

IMPROVING ELECTRONICS WITH USE - DESIGN TO WEAR

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## IMPROVING ELECTRONICS WITH USE - DESIGN TO WEAR

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## **ABSTRACT**

Today's products are designed to exude high fashion and flawless beauty, which are inevitably susceptible to deterioration over time, making the aesthetic value disappear due to wear and tear.

The purpose of this thesis is to design modern products not only to improve their aesthetic value and meaning but also their usability, while taking advantage of wear and tear in order to improve value.

The majority of previous studies focused on preventing the deterioration of products, whereas, this thesis approaches the opposite view of allowing wear to boost the product's value, thereby improving functionality with desirable appearance by design.

The electronics industry, with its constant technological advances, encourages an increasingly rapid obsolescence of goods and, therefore, consumers yearn for new goods with updated technology and a more attractive appearance.

In this paper, I will discuss the marketing strategy known as *planned obsolescence*. I will look at the meaning of goods in a material culture to analyze the current situation and provide insight into the value of goods and human interaction during the use process. I will focus on wear and design factors to address new possibilities for a desirable experience and beauty from deterioration of the product. I will then conclude by proposing a prototype of a digital camera that accrues increasingly desirable beauty and functionality throughout

its use.

Quantitative research and qualitative research were used to identify problems and defined the way the problems are solved.

Keywords: wear, ownership, beauty, aesthetic value, possession, material culture, electronic market, planned obsolescence.

## **INTRODUCTION**

The primary idea began with a question: “Why can’t we be free from worry about our beloved goods?”

Today’s products, with their perfect appearance, mostly shiny and expensive looking, make people endeavor to maintain their pristine beauty and not show wear. Users may even be nervous to touch them.

“In the story of *“The Fellowship of the Rings”* (J.R.R.Tolkien, 1954-55) ...the possessor of the ring becomes its prisoner... This view is not only a matter of fairytales, but can be seen in the way that the same kind of fear that these tales incorporate has been repeatedly reproduced when some significant new good (Car, TV, Mobil phone) has been introduced into the markets.” (Ilmonen 2004)

Fear is caused by the fact that every product wears out from use, and the value, especially the aesthetic value, decreases due to inevitable signs of wear. This is especially true in the case of modern electronic products with high fashion design. The surface is extremely delicate, and the perfect beauty that modern electronic products have hardly accepts any dents, nicks, or scratches on their shiny, glossy surfaces.



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Two major problems are defined below:

### 1. Value (Aesthetic Value):

People's perception of value can depend largely on the amount of wear displayed on an object, as they often want to keep the object in new quality, or close to it. The exact nature of what constitutes value is a subject of debate among philosophers discussing the nature of aesthetics and beauty.

### 2. Ownership

In most societies, the existence of objects is closely tied with ideas about ownership. Though a person may own something, the control and interaction with his or her object can be impaired by treating the objects too cautiously because of fear of depreciating value.



Figure 1

Worn cell phones

Source: Photography by the author

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To date, the solutions for lasting aesthetic value have focused on maintaining “like-new condition.” There have been studies about more durable materials along with new composition. However, alternative materials have to satisfy the conditions of aesthetic quality and manufacturing processes at an acceptable cost. Consumers often find covering the product an easy way to protect it. A wide variety of covers are available to suit many tastes. Have we come to the point where cover cases replace product design?

In our marketplace, design is valued for the importance of its ability to influence purchase decisions. Product design features fascinate people’s eye and entice them to buy products. But ironically, people purchase a case together with the product, then cover or hide the design appearance they are proud of.

At this point, I have another major question about why the value of products is assumed to diminish over time. Is it always true that goods are the most valuable when in brand new condition? Regardless of the issue of rapidly updated technology, visually worn-out products are generally considered less valuable than new ones.

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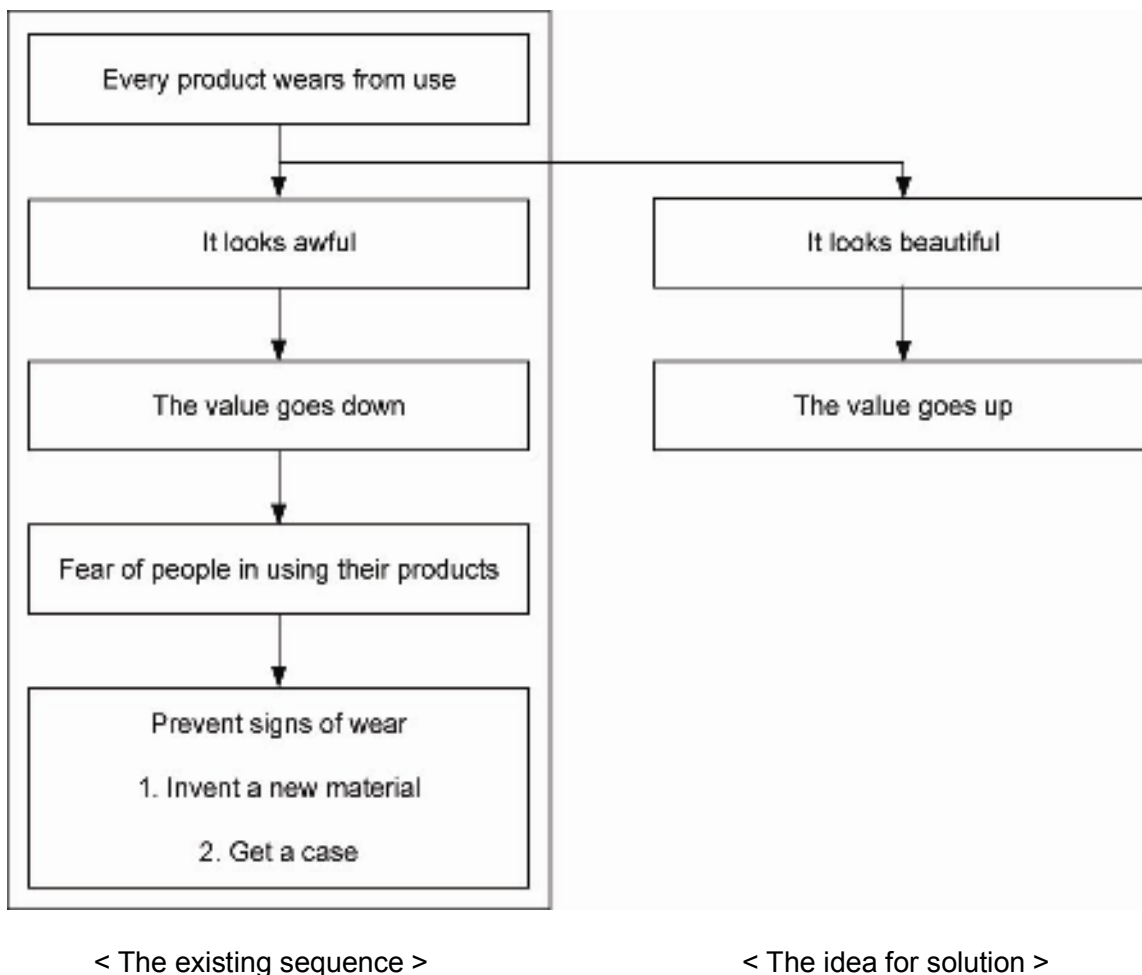


Table 1  
Analysis of situation and defining the approach

As I stated above, every product wears from use. I have a different approach to solve this problem instead of trying to avoid wear. The beauty-with-wear process should be considered in the design process.

Wearing out, or worn-out products is seemingly incompatible with aesthetic value and desire of the people. However, I believe that we can find value and beauty that fulfills

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**Improving electronics with use – Design to wear**

people's satisfaction rather than some sense gotten from new goods which does not last long. In this paper, I will explore the way we could get some benefit from wear by which it has more beauty and functionality in use, and then I will visualize my answers into the practice of designing a digital camera.

I started with my personal consideration and observation of a contemporary phenomenon. Through an investigation of scholastic study regarding the issue, I gained insight into corporate culture and marketing that I will document in the later chapter.

## **CHAPTER 1: ANALYSIS / FORMATIVE RESEARCH**

### **1.1 OBSESSED WITH “NEW”**

Why are we so obsessed with “new”? There are largely two factors that incite people to desire new goods with the latest technology and futuristic design. The first is that our economy stimulates the disposability of modern goods—planned obsolescence. The second is more complex than can be described in one statement. We need to understand it from the psychological status of customers in our social world.

What is the term “planned obsolescence”? Giles Slade defined it as: “planned obsolescence is the catch-all phrase to describe the assortment of techniques used to artificially limit the durability of a manufactured good in order to stimulate repetitive consumption” (Slade 2006, 5). He claims that our tendency to value whatever is new and original over what is old, traditional, durable or used, is caused by advertising and other marketing strategies encouraging dissatisfaction with the material goods we already have—psychological obsolescence (Slade 2006, 264-265).

As marketers plan the products that are expected to become technologically and aesthetically obsolete, the result is inferior quality. The lifespan of electronic goods is noticeably shortened. In particular, the design of electronics—in terms of durability of façade and surface quality—only considers its very new condition in the market. This

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### **Improving electronics with use – Design to wear**

temporary beauty does not even survive its technological obsolescence. Perfectly shiny surfaces and stylish edges get scratched and frayed by accident right after purchase. Without protection, such as a case, these accidents may occur readily and can make people distressed for quite a while.

“Sociology considered goods not only to be one of the most important means to make and maintain social distinctions, but also to be an important element in our identities” (Campbell 1996; Ilmonen 2001a; Warde 1994)

The second factor that causes people’s perception of goods is associated with our material culture. Possessing goods represents more than the performance of goods. According to Ilmonen, the symbolic aspect of goods makes possible the mediation of social relations and offers opportunities to make social distinctions (Ilmonen 2001). It can give weight to the extrinsic value rather than intrinsic value of goods. Superficial property is valued above the use value of goods. In this sense, people desire something to validate their superior status in our society. ‘New’ and ‘high fashion’ products with suitable design appearance presumably make their owner distinct from the crowd.

