Design Methodology which recollects Memory in Creation Process

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Abstract: There are two purposes of this research. One of the research purposes is to clarify the relation between the creation and the memory in the design. Another one research purpose is a proposal of the design methodology that promotes the creation. To consider the relation between the designer’s memory that was the first purpose and the creation in the design, the document concerning the creation and the memory was investigated. As a result of consideration, the memory in the creation process circulates while forming the concept to the design by studying the experience of creation. And, we thought that the circulation structure formed a spiral type. The proposal of the design methodology that promoted the creation was tried based on this hypothesis. We proposed the design methodology to which the process of intentionally recollecting the creation process in the characteristic portion of the work was taken to the design process. Next, we considered the role of the computer in the design, and produced the tool that was expressible of the structure of the memory in the creation process. The user takes the image data of the work in the D.S.I., and inputs the memory of the creation process according to the next three stages. Then, the structural model of the memory allocating three attributes “Design Element”, “Episode”, and “Characteristic Portion” is expressed as for three axes that express 3DCG. The case where an own tendency to create is understood recollecting a past work by having produced the tool that expressed the structure of this making of the designer the recollection of the produced work and the recorded memory by 3DCG was able to be found. Therefore, one example of the design methodology that promoted the creation was able to be presented.

Key words: Creation, Memory, Design Method, Interaction, Interface

1. Introduction

In the design, the creation is an important working. The creation is to invent a new thing by “Thinking” that is the activity of the brain and “Expression” that is the body action. The expression alone that the designer considered doesn’t appear in the work invented by the creation. The designer’s potential memory might be unconsciously expressed. In a word, not only a memory but also a potential memory takes part in the act of creation. We thought that the expression that appeared unconsciously was not caught assuming that by chance but thinking assuming that it was inevitable for the creation was necessary. Therefore, we thought the creation for the designer to understand the relation between the creation and the memory intentionally, and to be promoted. Then, this research tried to catch the creation from the aspect of memory. There are two purposes of this research. One of the research purposes is to clarify the relation between the creation and the memory in the design. Another one
research purpose is a proposal of the design methodology that promotes the creation.

2. Creation in design and relation to memory

To consider the relation between the designer’s memory and the creation in the design, the document concerning the creation and the memory was investigated.

2-1. Formation Process and Work of Memory
2-1-1. Formation Process of Memory

First of all, the formation process of the memory was examined. The process of memorizing information on the external world is described as follows [1].

Information on the external world is converted into stimulation. Stimulation of the outside is taken the human internally by sense’s working in the sense organ. The taken stimulation is perceived by the brain, and acknowledged. The acknowledged stimulation is recognized. In recognition, there are “Intellect” and “Kansei”. “Intellect” is a logical judgment, and “Kansei” is an emotional judgment. The recognized stimulation becomes information. And, the concept is formed with uniting information. Recognized information and the created concept are accumulated as a memory. However, it also has the memory accumulated all the memories are not consciously accumulated but unconsciously.

2-1-2. Working of Memory

Working of the memory was considered. The action happens based on the concept formed in the memory or the brain being accumulated in the memory. The experience changes by the action. Study changes by the experience's changing, too. Self-concept is formed by the result of study being accumulated in the memory. Self-concept is a concept that the person understands the self for me, and it works like a kind of theory. Self-concept doesn't only relate the experience of the past and present as knowledge. Self-concept controls the action and the consideration in the future, and leads directionality that acquires new knowledge. In a word, it can be said that self-concept is an algorithm that is an operation rule different in each individual. When a new experience joins and the memory changes, the algorithm of self-concept are rewritten. And, the thinking and the action change according to the algorithm newly rewritten. Therefore, working of the memory forms the algorithm that not only has accumulated the event and knowledge but also becomes basic of the thinking and the action (Fig. 1).

2-2. Creation and Memory in Design

In the design, the creation is an important working. The creation is a process of uniting the idea and the image to solve the problem, and inventing it by new existence [2]. There are two sides of the thinking and the expression in the creation. The thinking in the creation is working of the brain that unites the idea and the image because it solves the problem. The idea and the image that has been accumulated in the memory are united based on the algorithm of self-concept. United idea and image become new stimulation, and rewrite the algorithm. In addition, the idea and the image are united based on the algorithm newly rewritten. Thus, uniting the idea and the image that is rewritten many times, and has accumulated in the memory is tried as for the algorithm until the result of suitable for the purpose is invented. Then, we called the circulation of the memory seen in the thinking of the creation process “Inner circulation of the memory” (Fig. 2).
And, another side of the creation is an expression. The expression is an action that shows the concept invented by the thinking in the external world through the body [3].

