EXPERIENCE MONTAGE IN VIRTUAL SPACE

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Abstract. According to three experimental virtual spaces, the key factor for Experience Montage is identified—3D collage. Generally speaking, the theory of montage describes the connection of space and time. Time is a phenomenon of connection of points. Within 3D virtual space, the influence of Experience Montage generated examined through the *Exploration model* (**representation + rules + memory + policy =** *search exploration*) proposed by Woodbury in 1996. Through browsing and reading, the originally intact virtual space is dissected into pieces and corners. By duplicating, dismantling and reorganizing this dissected space, a new personalized virtual space is then modelled. As a continuation of previous analysis, the latter stages of the study use the Exploration model to explain anew the connection among the **representation, rules, memory**, and **policy** of *Experience Montage*.

1. Introduction

Spatial experience is an important issue regarding the spatial characteristics of architectural design. Learning from the design studio, most students of architecture acquire their own spatial experiences through continuous inspiration of images or intensive student–teacher discussions. Knowledge gained can then be applied in shaping the space form. A typical process is that the designer prepares a comprehensive design blueprint, utilizes diverse media materials within different design stages, and attains the goal of communication with the jury through the impressive rendering of collaged images. Similar experience is applicable to many art and design domains such as graphics, furniture, fashionable dress, interior design and architectural design.

In addition, the surrealism metaphors such as collage, deconstruction and montage of the 1980s are often adapted for representing the diverse experience while maintaining certain inspiration. A key characteristic of such representation

is the combination of materials (or media) to interpret inner expression for the concepts of space design, namely, *montage*. The word "Montage" is drived from Monter in French. It expresses the architecture terminology, which means combination and constitution. Such interesting means create hints of various physical experiences. One example of this is the movies of Pudovskin through enhancing the edits of the lens, scenes and stages. Such experiences merge into the conflicts of virtual and physical experiences and make a deep impression on people in the world of modern network.

By constructing on the concepts of the network communication (Ishida, 2002), people gradually have the concepts of space in the knowledge of virtual network. Several researches (DiPaola and Collins, 2002; Thoma et al., 1999) imitate the physical environment and bring such experiences into the virtual space of network. From the phenomenon of the user interface towards to imitating the physical space, people can understand the virtual environment and develop virtual space with repetition of real-life experience. Moreover, the mixture of virtual and physical experiences gradually merges directly into the virtual space itself (Kalay, 2004).

On the basis of the aforementioned the reviews and the metaphor of Montage, we may divide the characteristics of physical experience and virtual experience into: (i) Distribute visualization feedback, (ii) Discrete continuity, and (iii) Composition. Furthermore, based on the virtual space experience currently available, this research discusses the spaces of experiences, switching between virtual and physical spaces through the spatial fragments within the theory of Montage.

2. Problem and Objective

Based on the characteristics of physical experience and virtual experience, through the image collage of the static surface, the image of the three-dimensional space can be satisfied from the visual feedbacks as stated in (Kerne, 2000 and Kerne, 2002). By finding the phenomenon of Montage in the virtual space, the method of Montage as an expression of dynamic collage can then be unleashed. The Montage method thus helps to comprehend the differences between spatial means of images and the real space experience through the visual feedbacks. This provides virtual space experience in the real environment, which is the initial point of our research. Furthermore, the fuzziness between the existing and non-existing space experiences makes the virtual space a representation of real space.

While spatial experience in physical space is continuity, in virtual everything is discrete. In physical space, there must exist some discrete phenomena elements, and in virtual space continuity. Further, we provide dynamically interactive collage for representing the space experience gained during the process. Three experiment processes such as P2P (peer-to-peer) space, 3D Museum and Critic Room are conducted and examined for understanding the differences caused by spatial meaning

of images and its reflection of the real space experiences.

Through three experiments (P_2P space, 3D museum and critic room), the specific elements of distribute visualization feedback, discrete continuity and dynamically interactive collage in virtual space are studied respectively. Finally, five elements of the Exploration model (Woodbury, 1996) are used for examining these experiments.

3. The Experiment Processes

The characteristics divided (Distribute visualization feedback, Discrete continuity and Composition) in the previous session frame the base of the experiment process conducted within 3 years. With the operation of the experiments, these characteristics are examined in the following sections. First, we use P2P space to explore the possible structure of virtual space within our scope. Second, by uncovering discrete continuity within the 3D museum experiment, we gain more understanding of the user behaviours, the interactions and multi-users requirements. Third, with the experiment of the "Critic Room", the reconstruction of the virtual space can be used to discuss and experiment the dynamically interactive 3D collage. Finally, the influence of the montage is examined on the virtual space created within the design process.

