotional impressions in healthcare websites,” when the three designs were presented at the same time on one page. People could set the rankings 1 to 3 (1 is highest) for the ten questions:

Q1. Which design informs you better about health care?

Q2. Which design looks trustworthy?

Q3. Which design gives you the most pleasure?

Q4. Which design seems to give you new benefits?
Q5. Which design looks the most attractive?
Q6. Which design looks the most useful?
Q7. Which design looks the most helpful?
Q8. Which design looks the most simple?
Q9. Which design seems the most meaningful?
Q10. Which design looks as if it would keep your personal information confidential?

The 10 questions were created around 10 selected kansei words. The three designs were evaluated with responses to the 10 questions and analyzed according to the service, experience and design elements categories.

In part A, of the study, the presented design A is design 2, design B is design 1, and design C is design 3.

The intention of part B was to examine research question 3 “Which design elements affect emotional impressions in healthcare websites,” when the three designs were presented separately. Respondents checked five-level semantic differential scale boxes in 10 kansei words, “healthcare,” “new benefits,” “useful,” “helpful,” and “personal” in the service category, “trustworthy,” “pleasant,” and “meaningful” in the experience category, and “attractive” and “simple” in the design elements category. In part B, the presented design A is design 2, design B is design 3, and design C is design 1. The design order of part A and B were different to prevent participants sharing thoughts or opinions among themselves during survey periods. The online survey was available for two weeks.
4.4.2. Participants

The two surveys were sent to all ISU students, staff and faculty members. Half of this population received part A and the other half received part B. A total of 677 people participated. For part A, the total number of respondents was 293, and for part B, 384 people completed the survey.

Although participants were asked to provide their demographic information at the beginning of the surveys, this study did not analyze this information separately. Since websites need to be satisfactory to all users, the three MPDs were analyzed regardless of age, gender, position and ethnicity of the participants.

The online survey software had some limitations. Therefore, the three designs and five-level rating semantic differential scale boxes were not presented successfully as was the author’s intention.
CHAPTER 5
DATA ANALYSIS AND RESULTS

The data, collected with Microsoft Excel, were analyzed by used of the IBM Statistical Package for the Social Sciences (SPSS). Part A and B results were analyzed with respect to three categories (see figure 2.1) and sets of kansei words (see table 4.1).

5.1. Part A

Participants, who were all over 18 years old, were recruited from the ISU population and had various backgrounds and lifestyle (see appendix F). A total of 293 people participated (see appendix F).

5.1.1. Ranking analysis

Figure 5.1 presents the results in the service design category. Design 1 received high percentages of 1st rankings. In particular, under the question “showing personal information,” design 1 is for superior (58.7) to design 2 (26.2) and design 3 (15.3). In addition, responses to the question “better informing about healthcare” shows that design 1 received a higher percentage (52.6) than design 2 (27.4) and design 3 (23.7). The percentage gap is less when design 1 (36.1) is compared with design 3 (34.5) on “getting new benefits.” These analyses show that color and short length of the CTA are not important elements affecting these impressions.

Design 1’s website length affects the “informing healthcare” and “personal information” impressions. On the other hand, it does not affect the “getting new benefits” impression.
Design 1 (42.5) and design 2 (39.6) have similar percentages on “helpful,” but design 3 has a much lower value, 23.5. Hence, this result shows that image plays an important role in building the “helpful” impression.

The blue color palette of design 1 shows that blue affects trust, sincerity, calmness (Styleguide.HealthCare.gov, n.d.), financial reliability (J.Eckstut and A. Eckstut, 2013), honesty (Bleicher, 2005), and protection (Labrecque and Milne, 2010; Murray and Deabler 1957; Schaie 1961; Wexner 1954), as mentioned in the literature review, compared with design 2’s color palette (see figure 4.1 and 4.2). Blue suggests build “better informing healthcare,” “useful” and “showing personal information” impressions in the service category.

Design 1 is evaluated as an appropriate MPD compared with design 2 and 3 in the service category for a healthcare website.

![Graph showing first ranking percentages for three designs in the service category](image)

**Note:** D1 is design 1, D2 is design 2, and D3 is design 3.

**Figure 5.1. Percent of 1st ranking of three designs in the service category**

Figure 5.2 shows the results of three designs in the experience category. Although design 2 achieved the 1st ranking in “meaningful,” its percentage (49.8) is only slightly
higher than that of design 1 (41.7). Moreover, design 1 received the 1st ranking on “trustworthy” (52.6) but does not greatly differ from design 2 (46.6). Therefore, it cannot be said that they differ with regard to results of “meaningful” and “trustful.” Hence, the most that can be concluded is that the family image, and both the blue of design 1 and the several colors of design 2, contribute to producing “meaningful” and “trustworthy” impressions of healthcare websites (Ha & Kang, 2010, Styleguide.HealthCare.gov, n.d.).

Furthermore, design 2 was highly related with a “pleasant” impression. The agreeable family-oriented image (Jiang et al, 2008) and bright colors, along with the variety of colors used, probably helped build this “pleasant” impression.

Design 3 received the lowest percentage of 1st rankings on all three questions (see figure 5.2). In particular, design 3 received only 4.9 percent in the “trustworthy” impression. This result suggests that image is important in creating a “trustworthy” impression on healthcare websites. Type-dominant in a healthcare website MPD does not give “trustworthy,” “pleasant” and “meaningful” impressions to participants. In the experience category, design 2 was determined to be the most appropriate healthcare website MPD.

