A Study About Interface Design from the Eastern Philosophical Perspective

YeongMog PARK

University of Kookmin. Graduate School of Techno Design.
861-1, Jung-neung-dong, Sung Buk,-Ku, Seoul, Korea, parkym@kookmin.ac.kr

Abstract: Design and interface are concepts originated from the West. Although the ultimate intention is to create tools that are beneficial for humans, the definition of what is beneficial or right may differ according to region or culture. Therefore, to find a design that suits Easterners, we need to develop a design structure that is based on the thinking system of Eastern people. From this background, this study sets out to find the possibility of developing a design or interface design from the Eastern philosophy. On this foundation, the long-term goal of this study is to understand the Eastern philosophy, to interpret design elements and their concept based on the understanding, and finally to develop an application system. Here, we have examined the possibility of an interpretation of interface from an Eastern perspective, the application of what is extracted from design, an interpretation of form, and an interpretation of color and sound, all based on a study based on the above-mentioned structure. What we have learned through this study is that the Eastern philosophy is an intuitive, empirical, and emotion-oriented rather than intellect-oriented system as is the thinking behind design. It also has many similarities with those of digital technology. In summary, although we have yet to discover a concrete application structure of the Eastern philosophy, we can conclude that there is a high possibility that it can be applied to design.

Key words: Eastern philosophy, Yin Yang and Wu Hsing (the five material agents)

1.Introduction

1) Study Motivation and Objective

Design and user interface are terminologies that originated from theWest. But their ultimate intention is to make the tools that humans use more convenient, safe and beautiful. So now they are terms and concepts as well as systems commonly used the world over without any distinction between the East and West. As such, there is indeed no East-West division in their ultimate meaning, but there may be differences among regions and cultures as to what state or tool is seen as good or bad.

Therein arises the need to understand and confirm the Eastern world's ideal relationship between humans and tools and their concept of tools, through which we can develop a design system that suits the Eastern people. Such a view is not an unconditional revolt against Western design nor is it an attempt to prove the superiority of the Eastern philosophy over the Western one. This study was merely undertaken with the expectation that there is indeed a concept of tool and its development system that fits the Eastern people and that those could satisfy the ultimate ideals of design when discovered.

Against this background, this study developed a study structure such that its long-term objective is to develop a system applicable to modern design or interface design based on the Eastern philosophy; and based on the study conclusions, this study aims to find the possibility of applying the Eastern philosophy to design.

2) Expected Effect of the Study

The reinterpretation of design and the development of its system from the Eastern philosophy have the following possibilities.

Provision of a New Design System

A reinterpretation of design from the fundamental philosophy of the Eastern world holds an immense potential to create a

design system entirely different from the existing systems. The reason lies in that the solution and its process to a problem and knowledge are determined depending on which perspective through which you see the problem.

Provision of a Thinking System that Suits the Designer

In addition, most Eastern philosophies are more intuitive and empirical than analytic and explanatory and pursues realization rather than understanding. In this sense, Eastern philosophies have many similar characteristics with the thinking system employed in design.

Possible Application to Modern Media Design

The Tai Chi (the Supreme Ultimate) symbol, Yin Yang and Wu Hsing (the five material agents) and the Zhou Yi are all based on binary representation. That is, the basic symbols of Yin and Yang are similar in characteristics to the digital 0 and 1.

3) Difficulties of Research

There were the following difficulties in applying the Eastern philosophy to interface design or design.

First, the Difficulty of Establishing Research Structure

In the past, there must have been an application system for solving the basic problems of clothing, food and shelter that was founded on the Eastern philosophy. However, though records of the Eastern philosophy itself are abundantly found, it is difficult to come upon any knowledge or record of a system that is capable of designing a specific material object based on the Eastern philosophy. Moreover, the invention of industrial products and digital media unknown in the past is making it ever more difficult to apply Eastern philosophy to design.

Second, the Difficuty of Understanding Eastern Philosophy

Eastern philosophy has a history of about 5,000 years and has numerous types and branches. This makes it extremely difficult to determine which philosophy research should be based on. And even after the basic philosophy from which the research will stem has been determined, it is a feat in itself to comprehend the philosophy.

Third, the Difficulty of Selecting Research Method

In a case study of this study, we develop the inter-relationship between Yin Yang and Wu Hsing into an algorithm within a computer and run simulations. Such a case study has two limitations. The first limitation lies in the making of mathematical formulas out of the relationship where each element of Yin Yang and Wu Hsing produces and overcomes one another. The other limitation lies in whether the developed program logic reflects the characteristics of the production and dominance relationship. That is, programming language is spelled out on the basis of Western logic so has a language structure fit to describe a logical relationship, which does not guarantee that it is suitable in describing the inter-relationship of Yin Yang and Wu Hsing.