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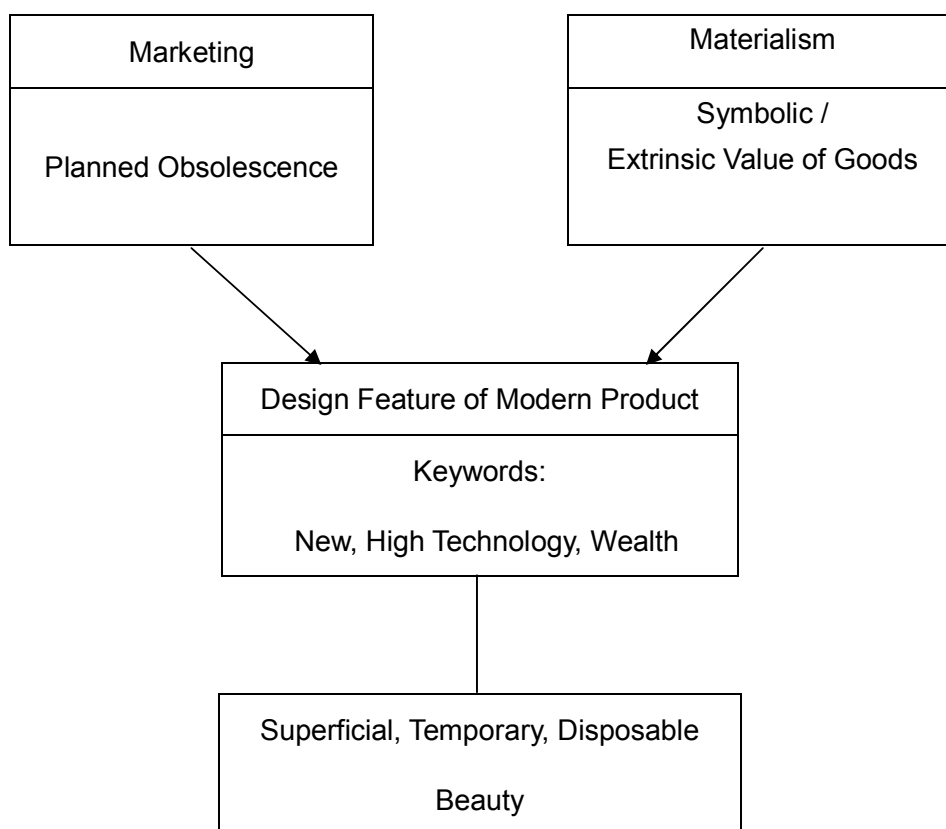
**Improving electronics with use – Design to wear**

Table 2  
Analysis of modern product

## **1.2 MAKE SPECIALTY THAT SURPASSES “NEW”**

We are always exposed to advertising that produces the perpetual desire to own something new. Getting newer and newer consumer items prevents people from being ‘outdated’ in a society. If it is a dominant phenomenon, having specialty products could be seen as that person standing out from those who keep up with the current products. Specialty is highly valued because of its rarity as limited edition goods. Generally, the specialty is an inherently distinctive quality or performance, and is determined in production. However, the specialty can be also achieved in the use of the product after purchase. Personalized processing of goods makes it possible. In the following paragraph, I introduce the idea that goods we are personally involved in creating have considerable value to us.

Stuart Walker points out the problem that we rarely participate in the processes of design and production, and that results in a functional product that often has considerable instrumental value, but relatively few contributions to the evolution of an inherently meaningful material culture (Walker 2006, 54). He maintains that: “Our lack of involvement in the design and making of objects, and our consequent gap in understanding, undoubtedly affect how we value them” (Walker 2006, 54). He cites two examples of deep involvement: home-remodeling and the preparation of meal. He stresses how highly something that we created ourselves is valued by us: “it is valued over and above function and appearance” (Walker 2006, 57). He asserts, however, in case of the products that we



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are not able to make by ourselves, such as electronics, that they can be valued for their function and appearance as an object, but they generally have little inherent meaning for us because we do not gain a sense of personal accomplishment in their making and design (Walker 2006, 56). However, he has narrow view of the relations between goods and humans. He limited the range of possibilities that we can be involved with goods. The personal association takes place not only in the process of making and designing but also in the using of goods.

Ilmonen argues that the use value of goods cannot be reduced to their symbolic aspect, and that goods play an active role in our relationship to other people against the previous view in social theory that goods function as markers of social differences, taste and so on (Ilmonen 2001). He described the internalization of goods as the process of appropriating goods—making them our own. According to him, when our experience with the good grows, our skills in using it improve and our relationship to it changes—it will become more and more personal (Ilmonen 2001). He states that our approach and emotion toward goods vary, owing to experience during the appropriation process, and might be so innovative that we want to show it to others (Ilmonen 2001). As a result, design features addressing this internalization process are the key to improving the aesthetics and personal value of products.

### **1.3 COMPETITOR ANALYSIS**

There has been an issue with the aesthetics of today's product design which do not last long because of the low durability of the surface. The deterioration of flawlessly shiny and new surfaces, especially in electronics, reduces the aesthetics that people desire in their products.

In his book "*sustainable by design*", Stuart Walker suggests two ways of addressing the issues of "aesthetic longevity and surface" (2006, 87). The first one is rough surfaces that are "unfinished or created from reused parts or recovered materials for aesthetic longevity" (Walker 2006, 87). It may be true, as he maintains, that "One more scratch on a variegated, irregular surface that is an integral part of the object's design will be unlikely to cause aesthetic dissatisfaction" (Walker 2006, 87). But he also points out the deficient factor of it: "It should be emphasized that the aesthetic qualities of such surfaces will be quite different from those of the artificially distressed surface, which is often applied to create the impression that the object is older than it really is. The spurious quality of such surfaces suggests an affectation or pretension and the resulting objects lack authenticity." (Walker 2006, 87)

The second suggestion for aesthetic durability is "to provide a complex surface that is easily maintained" (Walker 2006, 87). He states that "this surface can withstand scratches and knocks without detracting from the appearance of the object" (Walker 2006, 87)

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### **Improving electronics with use – Design to wear**

In both of his suggestions, he approaches one way to make signs of wear and tear unnoticeable is by applying rough and complex surfaces or patterns. Their particular design appearance intended to distract from signs of wear are not widely accepted to fulfill customers' high expectations for sophisticated products. In this point of view, signs of deterioration on products are still regarded as negative factors in the appearance of the products.

There is another approach, which is finding a different sense of beauty and meaning from deteriorated objects. Knoi Vinh posted this issue on his web site with some examples from his personal observation. He takes the Rimowa suitcase as an example. Regardless of their price, luggage bags are handled roughly and beaten up in the flight baggage system of airlines, but he sees “those scratches, dings and dents on the suitcase as part of their aesthetic:

A new, unspoiled Rimowa suitcase is actually the least desirable kind of Rimowa suitcase. Unused objects are ignorant; only the ones that have been put to use, that have traveled, that have been tossed around have accumulated knowledge. That knowledge and familiarity can make an object desirable. A beaten, worn, scratched Rimowa then is a point of pride” (Vinh 2007).

He takes another example of an object valuable because of its deterioration—a cast iron skillet which has “developed a coating from oil and food... I have spent a lot of time marveling at how its very deterioration has been incorporated into the design of the object as how it's gotten more attractive” (Vinh 2007).

He argues that the accumulated knowledge that makes the two examples desirable does

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### **Improving electronics with use – Design to wear**

not work for digital technology, and the concept of *designed deterioration* he says is “fairly anathema to digital hardware” (Vinh 2007). He maintains that manufacturers would not accept the concept of *designed deterioration* because it would undercut future sales.

However, I believe that there are ways to take advantage of the *designed deterioration* concept not only in the view of the customer, but also of the manufacturers. Of course, manufacturers will realize less profit from the loss of sales of replacements for aesthetically obsolete products that are still working well. Moreover, it would cost more than current manufacturing. However, if the product which is designed to have desirable wear succeeds in holding value and satisfying consumers’ tastes, consumers would very likely pay more for their electronic goods.

## **1.4 DESIGN INSPIRATION: WABI-SABI**

What is Wabi-Sabi?

“Wabi-Sabi is a beauty of things imperfect, impermanent, and incomplete. It is a beauty of things modest and humble. It is a beauty of things unconventional.

Beauty can be coaxed out of ugliness;

Wabi-Sabi is ambivalent about separating beauty from non-beauty or ugliness. The beauty of Wabi-Sabi is, in one respect, the condition of coming to terms with what you consider ugly. Wabi-Sabi suggests that beauty is a dynamic event that occurs between you and something else. Beauty can spontaneously occur at any moment given the proper circumstances, context, or point of view. Beauty is thus an altered state of consciousness, an extraordinary moment of poetry and grace.” (Koren 2008)

The main concept of Wabi-Sabi that inspires me is “acceptance of the inevitable”: Wabi-Sabi state of mind.

## CHAPTER 2: SUMMATIVE RESEARCH

### 2.1 VARIOUS TYPES OF WEAR: CLASSIFIED BY MATERIAL


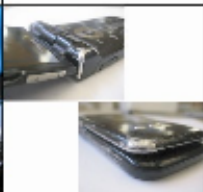






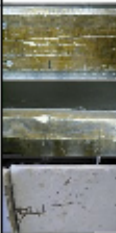











	Dents	Frayed edges	Fading out	Grime	Scratches	Weathering
Electronics						
Apparel						
Home						
Public space so on						

Figure 2  
Various types of wear

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**Nick:** A shallow notch, cut, or indentation on an edge or a surface<sup>1</sup>

**Scratch:** A slight injury, mar, or mark, usually thin and shallow, caused by scratching<sup>2</sup>

**Grime:** Dirt, soot, or other filthy matter, esp. adhering to or embedded in a surface<sup>3</sup>

**Dent:** A hollow or depression in a surface, as from a blow<sup>4</sup>

**Color or print fading out:** Loss of brightness or vividness of color.

**Weathering:** To discolor, disintegrate, wear, or otherwise affect adversely by exposure.<sup>5</sup>

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<sup>1</sup> Nick. Dictionary.com. *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. <http://dictionary.classic.reference.com/browse/nick> (accessed March 24, 2008).

<sup>2</sup> Scratch. Dictionary.com. *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. <http://dictionary.classic.reference.com/browse/Scratch> (accessed March 24, 2008).

<sup>3</sup> Grime. Dictionary.com. *Dictionary.com Unabridged (v 1.1)*. Random House, Inc. <http://dictionary.classic.reference.com/browse/grime> (accessed March 24, 2008).

<sup>4</sup> Dent. Dictionary.com. *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. <http://dictionary.classic.reference.com/browse/dent> (accessed March 24, 2008).

<sup>5</sup> Weathering. Dictionary.com. *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. <http://dictionary.classic.reference.com/browse/weathering> (accessed March 24, 2008).