3.1. P2P SPACE: THE METAPHORICAL PROPERTY OF COLLAGE

The initial concept lies in exploring how distribute visualization feedbacks create visual experiences. It provides visualization experiences that exist in the virtual world and allows them to transmit data and share circumstances in the virtual environment space (Pandzic et al., 1997, Pentland, 1998). What the user perceives is a virtual space, and the linkage between clients is after the pattern of the physical space. The pattern we used is the metaphor of "gate" for making connection between spaces. The experience of the physical world is introduced to the virtual world to release it from the normal pattern of online browsing. The examples are shown in (Figure 1). Among the observation and analysis, the sliding behaviour of navigation is discovered and adapted.

3.2. 3D MUSEUM: GRAPHICAL REPRESENTATION

This experiment continues the concept of jumping sliding without breaking down for the P2P in the virtual space. Based on the visual feedback and spatial location, which is located in the information reconstruction and user interactive issue, we use the analysis of the real-time function of online guideline and remote multi-connected online visitors. This experiment conducted is to use the 'spatial metaphors'

and 'visual components" in the interaction between 2D interface and 3D environment to create the toolkit for discussion.

The function of this toolkit contains *i-handles*, *i-Bag, i-Map* and *Focus/scale* as shown in (Chang and Lai, 2003). The structure of these basic browsing behaviours is named *i-Room*. It is a data framework comprising eleven important public architectures in Taiwan and depends solely on various digital media to design the basic browsing structure. According to the specific and metaphorical element of the space, such as displacement and handles of the vision spot, *i-Map*, *i-Bag*, and *Focus/scale* of the object will form the graphical representation as shown in (fig.1).

These metaphors in the virtual space can guide the users to browse and interact in any time. Therefore, through the experiment of the 3D Museum, the interactive behaviours with discrete continuity between the 3D environment and 2D interfaces are unleashed.

Figure 1. Users are navigation in the P2P virtual space like sliding (Left, Middle).
3Dmusem control interacts by multi-virtual entrainment space (Right).

3.3. CRITIC ROOM: DYNAMIC MODIFICATIONS IN VIRTUAL ENVIRONMENTS

The original concept in Critic Room uses the recombination of the basic digital materials like text, image, animation or model to express the compositional concepts of the design. By joining the interactive characteristics of Virtual Design Studio, information visualization and communication, this experiment provides an on-line critic space, which is named Critic Room. Through the operations and refinements of the structure, we can understand the spatial experience exchanges.

The Critic-Room is a behaviour relating to developing the spatial experience exchange while browsing the virtual spaces. Therefore, a necessary component of the Critic-Room required is adapting the graphical representation unleashed from 3D Museum experiment. It includes i-Handle, i-Bag, i-Toolbox, and i-Dialogue board. The property of the structure contains information, communication and modification.

Following the property, the graphical representation as well as spatial interactive behaviours are derived into five spatial symbol components and increased different behaviour of the usage for the users. Then, according to the three different roles of

users—critic, presenter and visitors for the participants—the critic environment is completed with dynamic role switches for more feasible interaction. The environment of the interactive 3D interface for the communication is composed as shown in Figure 2.

The online virtual environment is changed dynamically, it forming a harmonious space with ratio or construction (Mogensen and Gronbak, 2000, Schnabel 2003). The main purpose of spatial experience in this experiment is to create a share with similar inspiration for the space after the visual stimulation. To reach the purpose of spatial experience exchange, 3D virtual model that forms the spatial experience has to be constructed dynamically. The experience exchanging features include the real-time material swapping, configuration, ratio and model modification. Furthermore, the stimulation and inspiration is provided directly to the participant of juries for different issues judgment in real-time.

Figure 2.   Critic Room discusses spatial experience exchange in the virtual space.

3.4. SUMMARY

By joining the operation in the aforementioned three experiments, we can understand the meaning of the image spaces existing in the cross experiences of virtual space and real space. The characteristics can help the designer to accumulate the spatial experiences rapidly through browsing the virtual space. Though the network space, no matter use animation, 2Dimage, text, or 3D virtual model, the spaces are described as if the sliding and connecting of the time shown in montage. The time in this case is treated as a phenomenon with the joint of point and point. Such phenomenon is similar to the montage experience and appears frequently in the process of design. It belongs to one way of interpreting the concept of space design in virtual space.

