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I, Shuai Zhou, hereby submit this original work as part of the requirements for the degree of Master of Design in Design.

It is entitled:
Using Hassenzahl Model as a design method to improve user experience for Health Care Information Television App

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Using Hassenzahl Model as a design method to improve user experience for Health Care Information Television App

A thesis submitted to the Graduate School of the University of Cincinnati in partial fulfillment of the requirements for the degree of Master of Design in the Department of Design, Architecture, Art, and Planning by

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Abstract

Some of the products provided a discontented experience for users. Some of the user experience design model can help designers to redesign the product from designer perspective. In order to improve a better experience for users, designers should more focus on the user’s perspective and try to figure out the problems in product. The cases studies presented in this paper describe one examples which is about how to adopt hassenzahl model into product design process to improve the user experience.
Acknowledgements

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Thanks to professor Mike who taught me the research methods and provided help on developing my design hypothesis. The article that you gave to me is very helpful.

Mum, Dad. Without the financial support, I could not finish my master degree.

Amanda, from the very beginning of the HCI TV App project you gave me full support to complete the Media Care App Work. Thank you.
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Chapter 1

Introduction

1. What is the “Hassenzahl Model”

1.1 Overview

The Hassenzahl Model is a model of user experience which shows the different perspective between user and designer.

It assumes that users construct product attributes by combining the product’s features with personal expectations or standards. (Hassenzahl, Marc. "The interplay of beauty, goodness, and usability in interactive products." Human-Computer Interaction 19, no. 4 (2004): 319-349.)

Figure 1. Hassenzahl, Marc. "The thing and I: understanding the relationship between user and product." Funology. Springer Netherlands, 2005.
As the graphic shows (Figure 1), a product has at least four features, for instance: content, presentation, functionality and interaction. These features can be chosen and constituted by a designer to convey a intended product characters. The product attributes are detailed description of product character. They comprise pragmatic and hedonic product attributes, more specifically, these attributes include manipulation, stimulation, identification, evocation. (Figure 2).

**Perspective from Designer**

The function of product character can help reduce complexity in the user’s cognition and trigger certain feelings for handling the product. The process is triggered when individuals interact with a product. At first, users can experience the product features, then the product character will be established by the personal version of each individual (apparent product character). This character will be comprised by groups of pragmatic...
attributes and hedonic attributes. And then, the apparent product character will lead to consequences. However, the consequences are not same because they have different usage situations for product character (Figure 3).

**Perspective from User**

![Perspective from User Diagram](image)

Figure 3. *Explain the perspective from user*

1.2 The product character: Pragmatic and Hedonic attributes

The Hassenzahl model intended product character can be grouped into pragmatic and hedonic attributes. The pragmatic attributes captures the usage and functions of the product, the hedonic attributes are more about the psychological states of user. The Hassenzahl model advises that products should be designed to consider the user
experience, but that the user experience can not be controlled because it will be vary in different situations and in various usage scenarios (Figure 4).

1.3 Key elements

The Hassenzahl model shows the attributes can be grouped into four categories: manipulation, identification, stimulation and evocation. Understanding the distinction and correlation of these categories can help the designer to understand how to design products with respect to user experience. The details of the four attributes will discussed be in-depth below.
1.3.1 Manipulation

Manipulation relates to the pragmatic attributes of a product. Manipulation is about the functionality of a product and how to use its functions. Commonly, it relates to utility and usability. Typical manipulation attributes of a product are "clear", "supporting", "useful" and "controllable". The aim of a product should be clear to offer a better understanding about how to use it. Generally, manipulation is defined as most important attribute to help improve user experience.

1.3.2 Stimulation

The majority of a products potential functions are rarely used during one usage of a product. Specifically, product has few functions that can be help you to do next task in automatic, I will call these kind of functions as potential functions, for instance, the calendar application in Mac. When the user builds a new event and types “dinner with Renee at 8:00 PM on Sunday at Currito “, then the system will set time at 8 PM in Sunday, location at Currito. This is automatic, users do not need to set up the time and location. These kind of potential functions do things that users would normally do themselves and so this experience can provide a surprise for users. Users feel joyful with this kind of surprise. These rarely used potential functions can fill hedonic attributes (called stimulation) to increase user satisfaction in clever ways.
1.3.3 Identification

Identification is also an important element in designing a product. Users can identify product and user themselves. For instance, people could identify the proper restroom because of the icon on the door. The main way for users to get the idea of a product is through understanding of their appearance elements and from those to get a deeper understanding of the product’s identity (Figure 5).

The identification is two-directional. It also includes allowing users to identify themselves in the product. For example, a population application named WeChat. This social application allows users to define their individual profile so they can be easily found by other users (Figure 6).