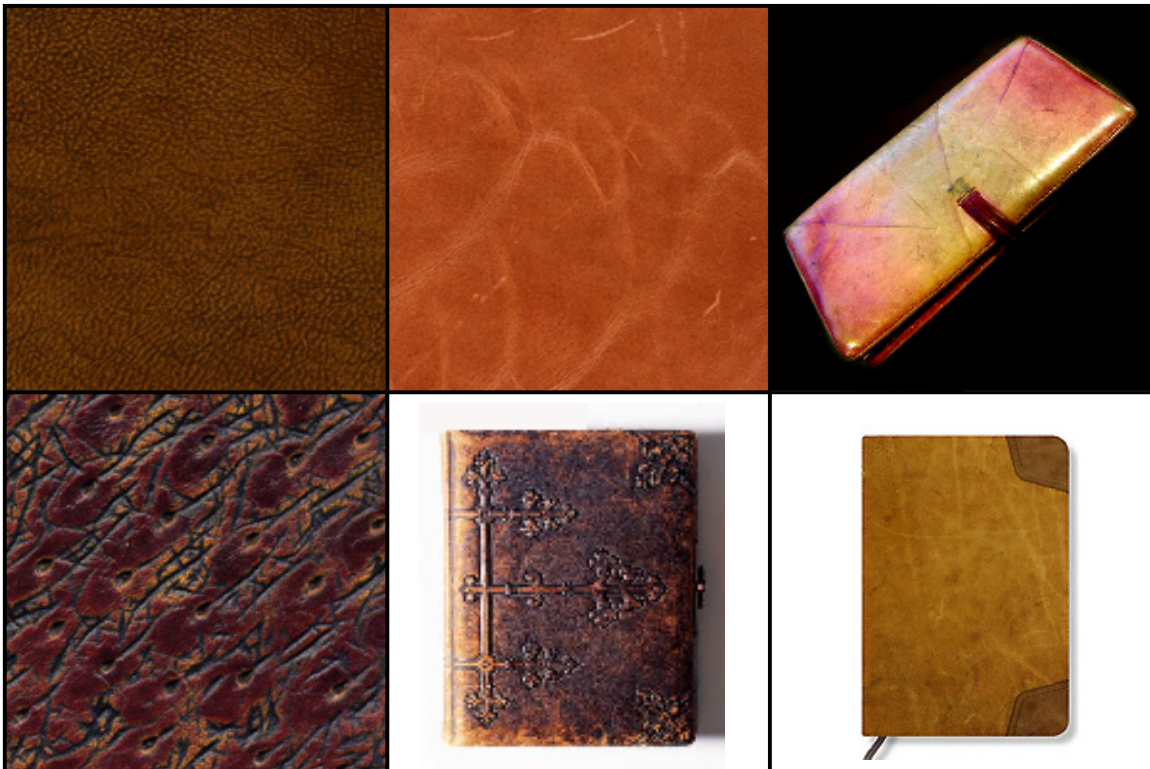
**OBSERVATIONAL RESEARCH |****2.2 VARIOUS TYPES OF WEAR: CLASSIFIED BY MATERIAL****LEATHER**

Figure 3

Wear on leather:

(Clockwise from left)

*Above left and middle*, use-wear (<http://www.gowfb.com/images/Coja/leathergrade/>); *right*, man-made use-wear; *below middle and right*, Classic old leather journal

([http://www.paperblanks.com/old\\_leather](http://www.paperblanks.com/old_leather)); below 3 images are artificial distressing



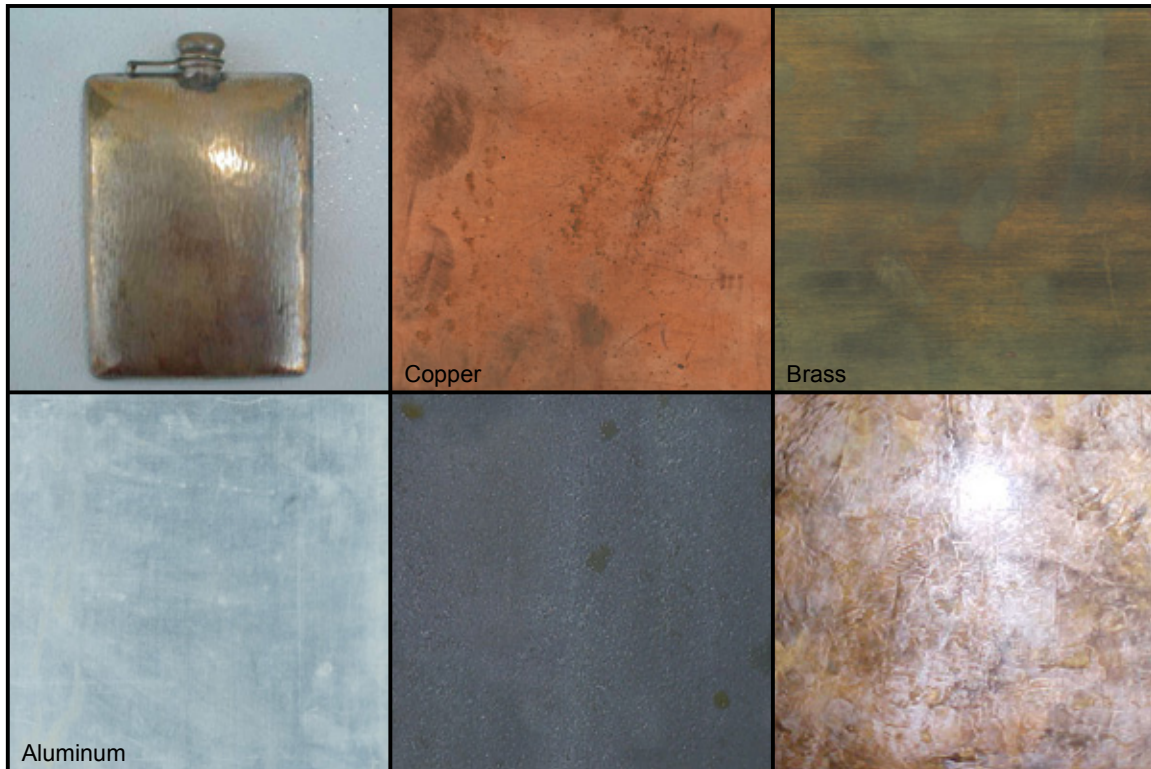
**OBSERVATIONAL RESEARCH |****METAL**

Figure 4

Wear on metal

## OBSERVATIONAL RESEARCH |

**2.3 VARIOUS TYPES OF WEAR: CASE STUDY**

Figure.5 is shown as an observation of how wear shows on a metal surface which has an embossed pattern.

Surface is dirty, discolored, and smudged by finger prints.

Figure 5: Cell phone case study



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## Improving electronics with use – Design to wear

### 2.4 USER OBSERVATION: WHERE TO WEAR

How users hold a camera?

When taking a photo:



When controlling buttons:



Figure 6

Observation of using a digital camera

(<http://dica.dcinside.com/>)

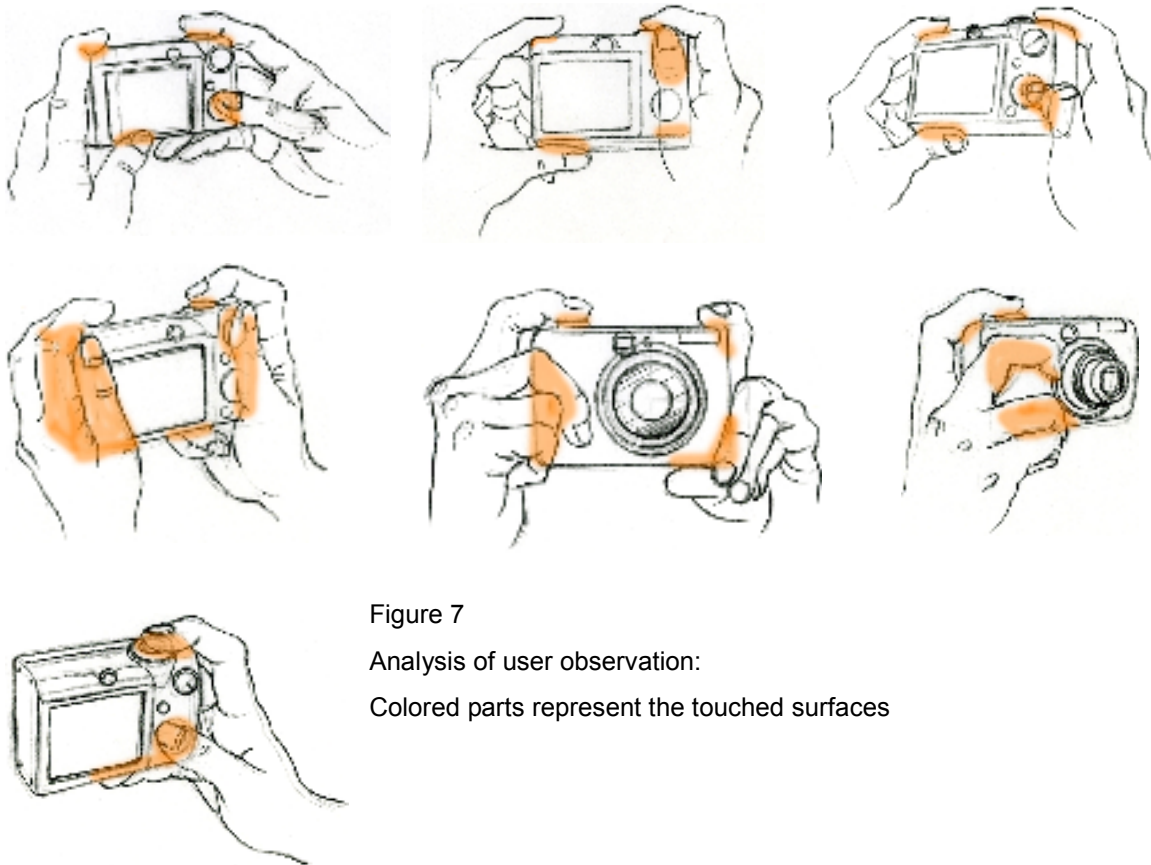
**2.5 ANALYSIS OF USER OBSERVATION**

Figure 7

Analysis of user observation:

Colored parts represent the touched surfaces

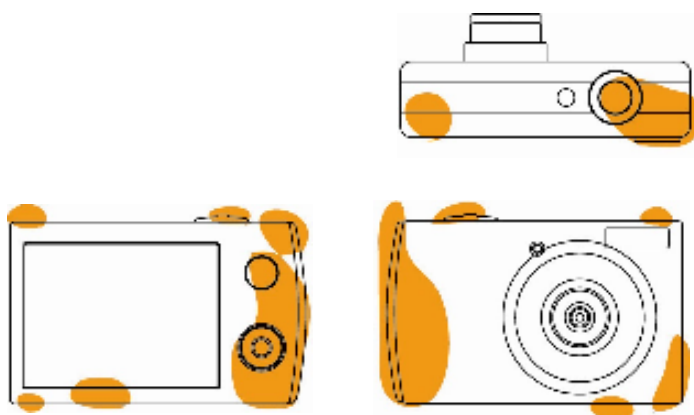


Figure 8

High frequency of touching

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**Improving electronics with use – Design to wear**
**2.6 THE CAUSES OF WEAR**

O: Affected

X: Not affected

	Convex part	Concave part
Holding in use	○	○
Holding for carrying	○	×
Dropping	○	×
Crashed against other stuff in hte purse or pocket	○	○
Rubbing (around or on the buttons)	○	×
Scratched on the table	○	×

Table 3

The causes of wear

## CHAPTER 3: CONCEPTUALIZATION

### 3.1 DESIGN CONCEPT 1

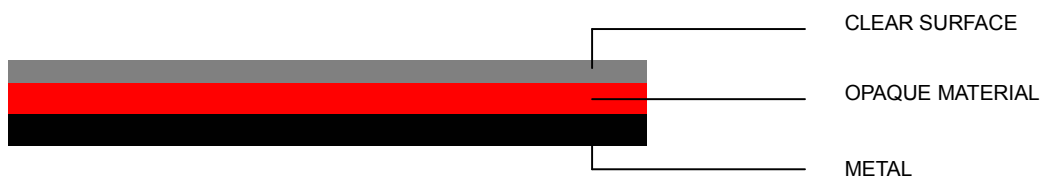


Figure 9

Surface Cross-Section with design concept 1

The opaque material in the middle is subject to breaking by pressure (mostly edge parts caused by dropping and collision with other objects)  
Cracks or Fractures look shiny because of refraction.