The work shown in the external world by the expression is a concept of uniting by the thinking in the creation. Concepts united by the thinking unite the idea and the image accumulated in the designer’s memory and is created. It can be said that the idea and the image that has been accumulated in the designer’s memory are projected onto the work. And, the designer might perceive the work shown in the external world again, and it become stimulation of a new creation. In a word, the memory shown in the external world as a work circulates as new stimulation for the creation. Therefore, we decided to call the circulation of the memory accompanying this expression “External circulation of the memory”.

2-3. Structure of Memory in Creation Process

It can be considered that the plane shows the experience when stimulation is perceived, and a series of acknowledgment process to moving to the action is drawn on the plane. And, study can be expressed by going in the plane of experience repeatedly. It can be thought that a direction advanced by study is a direction where
self-concept is formed. Then, a vertical axis to the plane that showed the experience was set as a formation process of self-concept. Then, the memory in the creation process circulates while forming the concept to the design by studying the experience of creation. And, we thought that the circulation structure formed a spiral type (Fig. 3). In a word, the creation process creates a new concept while repeating an inner circulation of the memory and an external circulation of the memory.

3. Proposal of Design Methodology that promotes Creation based on Memory of Creation Process.

The proposal of the design methodology that promoted the creation was tried based on the finding of the creation and the memory.

3-1. from Data to Sense of Values

There is a chain relation from data to values (Fig. 4).
In this chain relation, it becomes an upper form by the combination. Moreover, it becomes a lower form by the separation. Information of work is created with uniting of data of memory. Then, we thought that we were able to find data of memory by resolving information of work.

3-2. Recollection of Memory in Creation Process

The work created by the designer’s creation unites the memories and is created. However, all the parts of the work are not consciously created. In the work, there is an expression that appears unconsciously, too. It means not only no intentional thinking and the action but an unconscious thinking and the actions are included in the creation. There is an expression to be able to recall the idea and the image that became an origin when details that become the expressions are intentionally recollected even by the expression unconsciously shown, too. We thought that we were able to discover a personal algorithm of the creation process by understanding an unconscious like this memory and the memory that had been intentionally expressed. And, we thought a new creation to be promoted if the designer was able to understand an individual algorithm in the creation. Then, we proposed the design methodology to which the process of intentionally recollecting the creation process in the characteristic portion of the work was taken to the design process.
4. Tool that Structures Memory in Creation Process

Next, we considered the role of the computer in the design, and produced the tool that was expressible of the structure of the memory in the creation process.

4-1. Computer in Design

To produce the tool that was expressible of the structure of the memory in the creation process, working of the computer was considered. The computer in the design is a tool to assist the expressed activity, and to expand the possibility of the expression in addition. Moreover, the computer connected with the network has exerted a big influence on the design as a tool to give the designer a lot of information as stimulation. Thus, it has two useful abilities of the computer used to design. One is ability to record data. Another one is an ability to be treatable of the analysis of data and the display of an analytical result in real time. The computer can imitate designer’s interaction by the ability of the computer including these. The designer’s thinking and behavior are imitated by the computer, and the designer notices occasionally. And, when the thinking and the action that the designer doesn't notice are projected by the computer, the designer receives the information as new stimulation. In lying of the computer that works like this between the creation process, the activation of an external circulation of the memory is expected (Fig. 5).

4-2. Tool that Structures Memory in Creation Process

The memory in the creation process was structurized, and the tool that practiced the advocated design methodology was produced with a computer. The feature of the produced tool is to express the memory of the creation process in the characteristic portion of the work that the user input by sentences as a structural model by 3DCG. This tool was named Design Support Interface, and it was called D.S.I. as follows (Fig. 6).

4-3. Input Operation of D.S.I.

The user takes the image data of the work in D.S.I., and inputs the memory of the creation process according to the next three stages (Fig. 7).
Step 1: Specification of characteristic portion in work.

The user is made to specify the characteristic portion of the work up to six places by one place or more.

1) The icon of the number from 1 to 6 is made to be piled up to the characteristic portion of the work image that the user took.

2) Because pointer changes into the pen tool if the button of the pen icon is pushed, the range of the characteristic portion is drawn (Fig. 8).

Step 2: Input of “Design Element” in characteristic portion of work.

The user is made to input the design element of the characteristic portion to the corresponding field on the design element screen by the character with keyboard (Fig. 9). The design element of six items taken up is “FORM” “COLOR” “FUNCTION” “MATERIAL” “MEANING” “METHOD”.

Fig. 6 Design Support Interface which makes it structuralize Memory of Creative Process

Fig. 7 Input Operation Steps of D.S.I.
Step 3: Input of “Episode” in characteristic portion.