![Figure 5. The icon shows the restroom.](image1)

![Figure 6. The profile of WeChat.](image2)

1.3.4 Evocation

People enjoy recalling the past memory of the good old days. People evoke memories through products or events. As people remember the flavors of their favorite wine, they will enjoy the evocation when they taste the wine again after a long time. This attribute can bring amusement to the user. Evocation also is about a user’s previous experience
with a product. For example, one people used iPhone more than five years, he can
good at using iPhone, however, he can not use the android phone as well as iPhone.

2. Why is the “Hassenzahl Model” useful?

In recent years, Few of the user experience models have been suggested (Figure 7),
and based on Hassenzahl’s model. Hassenzahl model gives systematic interpretation
one of user experience concept, this model provides dominant user experience
principles and concepts help designers bring user experience concepts into the design
process.

A designer produces product features from the designer perspective, however their
perspective can neglect the user’s perspective because the users perspective is
different than the designers.

The Hassenzahl Model explains a clear perspective between user and product which
provides the designer with guidance in the design phase.

Figure 7. Peter Morville’s “Facets of User Experience.”, 2008
3. For my understanding

Think about it: people are always judging the food, environment and service at each different restaurant that they visit. These product features shape people’s dining experiences. However, each person can have a difference in experience for a restaurant, not simply influenced by restaurant factors, but also effected by the individuals themselves. It is the same with people judging a physical or interactive computer product.

From my understanding of the Hassenzahl model, many variables influence a user’s behavior and mental model when using the product such as product’s operation pattern, user previous experience and product’s design elements (interface, icons, color, etc). Otherwise, manipulation is the direct way of user using and feeling a product. However, there are other elements that effect user’s manipulation. User gets frustrated because they can not use a product as designers expected, this will make users impatient and the users will lose all the patience when the cycle is repetitive. For instance (Figure 8), people are excited when they use a product for the first time, but when they use the product and it does not perform as expected, users will lose their enthusiasm for the product. If these similar circumstances are repeated several times, users will lose interest with the product.

To summarize, the pragmatic attribute of a product has a close relationship with hedonic attribute, and these two attributes effect each other. Any attempt to provide a nice hedonic experience should consider the psychology of the user using product, because of the psychology will effect user behaviors.
4. Hypothesis

The health care information television app project provided a discontented experience for users. The health care information television app project will be adopted the hassenzahl model to help designers to redesign the product. Designers should more focus on the user’s perspective and try to figure out the problems in original product, then designers redesign the product to improve a better experience for users.
Designers have been talking about user experience for several years, but the term is still fuzzy in application. Many people misunderstand the term and some designers seem to have a firm belief in how they can create the best user experience of their product or service. However, user experience design not only depends on designers, but it also includes other aspects.

Users are unique. Some are able to easily use a product to perform their task. Others are not. The cognition for the product depends on the individual user’s experience. Each product has a different expectation and concern for different users. In other words, there is no guarantee that users will actually perceive and appreciate the product the way designers wanted it to be perceived and appreciated (Hassenzahl, Marc. "The thing and I: understanding the relationship between user and product." In Funology, pp. 31-42. Springer Netherlands, 2005).

The ISO definition of user experience is “a person’s perceptions and responses that result from the user or anticipated use of a product, system, service”. Designers can not design or control the user experience, but designers can create a better experience for users by applying the insights of Hassenzahl model.

In my summer internship, I worked on a project named “Health Care Television Application” based on android television. Due to the dissatisfaction feedback from users, we need to redesign the applications to apply to users experience. I have chosen
the health care television application as the case study for the Hassenzahl model, in order to improve user experience.
Chapter 3

Case Study for HCI TV App

1. What is the Health care information television app?

Currently, global countries are facing a rapid aging of their population, due to this rise many industries are designing products that keep the elderly in mind. In the field of digital technology, more designers are also concerned with the utility of products for the elderly. This has become a popular audience to design for.

The Health Care Information company products develops products ranging from smart television to medicare software (media care television app) for remotely administering education, communication, entertainment and enterprise apps that increase patient satisfaction and enhance productivity of staff. With the media care television app, patients can call for private service, learn from health care video and take the medical care test. We call this series of products the health care information television app.
2. How to adopt Haseenzal model into HCI project?

The original Health care television app has been used for few years, but based on informal user feedback the original product had a discontented experience for users. The Health care television app redesign adopted the Hassenzahl model as the redesign model (Figure 9). Designers focused on the product features and the product characters in the original product, then adopted the user perspective to improve the user’s experience and satisfaction in the redesign process. The design process will prove the Hassenzahl model can improve user experience significantly.
3. Find the problems

3.1 Interview

Health care information established sound cooperation relationships with some companies or hospitals to help us find target users for interviews. We selected five participants randomly to join the user interview and user testing. Before user testing, design (control) group will interview five participants to observe how users use the television app and what problems they encounter. Try to find the challenge for designers. (Figure 10).