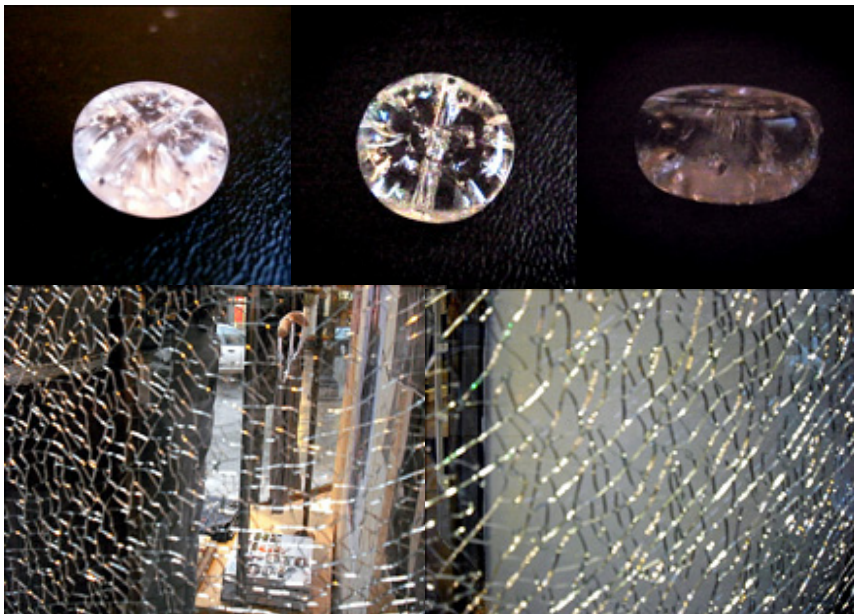


Figure 10 Cracks

### 3.2 DESIGN CONCEPT 2

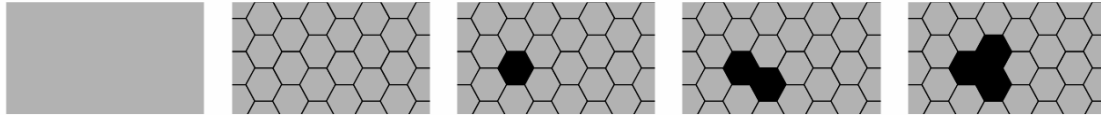


Figure 11

Sequence of wear with design concept 2

In use, some parts are going to be chipped away.

Since the surface consists of hexagon shapes, missing parts will reveal a planned, organized pattern. If it is applied on and near button parts, additional surfaces will show up where the user actually touches the button.



Figure 12

Prototypes with concept 2

### 3.3 DESIGN CONCEPT 3

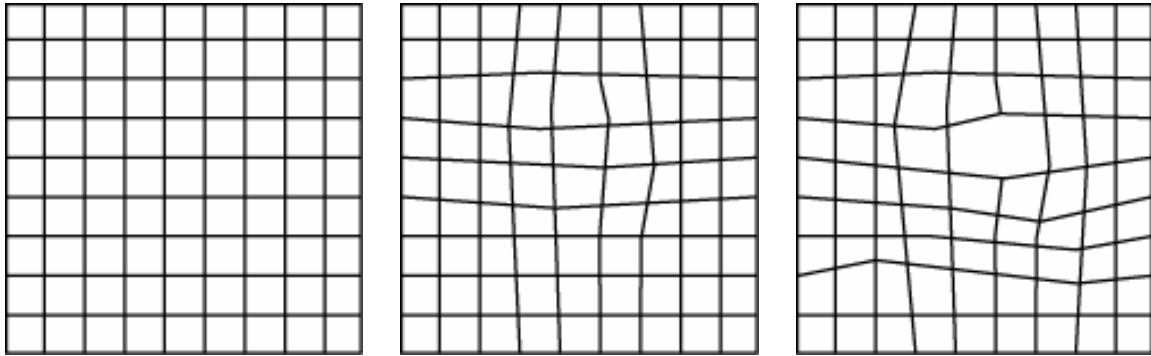


Figure 13

Sequence of wear with design concept 2

#### Mesh Surface

The rectangles in the mesh change shape when touched.  
Some are going to become bigger when touched frequently.

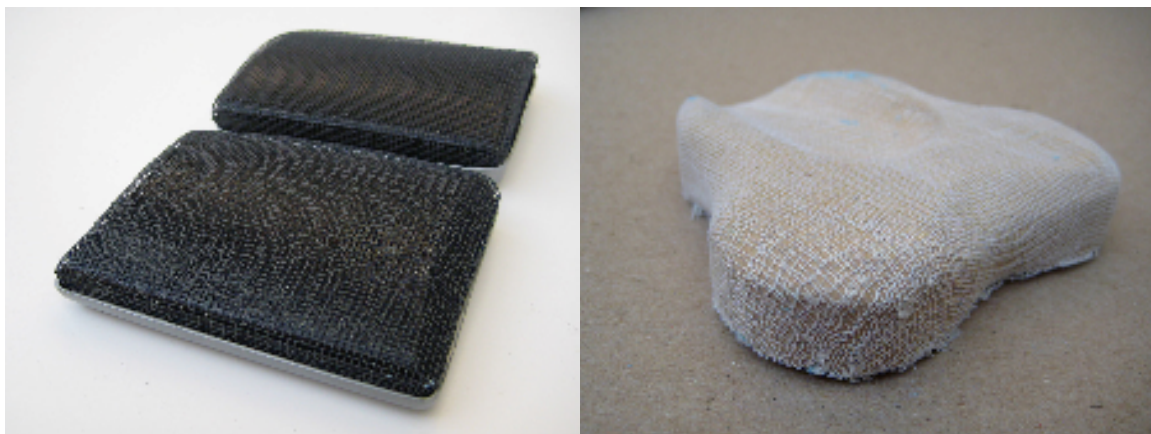
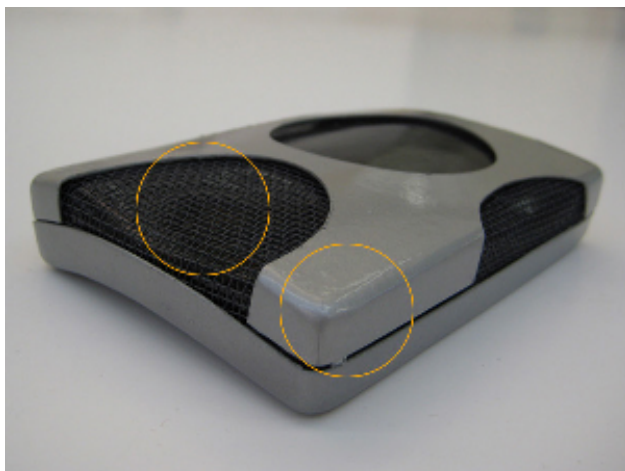


Figure 14

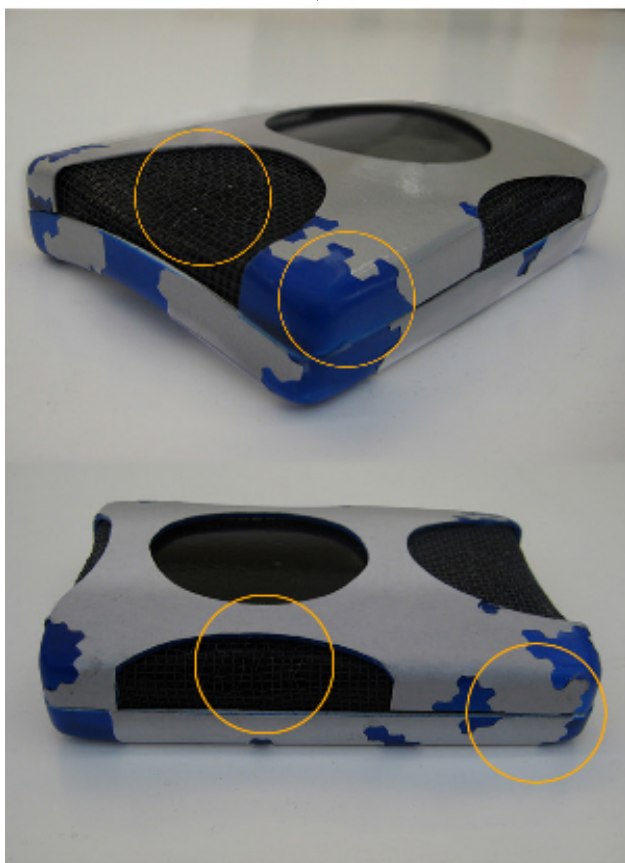
Prototypes with concept 3



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**Improving electronics with use – Design to wear**

When new



When used

Figure 15: Prototypes with concept 2 and concept 3 applied

### 3.4 DESIGN CONCEPT 4

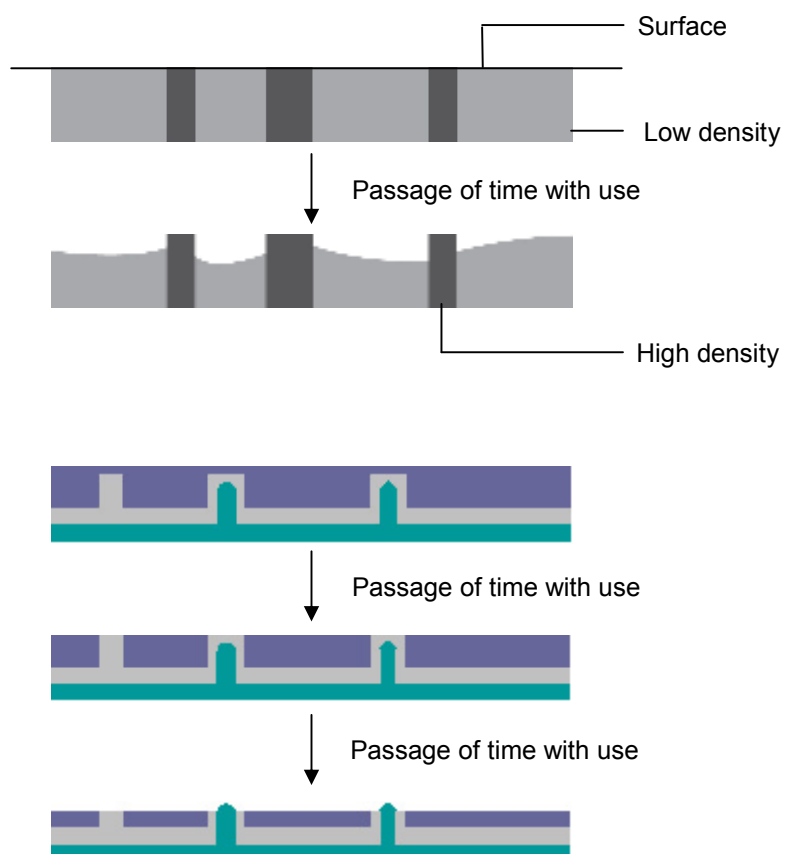
Surface reveals new features (color, textures, function)

Material consisted of high and low densities

The worn surfaces show new features as well as functions from actual wear in use.( Improving Usability, Personalization)