Note: D1 is design 1, D2 is design 2, and D3 is design 3.
Figure 5.2. Percent of 1st ranking of three designs in the experience category

In the design elements category, figure 5.3 indicates that design 2 received a higher percentage (58.5) or 1st rankings than design 1 (25.9) or design 3 (17.9) in “attractive.” Accordingly, the bright image and use of several colors of design 2 appear to be enough to generate an “attractive” feeling in response to the healthcare website MPD.

Design 3 has a higher percentage of 1st rankings in “simple” (69.8) than design 1 (11.2) and design 2 (21.0). Design 3 is appropriate for creating simple healthcare websites with various type sizes, icons, colors, simple grid, and visual punctuation, without images. However, it appears to be unsuitable to provide an “attractive” impression to participants.

Design 1 is not associated with any remarkable results in the design elements category. Its MPD, with blue dominating and a toned down image, are not suitable for providing “attractive” and “simple” impressions.

Note: D1 is design 1, D2 is design 2, and D3 is design 3.

Figure 5.3. Percent of 1st ranking of three designs in the design elements category
Table 5.1 summarizes results when the three designs are shown and evaluated at the same time, as to which design elements contribute and do not contribute to produce 1st rankings and high means’ impressions from the 10 questions in each category.

Table 5.1. Considered design elements contributing to 10 impressions

<table>
<thead>
<tr>
<th>Questions</th>
<th>Design elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better informing about healthcare*</td>
<td>Length of website and blue color</td>
</tr>
<tr>
<td>Getting new benefits*</td>
<td>Colorful call to action (CTA) is not important</td>
</tr>
<tr>
<td>Useful*</td>
<td>Length of website and blue color</td>
</tr>
<tr>
<td>Helpful*</td>
<td>Images</td>
</tr>
<tr>
<td>Showing personal information*</td>
<td>Length of website and blue color</td>
</tr>
<tr>
<td>Trustworthy**</td>
<td>Images</td>
</tr>
<tr>
<td>Pleasant**</td>
<td>Bright image and several colors</td>
</tr>
<tr>
<td>Meaningful**</td>
<td>Images</td>
</tr>
<tr>
<td>Attractive***</td>
<td>Bright image and several colors</td>
</tr>
<tr>
<td>Simple***</td>
<td>Color, visual punctuations, simple grid and icons</td>
</tr>
</tbody>
</table>

Note: *Service **Experience ***Design elements.

Figure 5.4, 5.5 and 5.6 show how frequently each design achieved 1st rankings and to which category they are highly related. Design 1 is overwhelmingly in the service category and design 2 is highly involved in the experience and design elements categories. Design 3, however, achieved only one 1st ranking that of “simple,” in the design elements category.
Figure 5.4. *Number of 1st rankings of Design 1*
Service **Experience ***Design elements.

Figure 5.5. *Number of 1st rankings of Design 2*
Service **Experience ***Design elements.
Although design 1 achieved many 1st rankings among the three designs (figure 5.4, 5.5, and 5.6), from the mean value (table 5.6), design 2’s mean (2.244) is seen to be higher than design 1’s mean (2.171). Consequently, participants appeared to regard design 2 as appropriate for the MPD of healthcare website.

Table 5.2. *Mean values of the three designs*

<table>
<thead>
<tr>
<th>Design</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design 1</td>
<td>2.171</td>
<td>0.484</td>
</tr>
<tr>
<td>Design 2</td>
<td>2.244</td>
<td>0.397</td>
</tr>
<tr>
<td>Design 3</td>
<td>1.621</td>
<td>0.509</td>
</tr>
</tbody>
</table>
5.2. Part B

A total of 384 people completed 30 questionnaires (see appendix F).

5.2.1. Five-level rating Semantic Differential scales analysis

Figure 5.7 indicates the mean values for the three designs with regard to 10 kansei words. In the service category, for the kansei words “healthcare” (design 1 achieved 4.2 and 2 achieved 4.0 and design 3 received 3.8) and “getting new benefit” (design 1 got 3.9, design 2 achieved 3.6 and design 3 received 3.8), the three designs had similar means. These results suggest that image, colors and typography are not significant elements in producing “healthcare” and “getting new benefit” impressions in visitors to healthcare websites.

With regard to the “useful” and “helpful” impressions, design 1 achieved a mean of 4.0 and design 2 and 3 received means of 3.8. Image, colors and type-dominant design therefore do not appear to be important factors. However, since the mean for design 1 is slightly higher (4.0) than the mean for design 2 (3.8) or 3 (3.8), both length of websites and blue color appear to affect impressions.

Design 3 has an extremely low mean (2.4) on the “personal” impression. Since design 2 (3.6) and 1 (3.5) achieved similar means, image appears to be strongly important to create a “personal” emotion. These results suggest that color and short length of the CTA are not important factors in healthcare websites MPD with regard to the service category.

In the experience category, design 1 and 2 had the same mean (4.0) for “trustworthy.” Since design 3 received a mean of 3.3, image appears to be an important element for building a “trustworthy” feeling to healthcare websites. With regard to the “pleasant” impression, design 2 achieved a higher mean (4.3) than design 1 (3.8) and design
2 (3.2). Therefore, bright images and use of several colors appear to produce a “pleasant” impression. For the kansei word “meaningful,” the mean of design 1 is slightly higher (3.7) than that of design 2 (3.6) and the mean of design 3 was 3.1. Consequently, image seems to contribute a “meaningful” emotion.