Figure 10. Simulate actual environment for users using the remote to control our product.
3.2 Challenge

The target user group for the health care information television app are patients aged 60-year-old and older who have chronic diseases and a range of physical and psychological problems.

Human’s vision begins to degenerate at the age of 40 and many can gradually form presbyopia. Meanwhile, for the elderly, "color vision" also degrades with increased age, and thus it is difficult to distinguish between similar colors. Also, many elder people suffer from bad flexibility and coordination with increasing age. These attribute will affect aged peoples use of the remote that is used to interact with the app. On the psychological end, anxiety, irritability and lack of interest are common problems among aged people. Many of these people use remotes to control the television. However, it is not a good way to interact with elderly users. We should consider more about how to design a friendly and comfortably experience for users. The actual environment is one of the factors that will effect usage (Figure 11).

Figure 11. Four challenges for redesign HCI project.
3.3 Previous User Testing

The core elements of Hassenzahl Model are pragmatic attributes and hedonic attributes, in other words, we should be focused on user’s satisfaction (Hedonic) and manipulation (Pragmatic). In the following example of user testing, I recorded specific times and clicks to observe users’ difficulties in using the product, then the participants evaluated the product on a scale 1 to 5 (Figure 12). I will describe two points of the user test below:

1. Simulate actual environment for users using the product.

2. The circumstances in which we would record anticipated use and reflection on use.

![Figure 12. Task for user test.](image)

The results of the user test shows that the product has an unsatisfactory user experience. The level of “user satisfaction” was mostly around “unsatisfactory” and “ok”.

---

Pragmatic

<table>
<thead>
<tr>
<th>Task</th>
<th>Time</th>
<th>Click</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Go to Education section, enter education library, focus on oceans 13 &amp; go back to education section.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Go to Patient Test section, finish the test.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hedonic

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Unsatisfactory</th>
<th>OK</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Logic</td>
<td>Hard</td>
<td>Fine</td>
<td>Easy</td>
</tr>
</tbody>
</table>
Users “times” and “clicks” exceeded our estimates by double. We need to figure out how to improve a better experience for users (Figure 13).

![Figure 13. Previous record data.](image)

### 3.4 Define Problem

Organizing the information and data for the user testing and interview, we made a significant problems list to show the problems of the product (Figure 14). The problems
concentrate on reflected environment light, color contrast, information layout, operation continuity, size and weight of the font, reminder information and so on. We divided problems in to three categories: environment problems, interface problems and interaction problems. I will explain these in more detail in the redesign section.

<table>
<thead>
<tr>
<th>Environment</th>
<th>Interface</th>
<th>Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Due to the reflected ambient light, it is hard to read the information on television.</td>
<td>- Information needs re-layout</td>
<td>- Saltatory operation undesirable.</td>
</tr>
<tr>
<td>- There is 100 - 120 inches between television and patients, the font size and font weight should be more readable.</td>
<td>- Create information hierarchy to help patient read information</td>
<td>- Reduce operation steps.</td>
</tr>
<tr>
<td>- Should be more considerate of aged people.</td>
<td>- Selected box should be more clear to help patient understand which selected box they are focused</td>
<td>- Various way of interaction to show the information.</td>
</tr>
<tr>
<td></td>
<td>- Selected box status: focus, selected, hit, re-selected</td>
<td>- Operational continuity</td>
</tr>
<tr>
<td></td>
<td>- Change some information into visual information to help patient more understandable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Color should be more friendly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Change the red color</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Simplify the information</td>
<td></td>
</tr>
</tbody>
</table>

Figure 14. *Problem list.*

3.5 Redesign

Some of the obvious questions can be solved by a designer. Designers are good at designing the clear interface, readable information and accessible functionality, helping users have a better experience than before. The redesign prototypes (Figure 15) have a
better information hierarchy, show the information more clearly and readably. We contacted the programmer to reduce the operation steps, to make the animation more comfortable.

![Four prototypes with same content.](image)

3.6 Refine

Programers help us to build the new product interface to be used in a user test. We invited five participants to try our new product interface, observed and talked with them to find some problems that we missed in the first user test, and then from the user’s perspective we refined our product.
1. Does the user really want this?

Studies have show that users do not read the information, they scan it. Most designers design the information contents to have a clear visual structure, in order to make the information readable. A designer’s goal is to layout a clear content hierarchy without too much focus on beautiful embellishments. This is a good way to design the information contents; however, there may be an issue that the designer neglected to consider, which is what information does the user really want to read?

For instance (Figure 16), a viewer wants to watch a film from an online source. If the information hierarchy is unclear, it can be difficult for the user to make a selection. The user will not read the detailed information if they are not interested in the information that they are getting from the title, or if the video takes to much time (a portion of users will abandon watching the video if they know it will take a long time).

