

IDEA GENERATION METHODOLOGY FOR CREATIVE DESIGN THINKING

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Abstract :

Because consumers consider the aesthetic side of a certain product more and more crucial, contemporary design is being molted from its existing concept to be more unique, flexible, and appealing. If the ultimate goal of a design is to make consumer's dream come true, then coming up with an original idea is one of the main abilities that a designer must have. Therefore, the fundamental study is to maintain the progression of a preceding research and to understand the different problems in various ways when trying to think of an original idea. It is also important to present an original way of thinking for the development of a new idea. In order to fulfill the purpose of this study, the effect and possibility of creative idea methodology will be presented, with the suggestion of creative idea methodology as a new sample study out of the use of computer, so that designers may make use of it in the practical world of design.

Keywords: Creativity, Design Method, Product Design

1. Introduction

Today, the world economy is coming to an era where there is only one winner. In other words, it is completely useless and meaningless if it is not meant being the best. An original product is the essence to the key of being the best, and in order to produce an ingenious creation one must attain a talent of being original and creative (Hwang Chang-Kyu Samsung Electronics Semiconductor President).

A design is a key element for preparing a new marketing foundation by raising the value of a product and its competitiveness. A design is also an outcome of a functioning human brain, which means that a processing of designing is a process of thinking. On top of that, a design is an act of a model creation, which allows it to be the epitome of creativity.

On the other hand, a designer as well as being an "inventor" who displays creativity must have a starting point with a new value through a design by reinterpreting consumer's natural value and request. To reach this kind of goal, "creativity" is certainly an essential ability that a designer must attain and definitely should be an area that has to be developed. In product design, there are two types of quality, skill and sensitivity. If a skill quality product represents a quality that is relevant to a spare part or a mold, then sensitivity quality has competitiveness and sensational creation which provides an individual with an innovative feeling. Simplified, skill quality is a quality of a product which the interior part has to be logically arranged and that the fabricating process must be done without any difficulty. Sensitivity quality is a quality which can stimulate the consumer's sensation, as well as sustaining the most the suitable fashion trend according to different generations. Before, skill quality was considered more significant than sensitivity quality, but recently it has been changing.

An original design has to be specified by the designer's different angled and modified looks. Therefore, the fundamental research is a method of presenting a new form by broadening the width of a limited though in order to attain creative form thinking for design. It presents a renovated form thinking process by promoting the creativity of a designer and escaping the form thinking process of establishment.

2. Design and Creativity

Creativity is calling an imaginative power to a stronghold, together with the abilities to ease problems and to apply various ideas and concepts in different sections. An imaginative power is an intellectual ability which cannot be seen or heard; however, only be drawn in one's mind. Newell Simon & Shaw said, "A situation where creativity is worth the product of an original idea, or a situation where idea does not bind to a custom, or when idea requires high motivation and persistence. Lumsdaine(1995) said, "With imaginative power and potential it is a process for ideas and humans to have a fresh and meaningful relationship in a mutual working environment." However, because creativity is a temporary rescue that explains and describes the special potential of mankind and the special effects to some extent, it is weak unless an individual changes and becomes novel through the work of people and releases a modernized new product.

Design action is a specific subject and a series of process aiming for value which is an abstract general principle. Understanding of situation and the analyzed generalization of thinking are more meaningful than having a modeling concept sample. Therefore, converting a design from an abstract concept into a visual concept has a significant meaning through the quality of modeling and creativity. Design is a thinking act of creativity in order to improve the image, and the effect of ideas which can be expressed in many ways. If it is too abstract it is not a "design" because people would not be able to visualize the image and the creativity. Thus, a design cannot be a design without image and creativity. So what is creativity in terms of designing and how designers must think in order to attain creativity?

Design creativity is the core idea of design problem solver, through this the truth or falsehood of design can be renovated. Creativity should be a balanced idea of collecting and emitting. The idea of emitting is having different solutions for different problems in an artistic way. On the other hand, the idea of collecting is having only one specific answer for one problem in a scientific way. Rationality is easier and has more freedom than imaginative power; however, the idea of imaginative power can easily receive a reasonable evaluation. Therefore, in design both collecting and emitting actions are necessary, however, for the designer's idea of creativity the idea of emitting is more significant. When a designer acknowledges and decides the various cultures for the value of a quality model for a new era, a new culture can be created in the future.

3. Form of Product Design

The desire of a human being in a product design can be summarized into three parts. It is a desire of having a potential of being easily accomplished, as well as being more efficient and economic, then a limited relationship between man and product. It is also a desire of wanting a visual form such as an absolute or a subjective aesthetic standard to attain aestheticism by enjoying visual angles. Lastly, it is a desire of wanting a visual form which one's personality or identity or a satisfaction of ownership can be a symbol in a society. Therefore, in conclusion a design has special features such as potential, aestheticism, and symbolism because design action has the goal of satisfying the desires of each individual in terms of product modeling. Likewise, the fundamental research indicates that there are two sections of quality among the special characters of a design. The first one is a skill quality which portrays strong ability character, and the second one is a sensitivity quality which portrays strong aesthetic character.