2. Research Scope and Structure

Despite the problems and difficulties mentioned above, this study judged that there was a possible approach, which it tried to find by dividing the research into the following parts:

1) Logic (Principle) Research:

To build a system that can solve a modern design problem using Eastern philosophy, we need to examine examples of tools developed on the foundation of Eastern philosophy and discover a regularly applied rule. But this inductive approach is made difficult with the scarcity of research material and the creation of a new tool called digital media. This leaves the approach of

building an application system starting with the understanding of Eastern philosophy. The basic foundation of Eastern philosophy is formed by the concepts of Tai Chi, Yin Yang and Wu Hsing, and Zhou Yi. In addition, the trinity formed by Heaven, Earth and Man are divided into three sub-application systems: Heaven which symbolizes astrology and horoscopy, Earth which symbolizes construction and Feng Shui, and Man which symbolizes morality, physiognomy and horoscopic data interpretation. The sub-systems of Heaven, Earth and Man inherit the attributes of their upper systems Tai Chi, Yin Yang and Wu Hsing, and Zhou Yi. At the same time, the sub-systems have their own application logic and methods to solve their own unique problem. Therefore, research needs to first focus on Tai Chi and Yin Yang and Wu Hsing, then examine the sub-systems of Heaven, Earth and Man depending on the application scope.

2) Design Element Research

Here, the basic elements that form design, interface design and media design—color, shape, sound and position—are interpreted or reconstructed based on what was studied in the logic (principle) research.

3) Application Research

Here, research is undertaken on actual applicable system and scope based on the logic and design elements examined above. First, we find the possibility of application through media works that do not assume actual usage.

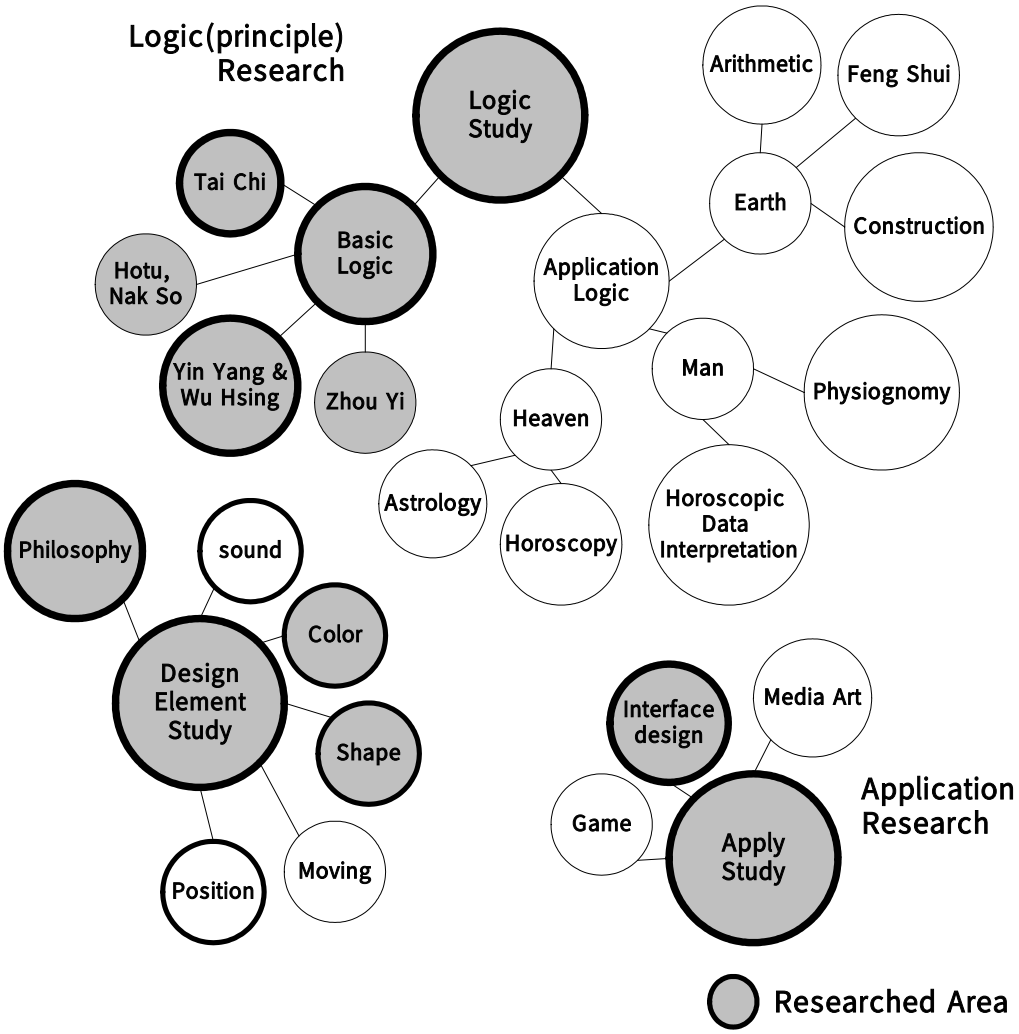


Fig. 1. Structure of Eastern Philosophy-Based Design Research

3. Concept of Tai Chi and Yin Yang and Wu Hsing

According to the concept of Yin Yang and Wu Hsing (the five material agents), ying and yang were separated from a common