In addition, the design wants to find out the spatial feeling from every corner to the shape of the architecture. This research called such sectional memory storage connection by the name of *Experience Montage*, which cannot exist in the real environment but exists in the virtual space or in the layer of the mind.

4. Experience Montage

According to the analysis, the experience montage can be divided into browsing and transform. The relation between montage and collage is illustrated in Figure 3. In where the behaviours are expressed by metaphorical representation. For example, the input of the transform means the relating operating status. The purpose is to find out the corresponding mechanism that Experience Montage can operate. In this premise, it can own the operating status of browsing and transform and the relating four behaviours. These behaviours are: "sliding" which is in the process of the browsing and crossing among several virtual space; "Catching" which can download various forms of data crossing among the virtual space in browsing; "Atlas" which can manage the data collected; and, "Composition" which can construct the data after arrangement. These four items are used in 2D image static Collage as well as the dynamic movie Montage through editing and combining the lens and shots. And the visual experience feedback is comparable to the Experience Montage. With these mechanisms, it is possible for users to communicate with others and connect the unlimited section memory. In addition, through browsing the virtual space, the space fragment can then be copied, disassembled and constructed. A new personal virtual space design will be produced during the process in real-time.
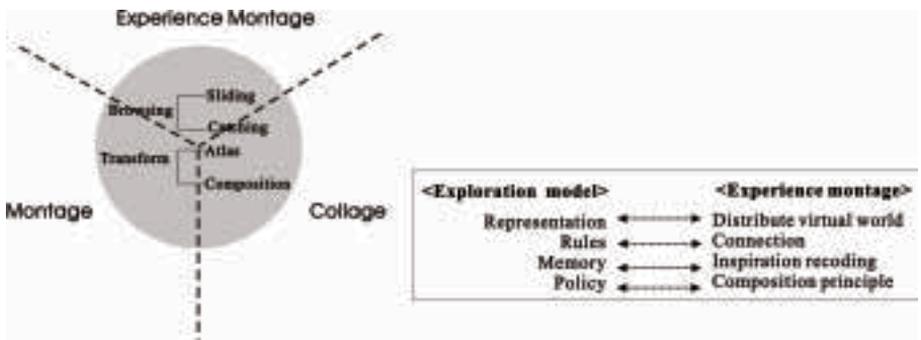

Figure 3. Operating status with Experience Montage, Montage and Collage (Left). The elements of Exploration mode are mapping with Experience montage (Right).

Furthermore, for examining purposes, a simplified version of the exploration model proposed by Woodbury is adapted. It is comprised of one simple equation (representation + rules + memory + policy = search exploration) (Woodbury 1996) for describing the interactive exploration behaviour. Representation comes from the field of design and formal symbolic language for representing design. Rules are designed as the operational basis for the representation. The transformation and expression of the concept of symbolic language, the prerequisites and inevitable conditions of the combination that fit the condition and description of the design

will be considered to put into the rules. Memory infers the possibility of the design in the space through the rules. Policy is to search and set the principles for guiding the design. With these, the exploratatry nature of Experience Montage can be specified and examined.

We further define Experience Montage (Figure 3) in the structure of the Exploration Model. The mapping criteria regarding these four principles of Exploration Model to Experience Montage are: (i) Distribute virtual world and cross among the virtual space with different places remotely; (ii) Connection, relating to the virtual space connection ways at different ends; (iii) Inspiration recoding, use the browsing carelessly to record the selection of the deep memory; (iv) Composition principle creating personal interface according to your favourite in design to give different experiences of browsing. It uses the character of the Experience Montage to transform the design method and applies Exploration model as the evaluative standard for preceding these three experiences. Ales, it views the effect of the experiment on the design in the process of improvement.

5. Intergrading the Design process with Experience Montage

The reconstruction of the fragments of the virtual objects brings the 3D environment into network space. From the experiments, even in the condition of hyperlink, the virtual figures get into a subject space from another space. In this situation, the user will not interrupt the talk and will keep sharing the experiences synchronously and continuously. The appearance of the experience montage according to the four principles of exploration model is shown in Table 1.

TABLE 1. Evaluation with the three experiments by the exploration model element.