3.1 Technological Form

The ability character of a design not only represents a technological ability of a product, but also represents the efficiency of the user which assists the design of the outward appearance. This kind of ability character of a design requests basic problems together with the performance of a product. It especially has the ability to emphasize the different products which had more physical contacts with the owner. Technological quality must be examined in the following matters.

1) Safety of usage and handling- Whether the quality of the product and the structure of the outward appearance can be safely sustained despite the worst environmental and handling condition.

2) Convenience of operation and management-Whether the structure of the outward appearance and the assembling method can be easily operated, as well as maintaining management.

3) Suitability of aesthetic character- Whether the aestheticism of a product is becoming a primary factor by being hindered by the important elements such as safety operation, and management.

3.2 Sensitivity Form

The aesthetic character of a product represents a sensational response given by a product that stimulates excitement and satisfaction. A design of product has every element of outward appearance as well as a sensitivity stimulating element, which can stimulate individual consumer's excitement and satisfaction to purchase a product. Likewise, the sensitivity form of a product design is a recent tool used in marketing strategy and tactic to stimulate the unfulfilled sensitivity of consumers.

4. Creativity Design Idea

During a designing process, one of the hardest parts for a designer is the idea part. For those designers, there are different thinking methods for ideas which are being developed and used. Like the picture shown below, idea thinking methods can be divided into groups such as individual, brainstorming, synectics, input-output, and Edward de Bono' 6 thinking hats, and etc..





4.1 Experiment- PDS

PDS (Proportion Distort System) is a system that expresses superficial qualities into specific qualities among the various qualities that designers have in mind whenever they start creating an idea. For example, big eyes give a cute image and big mouths give an active and cheerful image.

Thus, this is a system which helps designers creating what they have in mind. The PDS system has two ways of altering a form or shape. The first one is viewing the changed forms by randomly mixing the divided cells through computer operation, and for the designer to be able to choose what kind of form he/she wants. On the other hand, the second one is based on the designer's taste of cell mixing instead of randomized mixing.



Fig. 2: Experiment-PDS Process

4.2 Snowballing System

Snowballing system is constructing by putting together a new form of special features of a product image and each divided variations. This system was developed with a concept of building and accumulating ideas together, like building a snowman.



Fig. 3: Snowballing System Process

4.3 ERM (Element Reconstruction Method)

ERM is a method which helps the form idea of a designer. While the principle of ERM, like the Snowballing System, is divided into several elements of product-image, it is a method in which a

new form is created by the reunion of all numbers without the change of the form on the same principle for various different designs.



- Fig. 4: ERM System Process
- * ERM Process
- 1) Sampling Model Abstraction

The products used as samples in the experimental study are the 9 sampling models obtained out of 140 pieces on the sale of Korea market and China market (Korea's mobile phones 70 pieces, China's mobile phone 70 pieces) on March 2006 through group analysis.



Fig. 5: Mobile Phone Sampling Model

2) Image Elements Abstraction

The sampling model above is divided into 27 elements in all with the same width, and cut into 3 parts-the upper(3 pieces), the middle(3 pieces), and the lower(3 pieces)- on the ground of the display window of mobile phone.



Fig. 6: Mobile Phone Element Abstraction

3) ERM Application

The 27 abstracted images derived 729 new mobile phone images, the total of the image combination in the application of ERM.

4) Creative Form Research

The 729 abstracted mobile phone images are organized as a final form after the formation of 15 mobile phones, with the selection of new and interesting formation by students who are in major of design.



Fig. 7: Creative Formation Abstraction and Organized Form

5. The actual study from SEDS (Shape Elements Distort System)

The characteristics and the problems of the idea methodology of the previous study can be summarized as following diagram, and the developed program which compensated the problems is SEDS System.

methodology	characteristics	problems(weaknesses)
PDS	ratio change of design elements	limitations the form of ratio change

Snowballing	making and rebuilding of changed form of	the limitations of changed form and disharmony
System	design element	of element-combination
ERM	analyzing and rebuilding of common element of existing products	the limitations of element-analysis and disharmony of combination-image

Table 1: form methodology of previous study

5.1 The Definition of SEDS System

SEDS (Shape Element Distortion System) System can be defined as a system designed in order for a designer to maximize his or her creative ability, overcoming the limitations of the form methodology caused by a designer's personal limited-condition on the stage of form-idea, with compensation of the weaknesses of the previous idea methodology.