In the design elements category, under the kansei word “attractive”, design 2 received a mean of 4.0, design 1 received 3.6 and design 3 received 3.1. Bright images and colors therefore seem to provide an “attractive” emotion. Design 3 achieved a higher mean (4.3) than design 1 (3.4) and 2 (4.0) in “simple.” Variety of type sizes, clear layout with visual punctuation, colors and icons are important factors in building a simple healthcare website.

Figure 5.7. Mean value of design 1, 2 and 3s
*Service **Experience ***Design elements

*Service **Experience ***Design elements

Design 1  Design 2  Design 3
Table 5.3 summarizes the result when the three designs are shown and evaluated separately, which design elements contribute and which do not contribute to building specific impressions related to the 10 kansei words in each category.

Table 5.3. Considered design elements to build 10 impressions

<table>
<thead>
<tr>
<th>Questions</th>
<th>Design elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare*</td>
<td>Colors and images</td>
</tr>
<tr>
<td>New benefits*</td>
<td>Colors and images</td>
</tr>
<tr>
<td>Useful*</td>
<td>Length of website and blue color</td>
</tr>
<tr>
<td>Helpful*</td>
<td>Length of website and blue color</td>
</tr>
<tr>
<td>Personal*</td>
<td>Images</td>
</tr>
<tr>
<td>Trustworthy **</td>
<td>Images</td>
</tr>
<tr>
<td>Pleasant**</td>
<td>Bright images and several colors</td>
</tr>
<tr>
<td>Meaningful**</td>
<td>Images</td>
</tr>
<tr>
<td>Attractive***</td>
<td>Bright image and several colors</td>
</tr>
<tr>
<td>Simple***</td>
<td>Color, visual punctuations, simple grid and icons</td>
</tr>
</tbody>
</table>

Note: *Service **Experience ***Design elements

Figure 5.10, 5.11 and 5.12 show the three designs’ means separately and for which impressions they achieved high means. Figure 5.10 shows that design 1 has a mean that is higher and more highly related to the service category than the means of the other two categories. Design 2 has a mean that shows that its bright image and colors are linked to “trustworthy” and “pleasant” in the experience category and “attractive” in the design elements category (see figure 5.11). The mean of design 3 shows a lower mean in the experience category (see figure 5.12); in particular, it achieved an extremely low mean of “personal” (2.4) emotion.
Figure 5.8. *Mean values of design 1*

- **Service**
- **Experience**
- **Design elements**

Figure 5.9. *Mean values of design 2*

- **Service**
- **Experience**
- **Design elements**
Table 5.11 shows that design 2 had a higher mean (3.801) than design 1 (3.750) or design 2 (3.450). Accordingly, participants consider design 2 the most appropriate healthcare website MPD, whereas they regard design 3 as less appropriate healthcare for a website MPD.

Table 5.4. Mean values of the three designs

<table>
<thead>
<tr>
<th>Design</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design 1</td>
<td>3.750</td>
<td>0.667</td>
</tr>
<tr>
<td>Design 2</td>
<td>3.801</td>
<td>0.618</td>
</tr>
<tr>
<td>Design 3</td>
<td>3.450</td>
<td>0.726</td>
</tr>
</tbody>
</table>
CHAPTER 6

CONCLUSION

Service design is rising as a new area of design for helping both customers and service providers. It can be adapted to both academic and business settings and can be applied to improve website design. As a website to be evaluated, HealthCare.gov was selected. Since it was launched in 2013, it has been criticized for its design and system errors. The main page design (MPD) in particular has been changed repeatedly in an attempt to overcome these issues.

This study examined the considerations for a service design website, which design elements should be considered and their affect on the impression given by a healthcare website MPD, and how these elements are related and affect the service design diagram of a website MPD (figure 2.1).

Three designs were presented to participants: the existing MPD of HealthCare.gov (design 1), a prototype MPD with a service design elements suggested by Dager (n.d.) and produced by the author (design 2), and a prototype of type-dominant MPD (design 3). The designs were evaluated according to kansei engineering methodology. The three designs were presented in online survey as part A and B. The number of participants was 293 for survey A and 384 for survey B (see Appendix F). Although participants were asked to provide their demographic information at the beginning of the surveys, the individual demographic data were not analyzed. Since websites need to provide satisfaction to all users, the three MPDs were analyzed without regard to age, gender, position and ethnicity of the participants.
First, to build a successful website MPD with service design aspects, service, experience and design are necessary. Good service is essential, not optional; accordingly, designers need to understand what service is. Touch points, expectations, understanding and delivery are important sub elements of providing successful service. Researching the experiences of customers is a serious process for designers when they create a new product. Desirability, usability and pleasurable must be considered of positive customer experiences are to be built. In addition, with regard to website design, several basic design elements must be focused on. At the same time, designers have to determine people’s needs, expectations, capabilities, and behaviors, and must apply this information in creation of a suitable design style. Although these categories are separate, they are interrelated and must all serve as guidelines to designers who wish to created a successful service design website MPD.

A second important point is that color in particular, strongly affects memory, experiences, knowledge, cognition, performance, and awareness of a user (Elliot & Maier, 2007). Therefore, choosing appropriate colors is vital to attracting visitors and presenting the theme of a website. Since images can serve as visual cues in users’ minds (Idler, 2012), selecting images relevant to the website theme is crucial. Bright images are recommended so that they are memorable and interesting (Jiang et al., 2008). Typography directly conveys not only emotion and information about designers or providers’ purposes but also connects to all parts of the whole website (Desmet & Hekkert, 2009). Accordingly, location and characteristics of typography need to be considered carefully. From the results of the two surveys, the design elements of design 2, with several colors, bright image and san serif typeface, are recommended for healthcare websites’ MPD.
Third, table 6.1 presents the summarized data from the two surveys. It suggests that to build “healthcare,” “new benefits,” “useful” and “helpful” impressions, the website structure should be long. For “helpful,” “personal” and “trustworthy” impressions, the length of the website structure, images and colors are all vital. The use of several colors and bright images are recommended for creating “pleasant” and “attractive” impressions. Although images are not crucial to arousing a “simple” emotion, it appears to be necessary for building a “meaningful” impression.