Figure 16

Surface Cross-Sections with design concept 4



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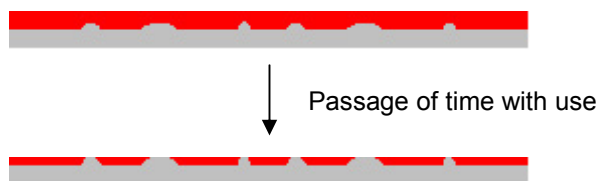
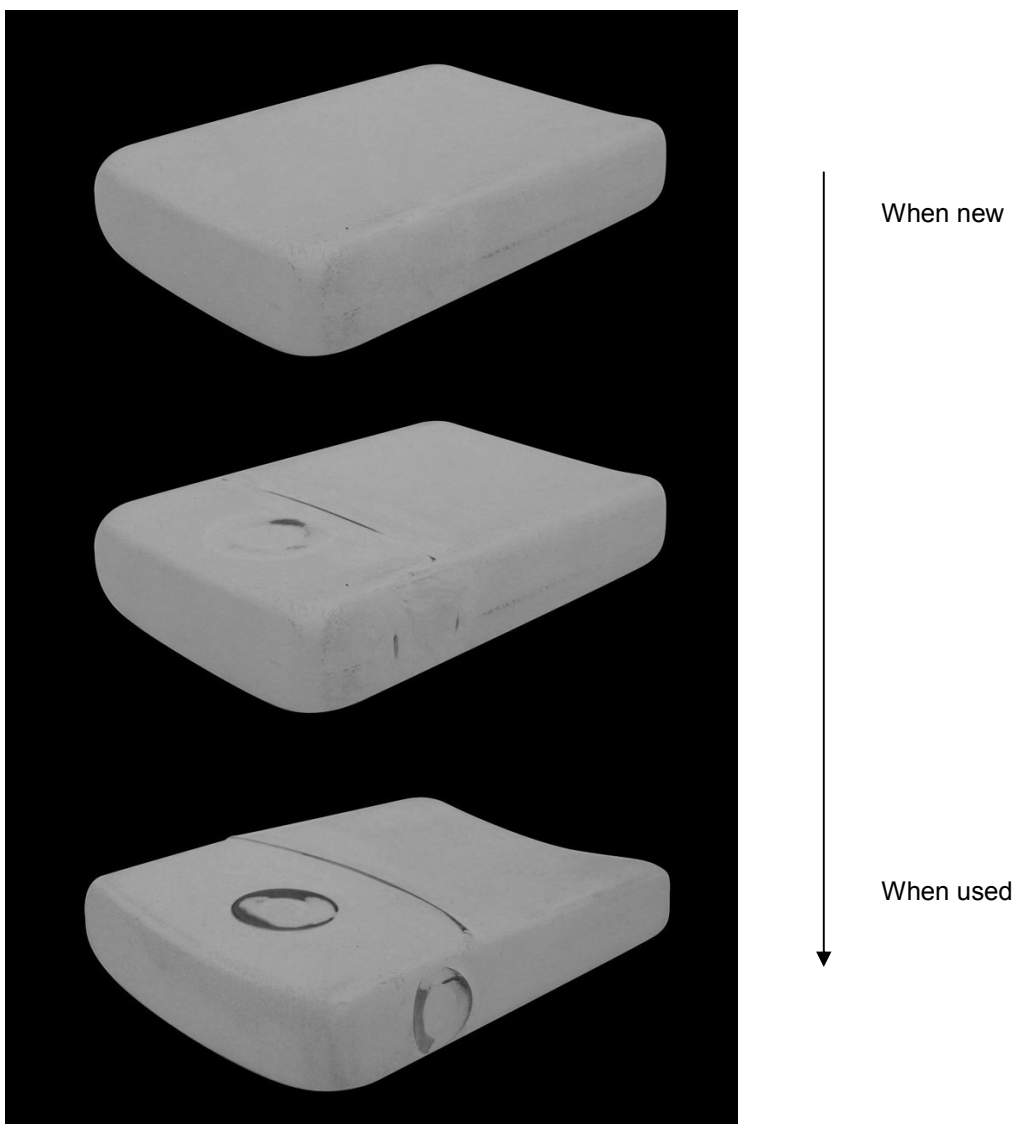
**Improving electronics with use – Design to wear****PROTOTYPES: SEQUENCE OF WEAR**

Figure 17: Sequence of wear

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### Improving electronics with use – Design to wear

- Surface reveals new features (color, textures, function)

- Multiple layers of paint (Paint wearing):

Some layers would be worn off, and then the underlying layer shows up with new features

Different shapes appear at different locations, depending on each user's habits and hand size

- The Value from Personalization / Special

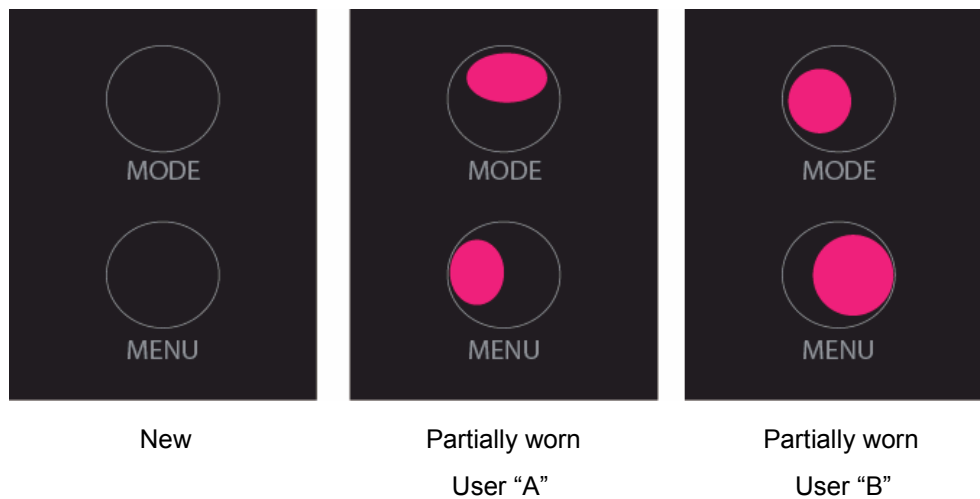


Figure 18

Anticipated features on buttons

### 3.5 DESIGN CONCEPT FOR FORM

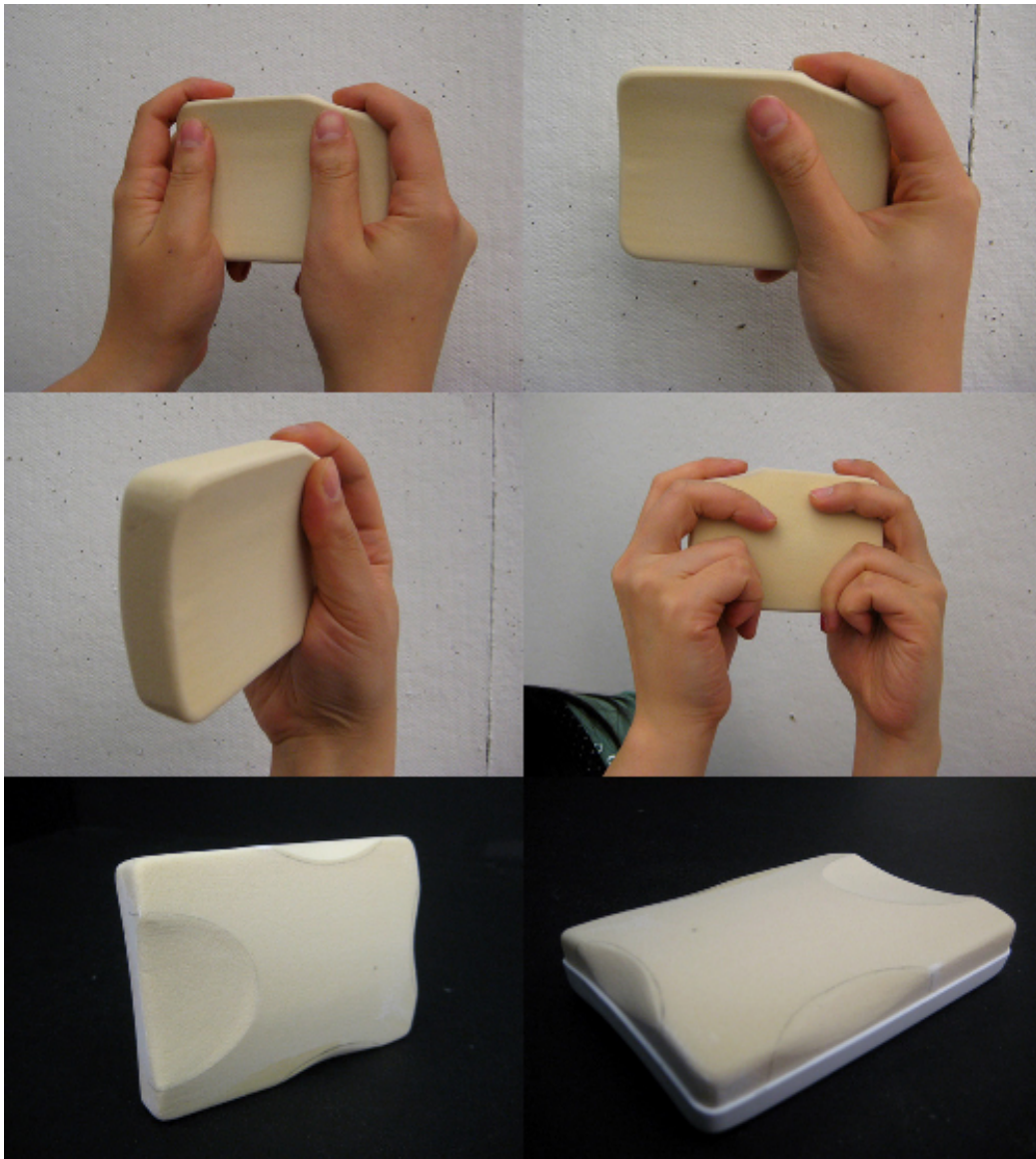


Figure 19: Form study

The use of a combination of concave and convex surfaces allows the designer to control the locations of wear patterns.