The episode that relates to the design element is made to be recalled when the design element is input by the user. And, the user is made to input the episode of the characteristic portion to the episode field by the character with keyboard. In the episode field, there are six items. Six items are “WHEN” “WHERE” “WHO” “WHAT” “WHY” “HOW”. The episode is input to these six items according to 5W1H.
The input field was set by six items per each three attribute “Design Element”, “Episode”, and “Characteristic Portion”. Therefore, there are 216 items in total input field. However, the user need not input it to all fields. The user only has to input only the item that was able to be recalled to the field.

4-4. Output Result of D.S.I.

When the Reload button is pushed while the user is working inputting, the structural model of the memory is displayed in the structural model display. Moreover, when the user pushes the OK button after completing the input operation, it moves to the screen where a detailed structural model is displayed (Fig. 10).

Three axes that expressed 3DCG allocated three attributes “Design Element”, “Episode”, and “Characteristic portion”. And, ball object is drawn in real time by 3DCG when there is an input in the design element field or the episode field (Fig. 11). The structural model where D.S.I. draws is changed by the user's operating the GUI (Graphical Use Interface) button. The item of the expression that the user can operate is six of the following.

“Movement of Viewpoint (Up & Down)”, “Zoom-In & Zoom-Out”, “Turn of Viewpoint”,
“Change of Viewpoint (Perspective View, Top View, Front View & Side View)”,
“Change of Structure Element (WORK & PORTION)”

These operations can be manipulated with 12 GUI buttons (Fig. 12). And, the display of 3DCG changes into the display of each feature part if the Portion button is pushed. Moreover, the display of 3DCG changes into the display of the entire work if the Work button is pushed. The data input to the data field that Mouse Pointer is piled up on ball object displayed on the structural model display is displayed. And, the episode screen where the data that became a radical where it is drawn to ball object when the user clicks ball object is input opens. Therefore, the user can understand the meaning that ball object comprises.
4-5. Effect of D.S.I.

We experimented by using the testee to investigate the utility of D.S.I.. The vocational school student who learnt the design was elected a testee. The CG work that the testee had produced was used as an experimental material. The content of the experiment made the testee recollect the produced work by using D.S.I.. By experimenting and after it had experimented, the testee uttered it to have felt because D.S.I. was used, and to have thought. The word of the user being uttered was recorded, and brought together.

The main effect of D.S.I. achieved because of this experiment is the following five points.

(1) Because the relation of the memory is shown with the structural model, the work can be abstractly understood.

(2) Because the relation of the memory is shown with the structural model, the relation of the memory can be understood in the sight.

(3) Because the structural model of the memory can be recorded, the transition of the memory can be understood.

(4) As for the work of a different form, the user is comparable in the same index.

(5) The stimulation for a new creation is given by understanding the process of the creation of oneself.
**Movement of Viewpoint**

- **UP**
  - While pushing button, viewpoint goes up

- **DOWN**
  - While pushing button, viewpoint goes down

**Change of Viewpoint**

- **PERSPECTIVE**
  - Pushed button, move to Perspective Viewpoint

- **TOP**
  - Pushed button, move to Top Viewpoint

**Zoom in/out of Viewpoint**

- **ZOOM IN**
  - While pushing button, viewpoint zoom in

- **ZOOM OUT**
  - While pushing button, viewpoint zoom out

**Front View**

- **FRONT**
  - Pushed button, move to Front Viewpoint

**Side View**

- **SIDE**
  - Pushed button, move to Side Viewpoint

**Turn of Viewpoint**

- **TURN**
  - While pushing button, viewpoint rotates

**Change of Structure Element**

- **WORK**
  - Button pushed, display of all structure elements

**Move to Viewpoint Menu**

- **VIEW MENU**
  - Button pushed, move to viewpoint menu

- **PORTION**
  - Button pushed, display of structure element of feature portion

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*Fig.12 GUI button of D.S.I.*
5. Conclusion

The result of this research is the following two.

(1) As a relation between the creation and the memory in the design

   The process of inventing the creation thing becomes a memory, and is accumulated. And, the memory of the accumulated creation process of each act of creating it circulates in the designer. The memory of the creation process circulating internally is expressed in the external world as a work. The designer comes to be able to be perceived by that by actualizing a potential memory. The hypothesis that the relation between the creation and the memory in the design had the spiral type circulation structure from this was obtained.

(2) As a proposal of the design methodology that promotes the creation

   In the creation process, the memory advocated the design methodology to which the recollection act was taken based on the hypothesis of circulating. And, the work that the designer produced was recollected, the memory of the creation process of each characteristic portion was recorded, and the tool that expressed the structure of the recorded memory by 3DCG was produced. The case where the testee understood an own tendency to create recollecting a past work with this tool was able to be found. Therefore, one example of the design methodology that promoted the creation was able to be presented.

The experiment on D.S.I. that uses more testees is executed, and the degree to which creativity is promoted will be investigated in the future.

And, the mechanism that the creation and the relation to the memory are quantitatively understood is researched.

Reference


Compare