Table 6.1. Summarized considered design elements contributing to10 impressions from two surveys

<table>
<thead>
<tr>
<th>Impressions</th>
<th>Design elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare, new benefits, useful, helpful</td>
<td>Length of websites</td>
</tr>
<tr>
<td>Helpful, personal, and trustworthy</td>
<td>Length of websites, colors, and images</td>
</tr>
<tr>
<td>Pleasant and attractive</td>
<td>Bright images and several colors</td>
</tr>
<tr>
<td>Meaningful</td>
<td>Images</td>
</tr>
<tr>
<td>Simple</td>
<td>Color, visual punctuations, simple grid and icons</td>
</tr>
</tbody>
</table>

Design 1 resulted in “healthcare,” “new benefits,” “useful,” “helpful” and “trustworthy” impressions and is strongly related to the service category. Design 2 produced “helpful,” “trustful,” “pleasant,” “meaningful” and “attractive” impressions in participants and belongs strongly to the experience category. Design 3 gave a “simple” impression and is related to the design category.

The study included only the MPD and results cannot be generalized to MPD of websites other than those in the area of healthcare.
6.1. Limitations

Some difficulties were observed during the survey period. Since survey tool did not allow presenting comfortable image size, the three designs presented with small size. Furthermore, depending on respondents’ screen sizes, some people could see three designs at a glance, but others could not. The survey tool provided another restricted expression of presenting five-level rating semantic differential scales. Therefore, several people were uncertain about the meaning of “very”. The participants were limited to the ISU population alone.

6.2. Future Study

Although this study has received some interesting findings, it could not avoid some limitations, which should be addressed in future studies.

The survey tool provided few methods of expression. Because of this, participants had complaints about evaluating the three designs. An alternative method needs to be devised to replace the restricted survey tool.

This research was not analyzed with participants’ demographic information. Analyzing the three MPDs with regard to such information could help to provide more specific in-depth data.

To obtain a wider variety of data, the survey location range should be expanded and more design variations included. Surveys were completed only by the ISU population in Ames, Iowa, and with only one existing website MPD and two prototype MPDs. Therefore, it could obtain data on only a relatively small number of people at only one school-based work place and with a survey based on only a restricted number of design elements. For future
study, the survey needs to be performed in other cities and also with several MPDs. The data also need to be analyzed in greater depth.
REFERENCES


Stickdorn, M, & Schneider, J. (2011). *This is service design thinking*. Hoboken, NJ: Jon Wiley & Sons, Inc.


APPENDIX A
IRB APPROVAL LETTER

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Date: 10/23/2015
To: Hye Jeong Park
   610 Squaw Creek Dr Unit 11
   Ames, IA 50010

From: Office for Responsible Research

Title: A study of healthcare website's visual information

IRB ID: 15-595

Study Review Date: 10/23/2015

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where
  - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
  - Any disclosure of the human subjects' responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

The determination of exemption means that:

- You do not need to submit an application for annual continuing review.
- You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. Only the IRB or designees may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

Please be aware that approval from other entities may also be needed. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515-294-4566
FAX 515-294-4287
APPENDIX B

INFORMED CONSENT

TITLE OF STUDY
A study of health care website’s visual information

Investigator: Hye Jeong Park, MFA (515-230-9478, hjpark@iastate.edu)
Faculty Supervisor: Sunghyun Kang (shrkang@iastate.edu)

PURPOSE OF STUDY
The purpose of study is to investigate three web designs to identify which design elements attract to people through online survey.

DESCRIPTION OF STUDY PROCEDURES
Participants voluntarily take part in this study via going to the URL link provided and endorsing the checkbox below indicating their wish to participate and attesting to the fact that they are currently 18 years of age or older. If you decide to participate in this study, clicking on the affirmative endorsement checkbox will access study materials on the website. Your responses to the research materials will be confidential and unidentifiable – the research surveys will ask for absolutely no identifying information from you, and all data will be reported in aggregate form.

RESEARCH MATERIALS
You will be initially asked about general demographic information (age, gender, etc.) as well as general questions about your awareness of a Healthcare website. After this, you will complete several questionnaires of three designs asking your opinion.

RISKS
There are no foreseeable risks in this study.

BENEFITS
There is no direct benefit to the participant. However, I hope to learn information that could help which design elements attract to people through this research.

COSTS AND COMPENSATION
You will not have any costs from participating in this study. There will not be any compensation to participate in this study.

PARTICIPANT RIGHTS
Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled. During the survey, if you feel uncomfortable at any time you can quit.
If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

CONFIDENTIALITY
Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken: The participant’s identity will be anonymous to outside sources throughout the study. Only the researchers will have access to the data. The data will be entered and kept in a password-protected computer located on the researchers computers.

QUESTION
You are encouraged to ask questions at any time during this study. For further information about the study contact Sung hyun Kang, Principal Investigator, phone 515-294-1669, email shrkang@iastate.edu, and Hye Jeong Park, Principal Investigator, 515-230-9478, email hjpark@iastate.edu. If you have any questions about the rights of research subjects or research-related injury, please contact IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, Office for Responsible Research, (515) 294-3115, 1138 Pearson Hall, Ames, IA 50011.