### 3.6 DESIGN SKETCH

Design the form convex and concave by functional factors

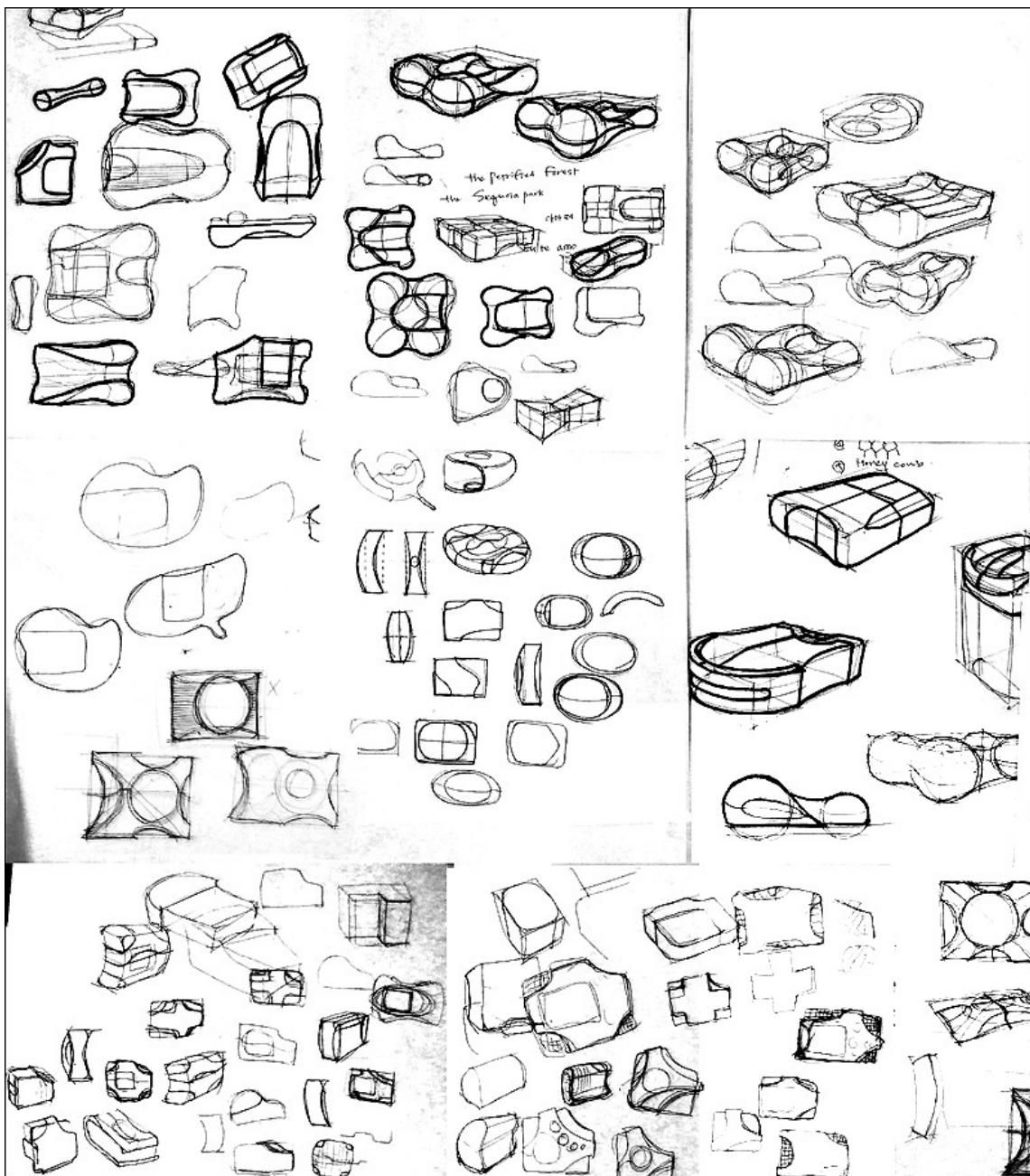


Figure 20: Early design sketch

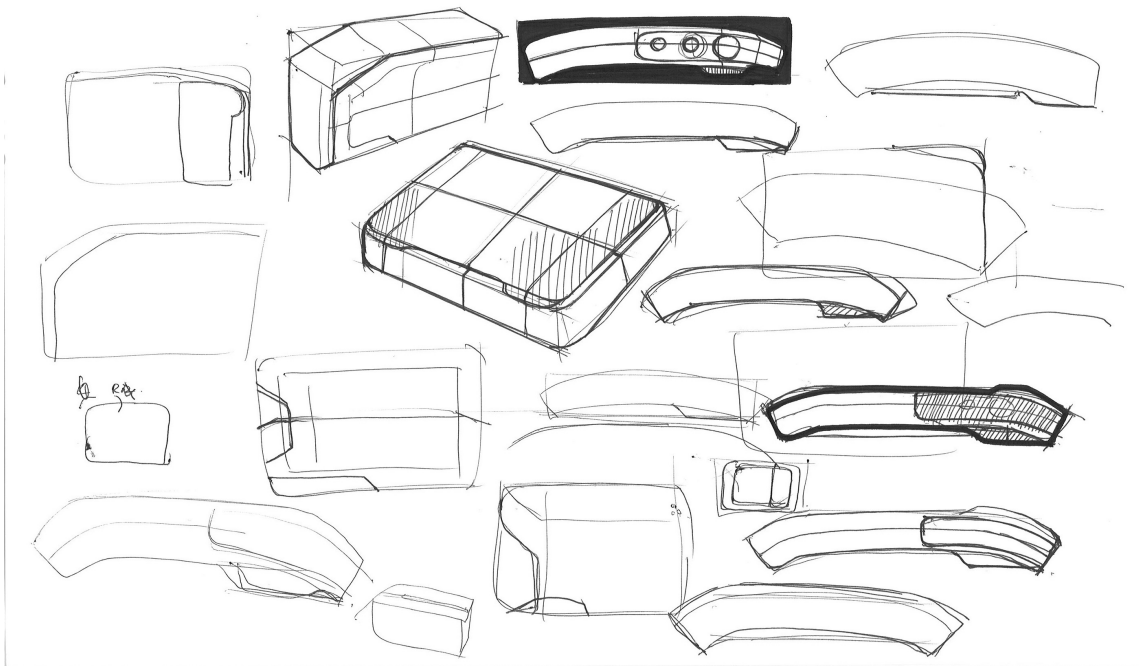
**CHAPTER 4: REFINEMENT / FINAL SOLUTION****4.1 SKETCH IDEATION**