SEDS is a shape grammar¹. SEDS is slightly different from those mentioned above to the context that the shape grammar regulates the combinations of the shape elements with the 'shape elements reconstruction' method, but it has a thread of connection with them to the context that both of them ultimately aim to extrusion of creative and diverse shapes upon computing shape generation. In other words, it is an Idea Generation System that identifies the shape elements by dividing the major parts of the design objects, extracts the deformed shape rules for each part to allow the computer to combine and reproduce the shale elements of each part, and make new combination and deformation of the shape elements database containing the identity of the design objective product out of the idea initiatives acquired through the procedures to allow the design objective product to be generated to comply the pursued style.

The more there are the elements to be changed, the more original images which can hardly be obtained through ordinary ideas, can be found through this System,

¹ I) The shape grammar is a method suggested by George Stiny and James Gips to describe 'language of design' in 1970s. The shape grammar can be classified into two categories, i.e. one is to study for analyzing the existing design styles and the other is to study for extruding creative and diverse shapes through infinite combinations of the shape elements utilizing the computer tools.

The technology circumstance of SEDS System is ShockWave operated through Internet, and ShockWave is supporting the DHTML of its own Coding and has no restriction in Platform. Also, the System Capacity decreases remarkably by the support of Compact Save Publishing, the usage of self compression technology. The language used in this System is Lingo Script, which is an object-oriented script language. And we performed energetic Interactivity, using the webpage, HTML4.0/Javascript based on CGI.

In this study, we did an actual study with Perfume Bottle, Public Art Sculpture design in the technological form idea and emotional form idea, using mobile phones.

5.2 Mobile Phone Form Idea of Technological Form

The mobile phone-Prototype used in this experiment is the most popular to Korean users, according to the survey on March 2006.

The elementary form of this phone can be said to have five sell forms; Screen, Body, Control, Frame, and Button, and if there is a partial image number in the divided each cell, the number produced by the cell combination is to be same as the multiplied number of every divided each cell's partial image number.

We can draw out the maximized image combination which may be produced by partial modification in the application of this principle.

The combined image got to the final modeling through the preference survey of the representing model by grouping.



- Preference survey & The final design of preference form -



Fig. 8: the form idea process of a mobile phone in the application of SEDS System

5.3 The form idea of a perfume bottle, public art sculpture as an aesthetic form



Fig. 9: the form idea process of a perfume bottle in the application of SEDS System

SEDS System is a system applying and combining partial form image on the third dimension, so that it shall be contributed to the establishment of effectual system through the more detail treatment of Shockwave 3D which is a technology for the next generation web.

Accordingly, it can be used effectually as a 3-Dimension Perfume Bottle, Public Art Sculpture displaying a totally new image through a little change, which may maximize the aesthetic characteristics by use of effective image distortion.



Fig. 10: form idea of a public art sculpture in the application of SEDS System





Fig. 11: the final design of a perfume bottle

Fig. 12: the final design of a public art sculpture

6. Conclusion and Further Study

This study emphasizes the importance of creativity in design and presents design idea with a view to overcoming limitations of thinking and maximizing imagination of creative form. This creative idea methodology will be effective as a way in providing idea or form in the development process of product-design, and is expected to play a assistant role in overcoming the limitations of form idea in the process of idea -producing steps through new image-combination.

This study is to help idea generation based on the theory of the 'reconstruction of shape elements', and aims to extrusion of creative and diverse shapes with combination of shape elements upon computing shape generation. In order to suggest the design generation methodology to maximize the idea generation ability and to overcome restriction of thinking out of existing idea generation methodology, it has suggested the SEDS (Shape Elements Distortion System) that is a creative idea generation methodology identified and complemented the problem of the computerized idea generation methodology identified and complemented the problem of the computerized idea generation methodologies. On the experimental study, we made the system to allow the designer to classify the major shape elements of the Mobile Phones and Perfume Bottle, Public Art Sculpture, extract the shape attributes deformed for each part and enter the requirements to utilized in the real fields and fitted with the trend into it, and regenerate the combination of the shape elements for each part. Since some of the idea initiatives the Mobile Phones and Perfume Bottle, Public Art Sculpture acquired from the procedure gives possibility to be applied to the real products, this study is expected to have effectives as one method for idea generation or shape generation assistance during the

product development process, and to serve as an assistance to overcome the restriction of the shape generation through diverse idea generations.

In the further study, it is necessary to survey user-preference on the target of outcomes abstracted by experiments and existing mobile phone formation, to investigate the utility of the direct application in design world, to set up an objective standard of design element-analysis, and to study on limitations overcoming of formation caused by limited image used in experiment. And, the diverse creative design method study should be done that is able to link personal sensitivity of the formation overcoming the limitations of personal creativity in formation to this study system, at the same time, the creative design methodology study is required which can be applied in the other design process, in addition to the creative design method which is applied to the formation of design.

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