By checking the “Yes, I agree to participate” box, you are confirming that you have read and understood the informed consent form in its entirety, and that you are at least 18 years of age.

Please print this consent form for your records and for access to provided contact information.

“I voluntarily agree to participate in this study, I have been given the time to read the informed consent document and thoroughly understand it, and any questions I may have about my rights or participation have been adequately answered. I am 18 years of age or older.

(   ) Yes, I agree to participate. (   ) No, I do not agree to participate.

## APPENDIX D

### ALL KANSEI WORDS

<table>
<thead>
<tr>
<th>Trust</th>
<th>Well-organized</th>
<th>Actionable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition</td>
<td>Actively</td>
<td>Tirelessly</td>
</tr>
<tr>
<td>Cobble-together</td>
<td>Applicable</td>
<td>Recovery</td>
</tr>
<tr>
<td>Kluge</td>
<td>User-friendly</td>
<td>Invalid</td>
</tr>
<tr>
<td>Motivate</td>
<td>Saliently</td>
<td>Exponentially</td>
</tr>
<tr>
<td>Easily</td>
<td>Questionable</td>
<td>Confused</td>
</tr>
<tr>
<td>Clear explanation</td>
<td>Woes</td>
<td>Helping</td>
</tr>
<tr>
<td>Curiosity</td>
<td>Overhaul</td>
<td>Challenging</td>
</tr>
<tr>
<td>Specific</td>
<td>Devoted</td>
<td>Rewarding</td>
</tr>
<tr>
<td>Poor</td>
<td>Inefficient</td>
<td>Contentious</td>
</tr>
<tr>
<td>Unclear</td>
<td>Exacerbates</td>
<td>Animosity</td>
</tr>
<tr>
<td>Failing</td>
<td>Relieved</td>
<td>Difficulty</td>
</tr>
<tr>
<td>Drastic</td>
<td>Reluctant</td>
<td>Unified</td>
</tr>
<tr>
<td>Simple</td>
<td>Deliberate</td>
<td>Constraints</td>
</tr>
<tr>
<td>Explicitly</td>
<td>Consumer-friendly</td>
<td>Consensus</td>
</tr>
<tr>
<td>Oddly</td>
<td>Intrusive</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>Versatile</td>
<td>Complicated</td>
<td>Eligibility</td>
</tr>
<tr>
<td>Overcomplicated</td>
<td>Clarification</td>
<td>Qualified</td>
</tr>
<tr>
<td>Bewildered</td>
<td>Blaming</td>
<td>Unfulfilled</td>
</tr>
<tr>
<td>Frustrated</td>
<td>Awry</td>
<td>Fairly</td>
</tr>
<tr>
<td>Controversial</td>
<td>Embraced</td>
<td>Unfavorably</td>
</tr>
<tr>
<td>Clear</td>
<td>Fudging</td>
<td>Slicker</td>
</tr>
<tr>
<td>Easy</td>
<td>Findability</td>
<td>Sanguine</td>
</tr>
<tr>
<td>Crummy</td>
<td>Understandability</td>
<td>Myriad</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Accessibility</td>
<td>Problems</td>
</tr>
<tr>
<td>Clarity</td>
<td>Usability</td>
<td>Navigate</td>
</tr>
<tr>
<td>Readability</td>
<td>Searchability</td>
<td>Secret</td>
</tr>
<tr>
<td>Complexities</td>
<td>Satisfied</td>
<td>Inevitably</td>
</tr>
<tr>
<td>Constructive</td>
<td>Useful</td>
<td>Optimize</td>
</tr>
<tr>
<td>Pleasant</td>
<td>Motivate</td>
<td>Compromises</td>
</tr>
<tr>
<td>Beneficial</td>
<td>Attributes</td>
<td>Agile</td>
</tr>
<tr>
<td>Premiums</td>
<td>Alleviate</td>
<td>Innovative</td>
</tr>
<tr>
<td>Deductibles</td>
<td>Visibility</td>
<td>Sensibility</td>
</tr>
<tr>
<td>Security</td>
<td>Persuasive</td>
<td>Sporadically</td>
</tr>
<tr>
<td>Valid</td>
<td>Meaningful</td>
<td>Private</td>
</tr>
<tr>
<td>Smoothly</td>
<td>Problematic</td>
<td>Beauty</td>
</tr>
<tr>
<td>Consolation</td>
<td>Cumulative</td>
<td>Unusual</td>
</tr>
<tr>
<td>Exacerbate</td>
<td>Flurry</td>
<td>Ambitious</td>
</tr>
<tr>
<td>Distrust</td>
<td>Reasonable</td>
<td>Political</td>
</tr>
<tr>
<td>Leery</td>
<td>Complexity</td>
<td>Scrutiny</td>
</tr>
</tbody>
</table>
Premiums
Available for reuse
State-based
(Loads) faster
Crucial performance
Surfacing information
Repository
Cheaper
Faster
Scalable
Open source tools
Open standards
Default
No successful
Promised
Fruition
Personal
Professional
Authenticate
Fantastic
Dynamic technology
Fails
Verification
Eligibility
Qualification
Product offering
Acceptance
Tired
True technology
Robust open source
technology
Modern approach
Free preventive care
Prescription discounts
Protection
Fraud
Guaranteed issue
New benefits
Rights
Reform law
Provide
Affordable
Exemption
Lower premiums
Reduced out of pocket
costs
Low income
Middle income
Open
Improves
Wellness
Raising
Equivalent
Mandate
Provision
Jeer
Cryptic
Inexplicable
 Plenty wrong
Serve
Appropriate
Impersonal
Arguably
Painless
Angry
Disappointed
Surprised
Hard
Excruciatingly
Embarrassed
Blame
Flexibility
Boring
Security
Supplemental
Assistance
Shopping
Healthcare
Health insurance
Automatically
Plans
Fix
Logic
Intuitively
Grasp
Suggest
Support
Value
Unfortunately
Clueless
Cracking
Supporter
Resolve
Familiar
Delay
Shopping
Vary
Expectation
Stressful
Accomplishing
Impenetrable
Clean
Simple
Anticipating
Click
Hierarchy
Start (location)
Catastrophic
Official
Believable
Attractive
Friendly
Comfortable
APPENDIX E
ONLINE SURVEY