Figure 21: Sketch ideation

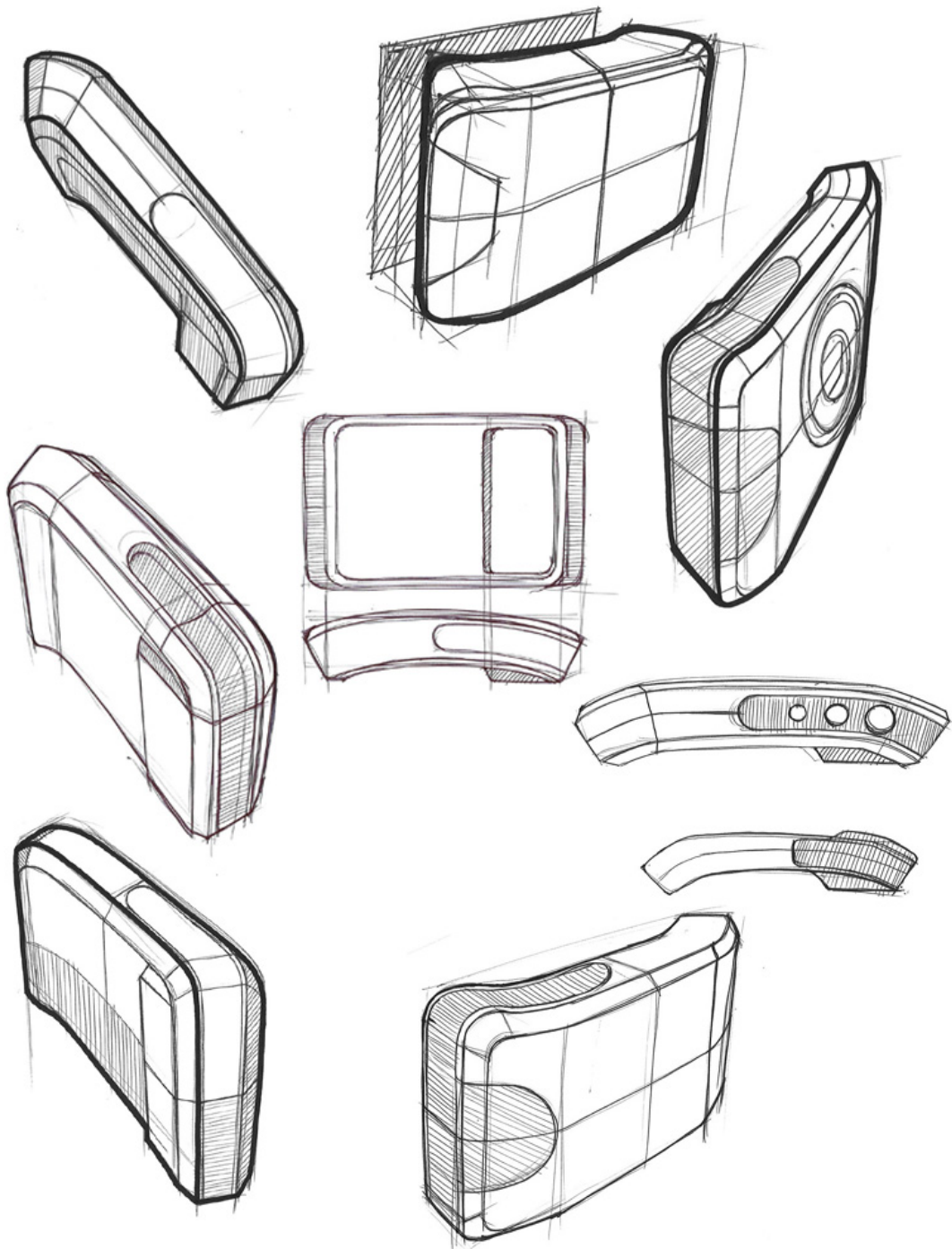


Figure 22  
Sketch for final design



#### 4.2 Z-CORP FULL-SCALE MOCK-UP



Figure 23

Z-Corp full-scale mock-up

### 4.3 DESIGN DESCRIPTION

A. The change of the surface:

The wearing away of the surface reveals an planned pattern underneath

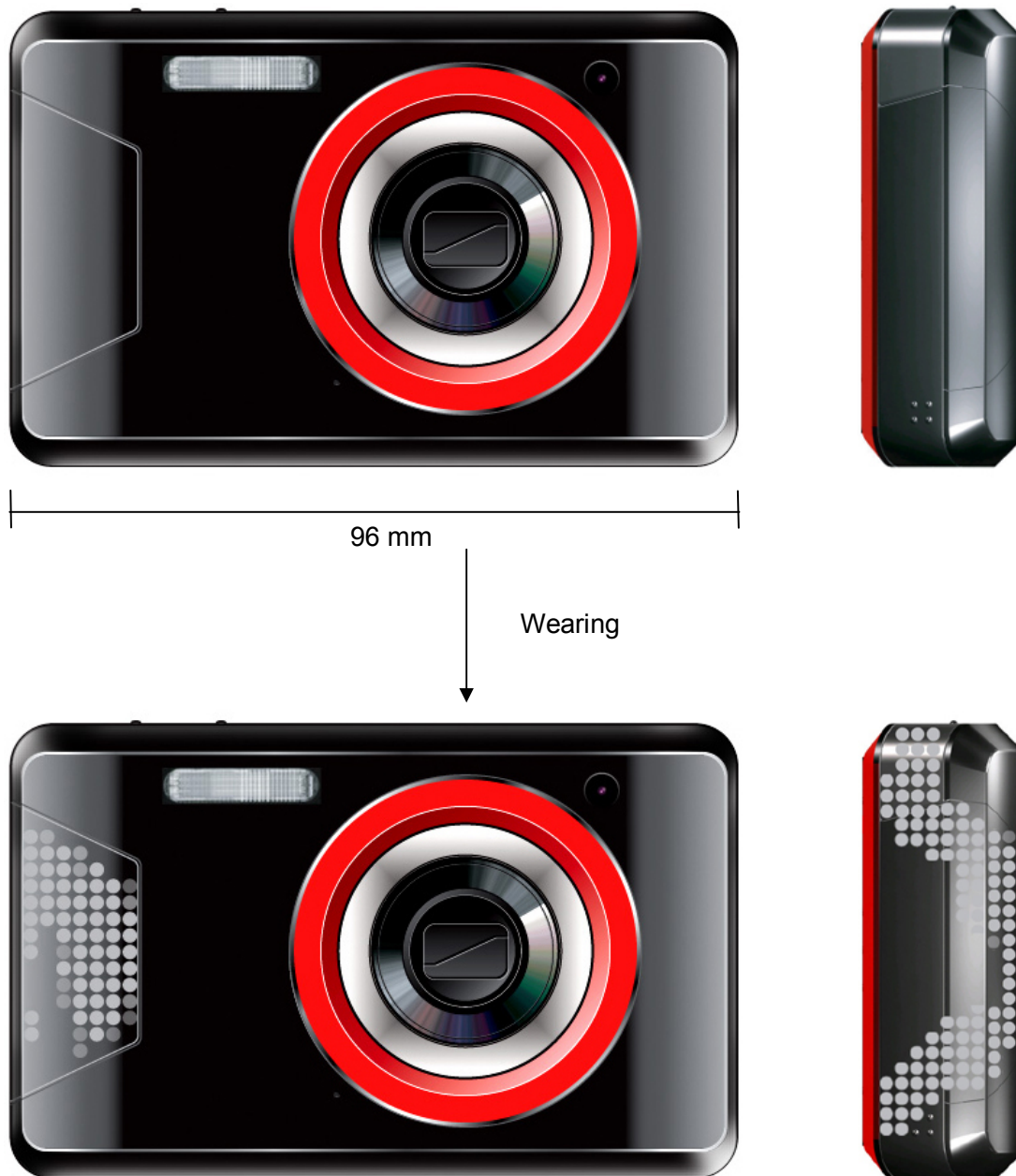


Figure 24: The change of the surface, Front and side view

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B. The change of the button: The buttons become bigger, but the exact shape and size will vary from user to user.

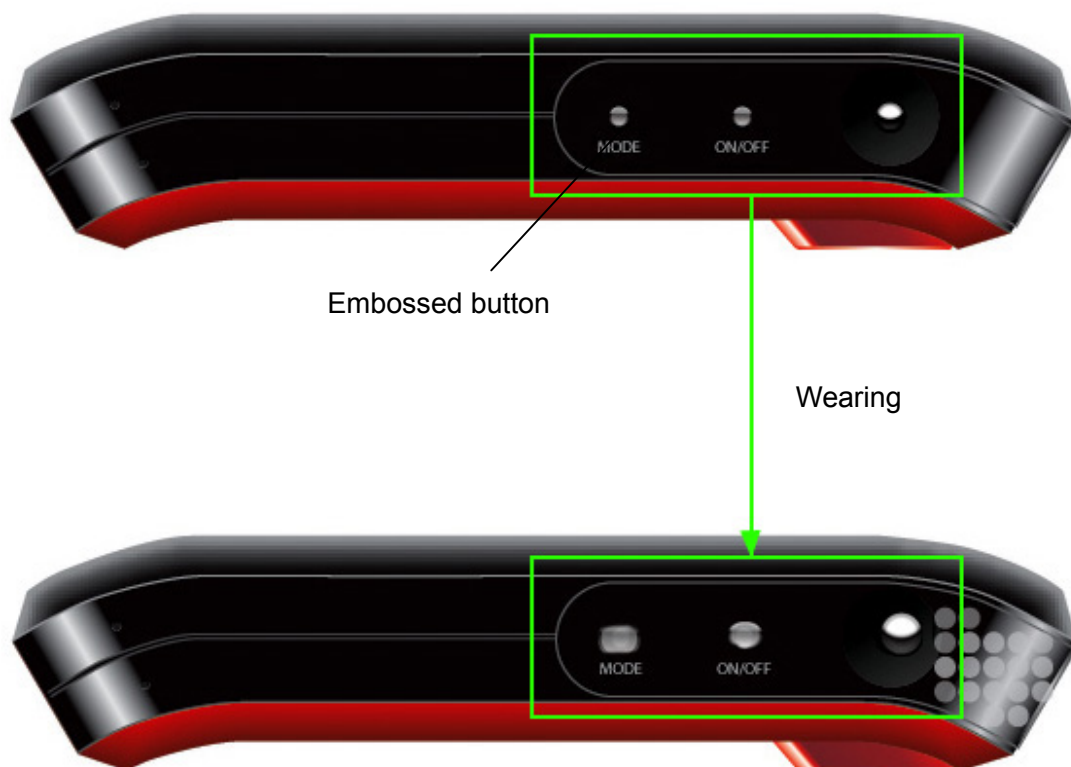
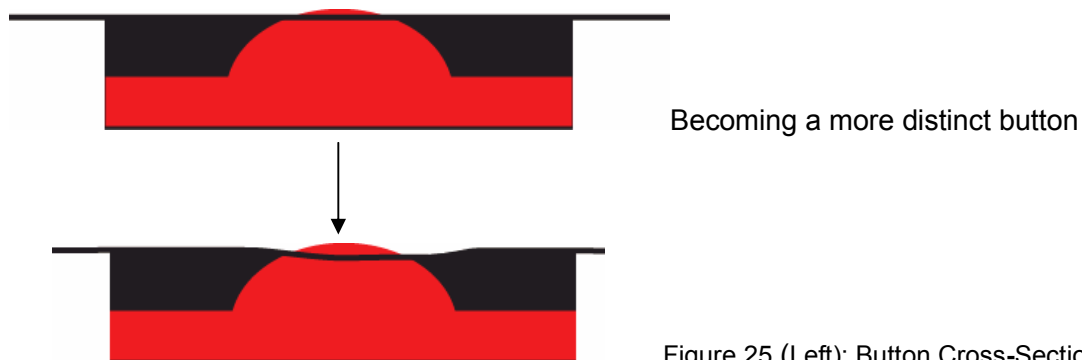


Figure 26: The change of the button, Top view

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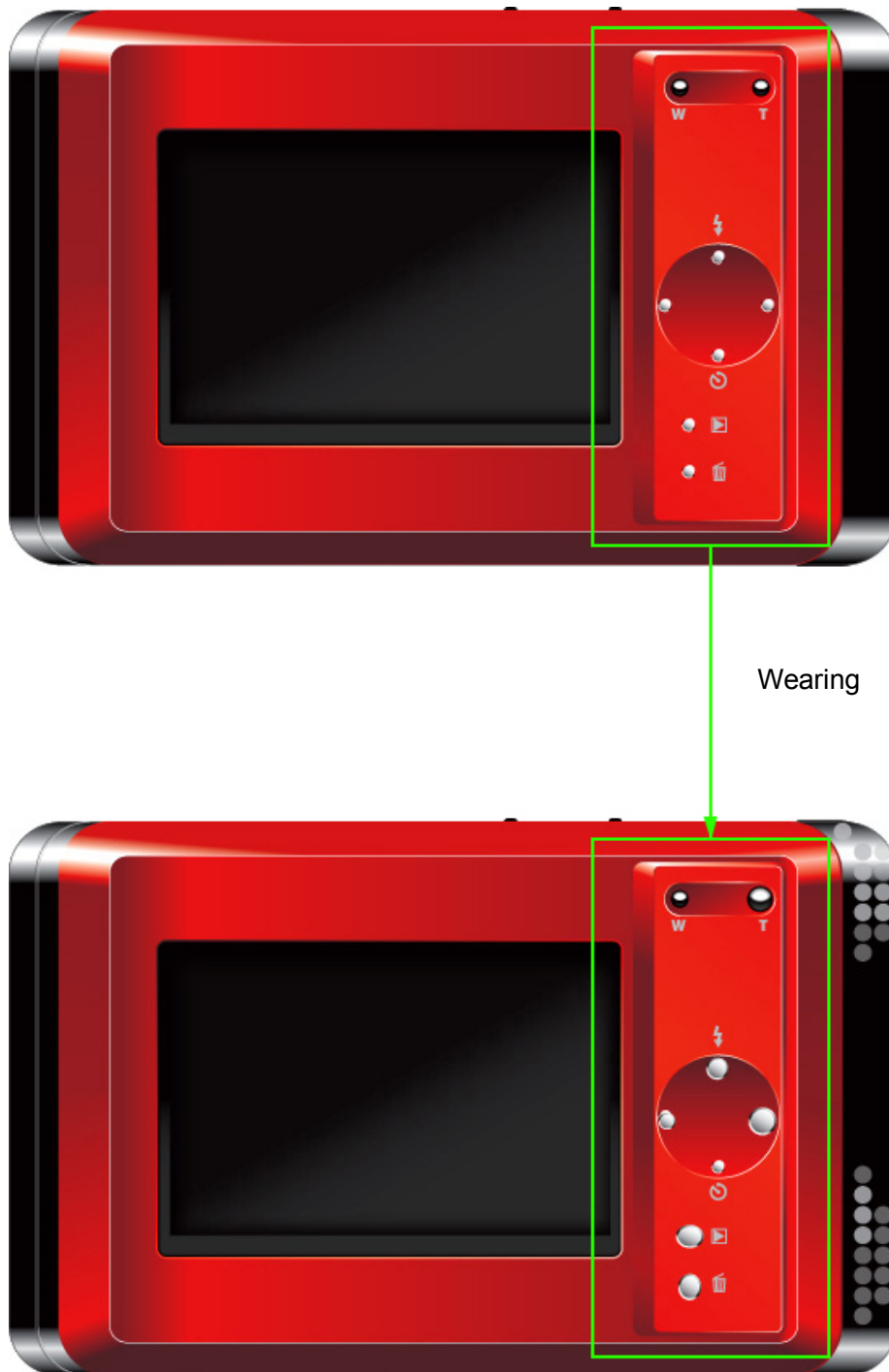


Figure 26: The change of the button, Back view

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C. Form: A combination of concave and convex parts

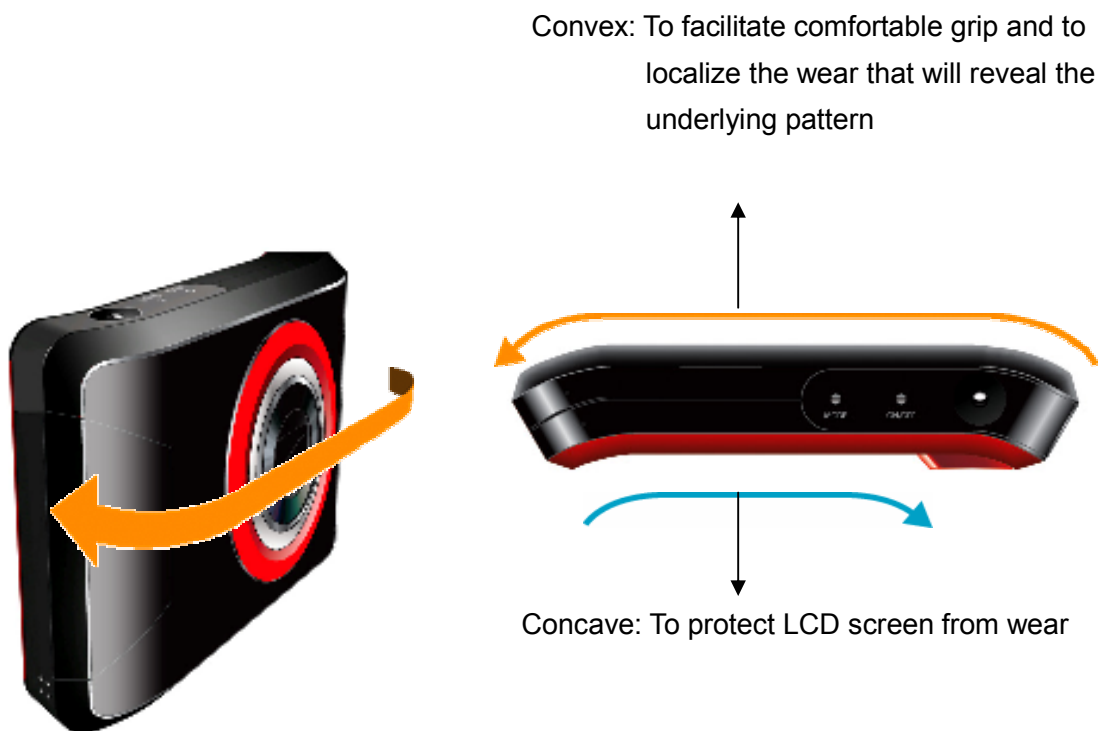


Figure 27

Form description – concave and convex parts

#### 4.5 USER SCENARIO

Persona 1:

Oronde Wright, Male, 21



Figure 28

Persona 1: Observation of using a digital camera

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From observation, “Persona 1”'s camera will wear with these results.