Exploration model / Project name	Representation	Rules	Memory	Policy
P2P space (2002)		○		
3D Museum (2002-2003)	○	○		○
Critic room (2003)	○	○	○	○

5.1. REPRESENTATION

The virtual space representation is derived from the user interface towards the test of stimulating Physical space, Physical experience and Physical cognition. The user interface with simulated 3D physical environment can give feedback for various browsing behaviours. It distributes virtual spaces to surpass the common browsing way in 2D web. The 2D web of limitless hyperlink can then connect and represent the linkages to various places for information web pages. Yet, when the communication of the remote single point or multi-points occurs, the possibility of

continuous communication cannot be produced through common data and common actions. Most of the data screens need to add another level of chat-like functionality. And these need two or more communication steps. In the 2D interface nature of our display currently available, we need multi-layer as the component of the communication. Moreover, in the process of the switching, the experience cannot be shared synchronously. The distributed virtual space refines this problem with the 3D environment imitation and brings it into the network space. Even if in the hyperlink, the virtual representation of users (avatars) can slide from one space to another space with ease. In such conditions, the users will not break down the communication and can keep the experience share at the same time. Therefore, the behaviours of keeping the experiences sharing can be achieved with this approach. There are four characters for connecting the distributing virtual space:

1. Communication between human-to-human and human to machines.
2. Visual information components.
3. 3D virtual environments and 2D/3D interfaces.
4. Interactive avatars.

5.2. RULE

The concept defining the distributing Peer-to-Peer of the network structure applies the type of the connecting network and each node offers a different service of transformation. Based on this structure, the Client/Server structure can be retained within the same IP address. Then the computer that connects to the IP address can be regarded as a server and allows to be connected with many users. In addition, this computer can connect to other clients with Peer-to-Peer connection and acts as a client. When the user searches some 3D information space, through near users, it can send the inquiry out. When one of the users receives virtual space such message, the message will be sent out continuously. If one receiving this message has an information space to fit the request, then one will send the message back and let the initial user decide whether he/she would like to change the connection to get into the online space platform of other people or not.

5.3. MEMORY

The memory is divided into short-term and long-term memory. The former means that a person keeps the section of the thought for several seconds or several minutes when acquiring the information. The latter implies the memory of past experience. The content could be some events (event memory), data, principles and concepts (meaning memory) or steps of something (process memory). We record the short-term memory that is selected by browsing several virtual spaces, and make the memory become a series of connection of carriage memory. By transforming this

memory into personal experience, it will become carriage memory, principles and concepts. Particularly, the memories create visual feedback with text, image, pictures and models.

5.4. POLICY

To get the feedback of the experience montage, the necessary element depends on the uniqueness of browsing each virtual space. Each administrator owns personal space to express personal opinion. Through the aviator property in the virtual space, each user can use virtual identity to access the virtual space and browse information for communication. Everyone maintains his/her own 3D virtual space to store the information shared and communicated with others. Also the participants can "meet" in the same space and discuss via the visual data in that space. In the communication process, the virtual users can control the access of the virtual space for relational topics. And the characteristics of the roles are:

1. Freedom navigation behaviours in the virtual space.
2. Virtual avatars delegated users.
3. Virtual space exchange keeping communication/information sharing.

6. Conclusion

In Experience Montage, select the factor that is your favourite through browsing, and the personal design can be derived and reorganized according to the feedback of given 3D space. The meaning of penetrating subconscious was taken into the layer of the consciousness and thus made certain influences in realizing the virtuality of network space. It divided things which are concrete and familiar into fragments that were recombined under the various design consideration and created a strange scene to weave the reality and non-reality of spatial experience.

As to the current research of the Experience Montage, it is limited to the phase of re-combination of the components. Through recording the virtual component from browsing virtual space, users will be able to select the stimuli fragment of the experience, and recombine based on the designer's consideration.

During the process of persistent design, the Experience Montage focuses on combining the short-term memory that is stored temporarily. The 3D patterns created can offer a result that might fit the subconscious nature of the designer. In the process of architectural design, we use the visual feedback directly. So the future work of this research will be focused on how to use the issue of recombining of physical and virtual 3D spaces to verify if the Experience Montage existed in the process of browsing virtual space. Furthermore, based on the Experience Montage, we will structure a set of system tools for the users and reshape the 3D virtual space experience in the Experience Montage.

The main contribution of this research is to be able to describe the P2P way in terms of the 3D virtual space experience. From the numerous P2P to virtual space jumping and connecting browsing, the mechanism creates space experience accumulating in the recombination process. With this phenomenon, we offered Experience montage; a phenomenon already existing in the process of design. In architectural design, the designers can interact online and interact with spatial experience exchanges for further communication in the purpose of getting better refinements of design.

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