Demographic information

User Information

Age
- 18 - 19
- 20 - 29
- 30 - 39
- 40 - 49
- 50 - 59
- 60+

Gender
- Male
- Female

Position
- Undergraduate Student
- Graduate Student
- Faculty
- Staff

Please specify your ethnicity
- American Indian/Native American
- Asian
- Black/African American
- Hispanic/Latino
- White/Caucasian
- Pacific Islander
- Other

Awareness of HealthCare.gov

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever heard of HealthCare.gov?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you ever seen HealthCare.gov?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you ever visited HealthCare.gov?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part A

Evaluation of Web Design

(Please put your mouse on the images and move its scroll to the right and left.)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 is higher.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please give 1 to 3 rankings.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which design informs you better about health care?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design looks trustworthy?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design gives you pleasant?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design seems to give you new benefits?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design seems to give you clue that they have important health care information?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design looks attractive?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design looks useful?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design looks helpful?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design looks simple?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design gives you meaningful?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which design looks to keep your personal information?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part B

Design A

Please check.

<table>
<thead>
<tr>
<th></th>
<th>Very</th>
<th>Neutral</th>
<th>Very</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trustful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleasant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can get new benefits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attractive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Useful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helpful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meaningful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Not healthcare
Not trustful
Not pleasant
Cannot get new benefits
Not clue
Not attractive
Not useful
Not helpful
Not simple
Not meaningful
Not personal
Design B

[Image of a website design with the headline: You can still get 2015 health coverage]

Please check.

<table>
<thead>
<tr>
<th></th>
<th>Very</th>
<th>Neutral</th>
<th>Very</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trustful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleasant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can get new benefits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attractive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Useful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helpful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meaningful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Not healthcare
Not trustful
Not pleasant
Cannot get new benefits
Not clue
Not attractive
Not useful
Not helpful
Not simple
Not meaningful
Not personal
Please check.

<table>
<thead>
<tr>
<th></th>
<th>Very</th>
<th>Neutral</th>
<th>Very</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trustful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleasant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can get new benefits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attractive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Useful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helpful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meaningful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Not healthcare
Not trustworthy
Not pleasant
Cannot get new benefits
Not clue
Not attractive
Not useful
Not helpful
Not simple
Not meaningful
Not personal
## APPENDIX F

### ALL SURVEY DATA ANALYSIS

### Part A

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>18 - 19</td>
<td>23.973%</td>
</tr>
<tr>
<td>20 - 29</td>
<td>39.384%</td>
</tr>
<tr>
<td>30 - 39</td>
<td>13.356%</td>
</tr>
<tr>
<td>40 - 49</td>
<td>8.562%</td>
</tr>
<tr>
<td>50 - 59</td>
<td>9.932%</td>
</tr>
<tr>
<td>60+</td>
<td>4.795%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>43.493%</td>
</tr>
<tr>
<td>Female</td>
<td>56.507%</td>
</tr>
<tr>
<td><strong>Position</strong></td>
<td></td>
</tr>
<tr>
<td>Undergraduate student</td>
<td>45.361%</td>
</tr>
<tr>
<td>Graduate student</td>
<td>23.368%</td>
</tr>
<tr>
<td>Faculty</td>
<td>6.529%</td>
</tr>
<tr>
<td>Staff</td>
<td>24.742%</td>
</tr>
<tr>
<td><strong>Ethnic</strong></td>
<td></td>
</tr>
<tr>
<td>American Indian / Native American</td>
<td>0.342%</td>
</tr>
<tr>
<td>Asian</td>
<td>18.151%</td>
</tr>
<tr>
<td>Black / African American</td>
<td>1.370%</td>
</tr>
<tr>
<td>Hispanic / Latino</td>
<td>2.055%</td>
</tr>
<tr>
<td>White / Caucasian</td>
<td>76.027%</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>0.342%</td>
</tr>
<tr>
<td>Other</td>
<td>1.712%</td>
</tr>
</tbody>
</table>