![Figure 16. How the users reading the information.](image)
2. Patients are comparatively sensitive when they stay at a hospital.

Due to the patient being comparatively sensitive when they stay at a hospital, there have been a few problems that we missed. It seems that some specific elements (colors, symbols, text) will result in a psychological burden on patients. The following is an example to aforementioned problem:

*There is a patient who asked “can you change the red into another color please? I like the red but it hard to say this feeling, I am not feeling good when I see the red color in hospital.”*

Red, as a general color used in an alert box and with incorrect instruction of the interface, should not be applied into the health care television app; it may give rise to a patient’s psychological reactions. Besides red, orange can also define the warning and incorrect information, it is more friendly for patients (Figure 17).

![Figure 17. Refine color.](Image)
3.7 Prototype

I keep the product’s interface beautiful, information more readable and refine the product function, etc. In the final prototype (Figure 18), I adopted the product attributes from hassenzahl model into our final redesign prototype.

Figure 18. Part of the prototypes.
1. Stimulation

We want help user better understand and learn from the patient test section. We designed a friendly way to help a user better know the correct or incorrect answer and why the answer is correct or incorrect in the patient test section (Figure 19).

2. Identification

Figure 19. product attribute - stimulation for patient test section.

Figure 20. product attribute - identification for patient survey section.
The user chose all the icons that we used in the prototype, they could identify content meaning by the icons in the patient survey section (Figure 20).

3. Evocation and Manipulation

User prefer a fewer operation steps and accessible operation pattern for a product. Users can not operate our product as their expected, because of our product operation pattern is different than general television’s operation pattern. In operation, we learned from the users general familiarity with television operation to use the users previous experience with television remote controls to rebuild the operation pattern for the prototype using a television remote, and design the a fewer operation steps as possible as we can (Figure 21).

Before

![Before Image]

After

![After Image]

Figure 21. product attributes - evocation and manipulation in education section.
3.8 Post User Testing

After programmers completed implementation of the prototype revisions, we ran the same user test as we did in the previous user test (Figure 12), then we gathered the data (Figure 22). The data shows clicks and time are lower than on the previous test (Figure 23).

![Post record data](image)

Figure 22. Post record data.
3.9 Comparing before and after

We compared the data between the original and redesigned app to analyze whether the design proposal is valid or not. The above chart shows the change in test times and the number of clicks (Figure 23). The data shows the change in the increase of satisfaction and intelligibility. The redesigned plan demonstrated significant improvement as shown by the comparison data. From the overall look of the chart, we can see that for patient 1 to patient 5, the number of clicks and test times reduce rapidly, also the data shows much more satisfying results between satisfaction and accessibility.

Figure 23. Compare the record data.
Using a T-test demonstrates the design plan success. The P-value is one of the most important factors in the T-test, it is the reference standard to demonstrate the test result of significant or insignificant. In statistics, the p-value is a function of the observed sample results (a statistic) that is used for testing a statistical hypothesis (P-value. Retrieved from https://en.wikipedia.org/wiki/P-value). If the P-value is lower than 0.01, the result is more significant; conversely (P>0.05), the result is insignificant. We assigned specific values for different evaluation levels of satisfaction and operational difficulty; computed the mean value of the numbers of clicks and times, use then calculated the P-value of the different between the two tests. The chart shows all the P-value is much lower than 0.01, in other word, the redesign is significant improved (Figure 24).

<table>
<thead>
<tr>
<th>P-value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 0.05</td>
<td>insignificant</td>
</tr>
<tr>
<td>0.05 &gt; P-value &gt; 0.01</td>
<td>almost significant</td>
</tr>
<tr>
<td>&lt; 0.01</td>
<td>significant</td>
</tr>
</tbody>
</table>

**P-value**

**Satisfaction** P-Value equals **0.0069**

**Operation** P-Value equals **0.0038**

**Clicks** P-Value is less than **0.0001**

**Times** P-Value equals **0.0353**

Figure 24. Data's P-value.
Chapter 4

Conclusion

The P-value calculated from the t-test proves the improvement in our redesign is significant. The redesign adopted Hassenzahl model can help user to improve the user experience significantly.

The user experience encompasses all aspects of interacting with a product. The user’s psychological complexity cannot be underestimated. First of all, the user experience is subjective; therefore, the practical experiences with products may considerably vary from intended experiences by the designer. Individuals experiences are unique, in addition, experiences will be changed by situations and over time.

The Hassenzahl model has the benefit in few aspects: Firstly, designers may better understand how users perceive and value objects. Further, it allows operational and recombination of key elements. The Hassenzahl model will lead designers to design the products which are more efficient, quicker to use and better, more satisfying.
Reference


P-value. Retrieved from https://en.wikipedia.org/wiki/P-value