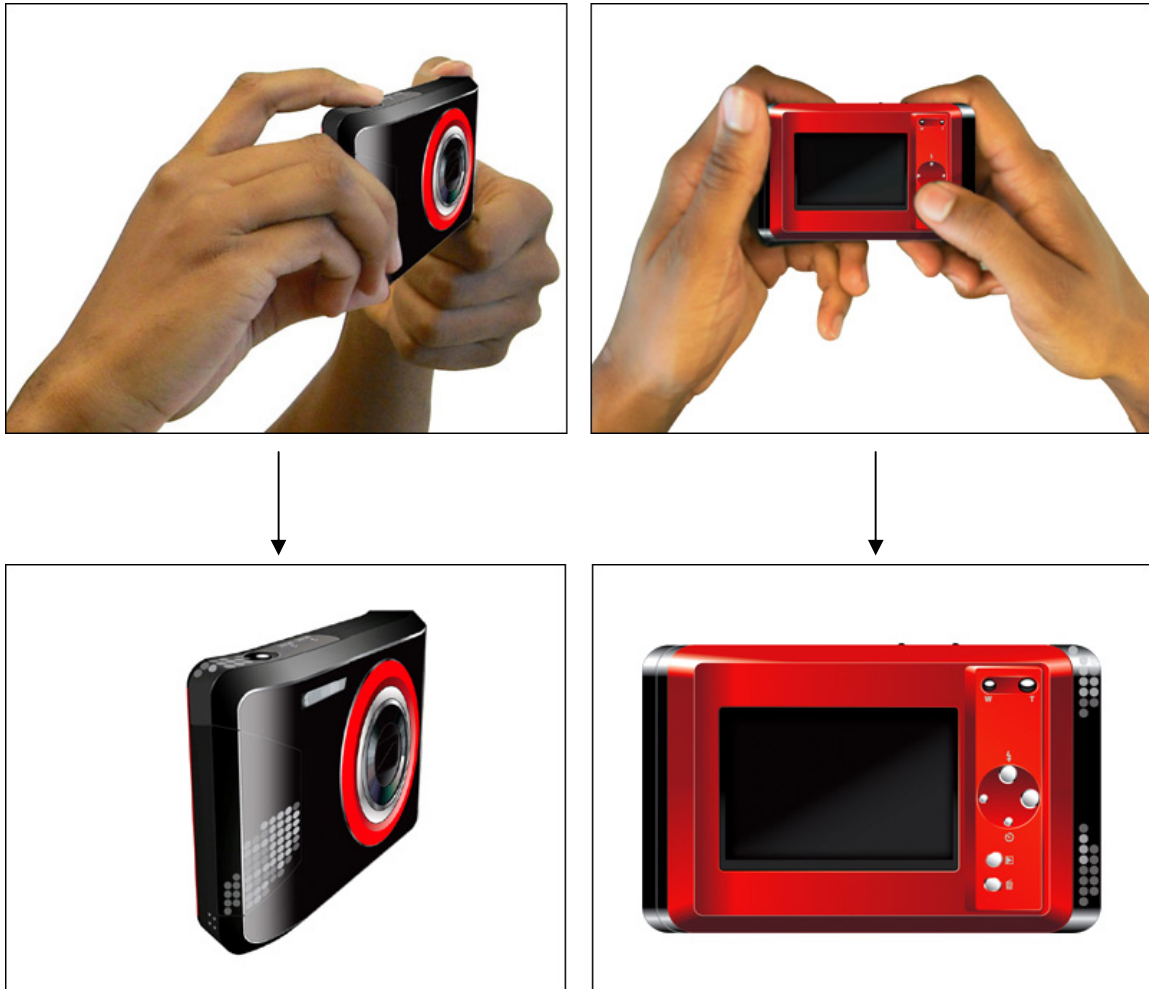


Figure 29

The change of Persona 1's digital camera, Perspective and back view

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From observation, "Persona 1"s camera will wear with these results.

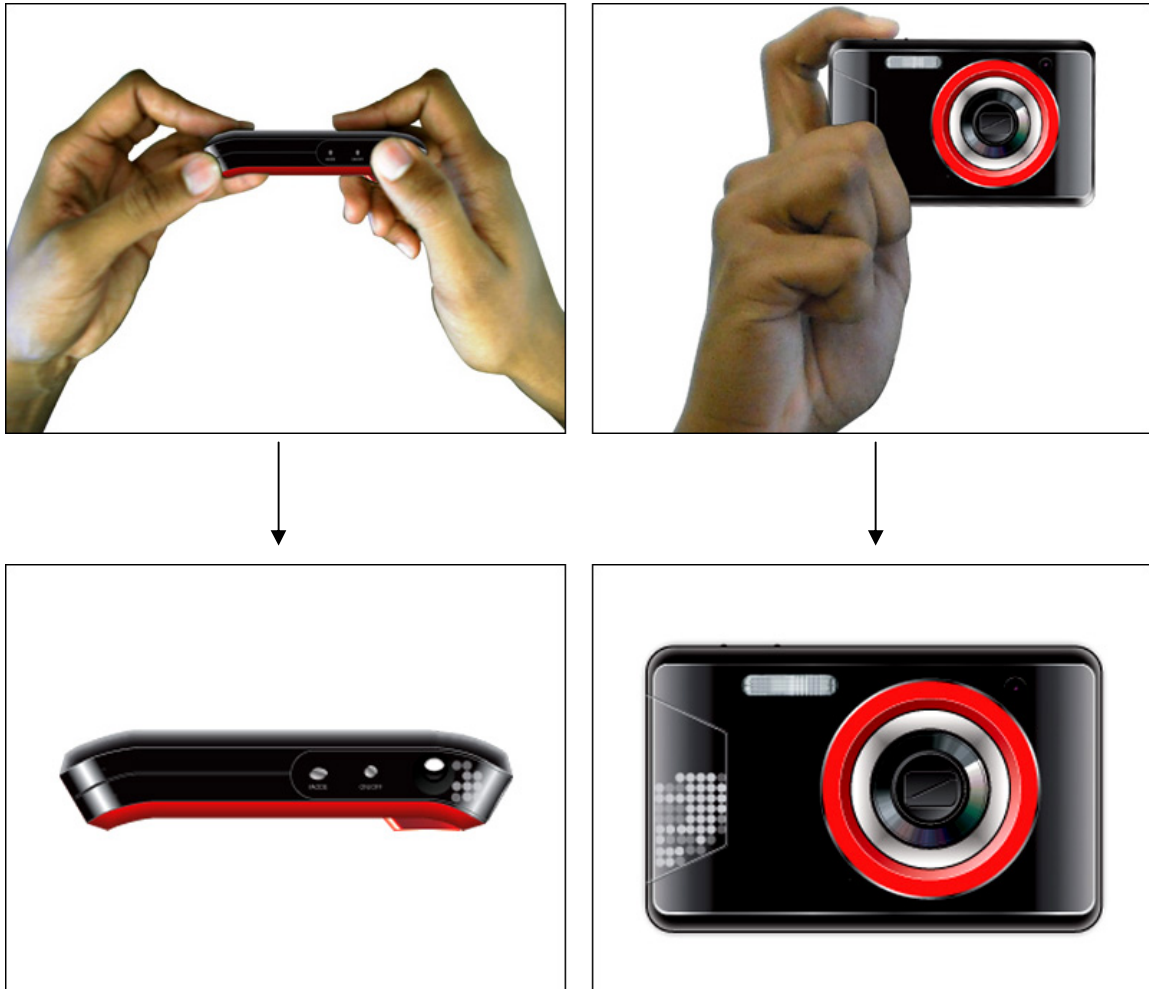


Figure 30

The change of Persona1's digital camera, Top and front view



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Persona 2:

Shinae Hwang, Female, 23



Figure 31

Persona 2: Observation of using a digital camera

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From observation, “Persona 2”'s camera will wear with these results.



Figure 32: The change of Persona 2's digital camera

## **CONCLUSION**

The aesthetic value of some products fades with use. Signs of wear on the surface give a sense of dissatisfaction with a product.

In previous chapters, I analyzed the social factors that cause this problem in basically two ways: *planned obsolescence* and the symbolic meaning of goods in our material world.

We live in a society that worships the new but cringes before the old, the crippled. This aversion to used, worn objects stimulates a improper relationship between user (owner) and goods (possessions) in use.

From a designer's perspective, we can see the major cause of the problem. Today's products are designed to appeal with good looks and elegance, which generally rely on perfectly polished and glossy surfaces. As a result, consumers' preference for immaculate beauty went off the charts - this penchant gave way to social factors mentioned above. This exquisite and delicate beauty of product appearance is not designed to accommodate with signs of wear.

In tackling the problem, I have utilized the perception of beauty from the Japanese theory of Wabi-Sabi, a beauty of things imperfect, impermanent, and incomplete. My approach involved acceptance of the inevitable signs of wear on products. Whereas the theory of Wabi-sabi accepts beauty comprehensively from all natural processes including ugliness, I explored a way of making beauty from natural wear more desirable by design, by anticipating certain wear in the course of using the product.

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I have tried to explore a design solution that will coax people into wanting to maintain “a relationship” with the worn products, willingly involved in the process of wear and tear. Making people realize that today’s marketing strategy manipulates them to desire newer and newer things, and instigates the throw-away culture is not enough to change people’s perception. The ethical approach that makes people feel guilty about wasting also cannot make it happen. The actual benefit or value of keeping and continuing to use is proposed to change the behavior or the perspective of the consuming public.

As a final solution, I proposed a concept for a digital camera designed to reveal new features (desirability of wear). It implies not only a sense of fun and new appearance, but also increasing usability from use (functionality). Moreover, the usability increases specifically in response to each user’s behavior (specialization).

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