*Note: n=293*
<table>
<thead>
<tr>
<th>Awareness of HealthCare.gov</th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever heard of HealthCare.gov</td>
<td>202</td>
<td>73</td>
<td>18</td>
</tr>
<tr>
<td>Have you ever seen of HealthCare.gov</td>
<td>76</td>
<td>196</td>
<td>20</td>
</tr>
<tr>
<td>Have you ever visited of HealthCare.gov</td>
<td>54</td>
<td>222</td>
<td>16</td>
</tr>
<tr>
<td>Questions</td>
<td>D1</td>
<td>D2</td>
<td>D3</td>
</tr>
<tr>
<td>-----------</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Q1. Which design informs you better about healthcare?</td>
<td>52.595</td>
<td>29.412</td>
<td>17.993</td>
</tr>
<tr>
<td>Q2. Which design looks trustworthy?</td>
<td>52.577</td>
<td>37.457</td>
<td>9.966</td>
</tr>
<tr>
<td>Q3. Which design gives you the most pleasure?</td>
<td>21.678</td>
<td>54.196</td>
<td>24.126</td>
</tr>
<tr>
<td>Q4. Which design seems to give you new benefits?</td>
<td>36.071</td>
<td>33.571</td>
<td>30.357</td>
</tr>
<tr>
<td>Q5. Which design looks the most attractive?</td>
<td>25.874</td>
<td>43.706</td>
<td>30.420</td>
</tr>
<tr>
<td>Q6. Which design looks the most useful?</td>
<td>48.951</td>
<td>34.266</td>
<td>16.783</td>
</tr>
<tr>
<td>Q7. Which design looks the most helpful?</td>
<td>42.456</td>
<td>37.193</td>
<td>20.351</td>
</tr>
<tr>
<td>Q8. Which design looks the most simple?</td>
<td>11.189</td>
<td>26.224</td>
<td>62.587</td>
</tr>
<tr>
<td>Q9. Which design seems the most meaningful?</td>
<td>41.667</td>
<td>41.667</td>
<td>16.667</td>
</tr>
<tr>
<td>Q10. Which design looks as if it would keep your personal information confidential?</td>
<td>58.696</td>
<td>27.536</td>
<td>13.</td>
</tr>
</tbody>
</table>

Note: D1 is design 1, D2 is design 2, and D3 is design 3.
### Part B

<table>
<thead>
<tr>
<th>Item</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>18 - 19</td>
<td>21.728%</td>
</tr>
<tr>
<td>20 - 29</td>
<td>34.031%</td>
</tr>
<tr>
<td>30 - 39</td>
<td>11.780%</td>
</tr>
<tr>
<td>40 - 49</td>
<td>10.733%</td>
</tr>
<tr>
<td>50 - 59</td>
<td>13.351%</td>
</tr>
<tr>
<td>60+</td>
<td>8.377%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>40.576%</td>
</tr>
<tr>
<td>Female</td>
<td>59.424%</td>
</tr>
<tr>
<td><strong>Position</strong></td>
<td></td>
</tr>
<tr>
<td>Undergraduate student</td>
<td>46.335%</td>
</tr>
<tr>
<td>Graduate student</td>
<td>8.115%</td>
</tr>
<tr>
<td>Faculty</td>
<td>8.901%</td>
</tr>
<tr>
<td>Staff</td>
<td>36.649%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>American Indian / Native American</td>
<td>0.262%</td>
</tr>
<tr>
<td>Asian</td>
<td>6.806%</td>
</tr>
<tr>
<td>Black / African American</td>
<td>1.309%</td>
</tr>
<tr>
<td>Hispanic / Latino</td>
<td>4.450%</td>
</tr>
<tr>
<td>White / Caucasian</td>
<td>84.031%</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>0.262%</td>
</tr>
<tr>
<td>Other</td>
<td>2.880%</td>
</tr>
</tbody>
</table>

*Note: n=384*
<table>
<thead>
<tr>
<th>Awareness of HealthCare.gov</th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever heard of HealthCare.gov</td>
<td>282</td>
<td>86</td>
<td>16</td>
</tr>
<tr>
<td>Have you ever seen of HealthCare.gov</td>
<td>87</td>
<td>267</td>
<td>27</td>
</tr>
<tr>
<td>Have you ever visited of HealthCare.gov</td>
<td>56</td>
<td>303</td>
<td>22</td>
</tr>
</tbody>
</table>
Design 1

<table>
<thead>
<tr>
<th>Kansei Words</th>
<th>Mean</th>
<th>1 (Not)</th>
<th>2</th>
<th>3 (Neutral)</th>
<th>4</th>
<th>5 (Positive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare:Not Healthcare</td>
<td>4.247</td>
<td>n=2</td>
<td>n=5</td>
<td>n=37</td>
<td>n=116</td>
<td>n=123</td>
</tr>
<tr>
<td>Trustful:Not Trustful</td>
<td>3.951</td>
<td>n=3</td>
<td>n=4</td>
<td>n=77</td>
<td>n=119</td>
<td>n=80</td>
</tr>
<tr>
<td>Pleasant:Not Pleasant</td>
<td>3.845</td>
<td>n=6</td>
<td>n=18</td>
<td>n=61</td>
<td>n=128</td>
<td>n=71</td>
</tr>
<tr>
<td>New Benefit:Not New Benefit</td>
<td>3.894</td>
<td>n=5</td>
<td>n=8</td>
<td>n=75</td>
<td>n=119</td>
<td>n=76</td>
</tr>
<tr>
<td>Attractive:Not Attractive</td>
<td>3.588</td>
<td>n=9</td>
<td>n=38</td>
<td>n=70</td>
<td>n=111</td>
<td>n=56</td>
</tr>
<tr>
<td>Useful:Not Useful</td>
<td>3.965</td>
<td>n=3</td>
<td>n=9</td>
<td>n=56</td>
<td>n=143</td>
<td>n=73</td>
</tr>
<tr>
<td>Helpful:Not Helpful</td>
<td>3.968</td>
<td>n=3</td>
<td>n=9</td>
<td>n=63</td>
<td>n=125</td>
<td>n=81</td>
</tr>
<tr>
<td>Simple:Not Simple</td>
<td>3.424</td>
<td>n=13</td>
<td>n=48</td>
<td>n=79</td>
<td>n=92</td>
<td>n=51</td>
</tr>
<tr>
<td>Meaningful:Not Meaningful</td>
<td>3.676</td>
<td>n=6</td>
<td>n=18</td>
<td>n=86</td>
<td>n=122</td>
<td>n=49</td>
</tr>
<tr>
<td>Personal:Not personal</td>
<td>3.488</td>
<td>n=12</td>
<td>n=39</td>
<td>n=79</td>
<td>n=102</td>
<td>n=49</td>
</tr>
</tbody>
</table>
### Design 2

<table>
<thead>
<tr>
<th>Kansei Words</th>
<th>Mean</th>
<th>1 (Not)</th>
<th>2</th>
<th>3 (Neutral)</th>
<th>4</th>
<th>5 (Positive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare:Not Healthcare</td>
<td>4.026</td>
<td>n=4</td>
<td>n=15</td>
<td>n=69</td>
<td>n=98</td>
<td>n=119</td>
</tr>
<tr>
<td>Trustful:Not Trustful</td>
<td>3.964</td>
<td>n=1</td>
<td>n=5</td>
<td>n=86</td>
<td>n=125</td>
<td>n=88</td>
</tr>
<tr>
<td>Pleasant:Not Pleasant</td>
<td>4.317</td>
<td>n=2</td>
<td>n=0</td>
<td>n=38</td>
<td>n=125</td>
<td>n=141</td>
</tr>
<tr>
<td>New Benefit:Not New Benefit</td>
<td>3.607</td>
<td>n=9</td>
<td>n=27</td>
<td>n=109</td>
<td>n=90</td>
<td>n=70</td>
</tr>
<tr>
<td>Attractive:Not Attractive</td>
<td>4.020</td>
<td>n=1</td>
<td>n=22</td>
<td>n=42</td>
<td>n=143</td>
<td>n=95</td>
</tr>
<tr>
<td>Useful:Not Useful</td>
<td>3.756</td>
<td>n=3</td>
<td>n=26</td>
<td>n=75</td>
<td>n=137</td>
<td>n=62</td>
</tr>
<tr>
<td>Helpful:Not Helpful</td>
<td>3.762</td>
<td>n=3</td>
<td>n=22</td>
<td>n=79</td>
<td>n=139</td>
<td>n=60</td>
</tr>
<tr>
<td>Simple:Not Simple</td>
<td>4.003</td>
<td>n=4</td>
<td>n=22</td>
<td>n=45</td>
<td>n=130</td>
<td>n=102</td>
</tr>
<tr>
<td>Meaningful:Not Meaningful</td>
<td>3.643</td>
<td>n=6</td>
<td>n=23</td>
<td>n=105</td>
<td>n=104</td>
<td>n=62</td>
</tr>
<tr>
<td>Personal:Not personal</td>
<td>3.613</td>
<td>n=10</td>
<td>n=35</td>
<td>n=84</td>
<td>n=103</td>
<td>n=68</td>
</tr>
</tbody>
</table>
### Design 3

<table>
<thead>
<tr>
<th>Kansei Words</th>
<th>Mean</th>
<th>Frequency (n=384)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 (Not)</td>
</tr>
<tr>
<td>Healthcare:Not Healthcare</td>
<td>3.829</td>
<td>n=12</td>
</tr>
<tr>
<td>Trustful:Not Trustful</td>
<td>3.266</td>
<td>n=12</td>
</tr>
<tr>
<td>Pleasant:Not Pleasant</td>
<td>3.204</td>
<td>n=17</td>
</tr>
<tr>
<td>New Benefit:Not New Benefit</td>
<td>3.797</td>
<td>n=11</td>
</tr>
<tr>
<td>Attractive:Not Attractive</td>
<td>3.070</td>
<td>n=34</td>
</tr>
<tr>
<td>Useful:Not Useful</td>
<td>3.820</td>
<td>n=7</td>
</tr>
<tr>
<td>Helpful:Not Helpful</td>
<td>3.829</td>
<td>n=6</td>
</tr>
<tr>
<td>Simple:Not Simple</td>
<td>4.333</td>
<td>n=3</td>
</tr>
<tr>
<td>Meaningful:Not Meaningful</td>
<td>3.122</td>
<td>n=27</td>
</tr>
<tr>
<td>Personal:Not personal</td>
<td>2.356</td>
<td>n=69</td>
</tr>
</tbody>
</table>
Part B: Comparing mean value of three designs

<table>
<thead>
<tr>
<th>Kansei Words</th>
<th>Mean of Designs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design 1</td>
</tr>
<tr>
<td>Trustful:Not Trustful</td>
<td>3.951</td>
</tr>
<tr>
<td>Pleasant:Not Pleasant</td>
<td>3.845</td>
</tr>
<tr>
<td>New Benefit:Not New Benefit</td>
<td>3.894</td>
</tr>
<tr>
<td>Attractive:Not Attractive</td>
<td>3.588</td>
</tr>
<tr>
<td>Useful:Not Useful</td>
<td>3.965</td>
</tr>
<tr>
<td>Helpful:Not Helpful</td>
<td>3.968</td>
</tr>
<tr>
<td>Simple:Not Simple</td>
<td>3.424</td>
</tr>
<tr>
<td>Meaningful:Not Meaningful</td>
<td>3.676</td>
</tr>
<tr>
<td>Personal:Not personal</td>
<td>3.488</td>
</tr>
</tbody>
</table>