entity. Additionally, yin and yang are never to be considered in a permanent state. There is always dynamic movement. And that cyclical movement occurs among water which is pure yin, metal which is yang within yin, earth which is a balance of yin and yang, wood which is yin within yang, and fire which is pure yin. With the addition of these five material agents, we have Yin Yang and Wu Hsing.

These five agents sometimes produce one another and at times overcome one another, thus striking a balance between heaven and earth. This relationship of production and dominance is represented in Figure 2.

The production relationship can be explained as follows: wood produces fire, fire produces earth (there are ashes or earth after fire is extinguished), earth produces metal (earth turns hard after a long time and turns into rock), metal produces water (a valley with a lot of rocks has clear water and the rocks prevent water from seeping into the earth, thus creating a pond of water).

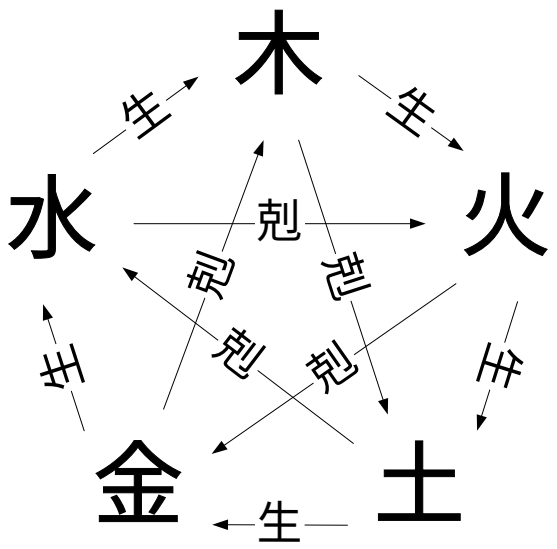


Fig. 2. Production and Dominance Relationship of Yin Yang and Wu Hsing

The relationship of dominance is formed when one agent overcomes another agent. Wood overcomes earth, meaning too many trees make the earth barren. Fire overcomes metal, meaning fire melts metal. Earth overcomes water, meaning dams made of earth prevent the flow of water. Metal overcomes wood, meaning axes made of metal are used to fell trees. Finally, water overcomes fire in that water is used to extinguish fire.

As such, all matters and the principle of the universe have the characteristics of Wu Hsing (the five material agents) and the five agents form a relationship where one agent produces and overcomes another.

4. Case Study

1) Case Study 1. Reinterpretation of Interface Design Concept [R1]

Study Subject: The design or development of interface translates into the elimination of the gap that exists between humans and tools, which in turn means bridging the distance between humans and tools. What is called gap here refers to a state where a problem has risen. Diverse methods and knowledge are employed to eliminate or reduce this gap. However, from the perspective of Yin Yang and Wu Hsing, a gap does not signify a problem between man and tool but rather an imbalance between the two. That is, a gap exists when balance between yin and yang is lost and thus results in an unstable state. If yin exceeds yang, yang will be strengthened and vie verse to strike a balance between the two forces. An “imbalanced state” and a “problematic state” are two

quite different things. Generally, a “problematic state”can be fixed by removing the problem and creating a state without problems. But when there is an “imbalanced state,” the aim will be to find a balance. This concept can also be applied to interface design. Previous approaches tried to reduce the gap between humans and tools by removing problems that occurred between the two, whereas in the interface design using Yin Yang and Wi Hsing, the approach will be to find a balance between humans and tools. Therefore, in interface design, we would not be focused solely on finding and solving problems in tools and systems but in forming a relationship between humans and tools such that they complement each other and create an ideal harmony.

Study Result: When reinterpreting the meaning of interface design using the concept of Yin Yang, what is important in the relationship between humans and tools is harmony. That harmony can be achieved by improving the tool but also by improving the human capability. This indicates the possibility of a new interpretation of interface.

2) Case Study 2. Interpretation of Interface Using the Characteristics of the Eastern Concept of Numbers [R1]

Study Subject: The ideal state or relationship between humans and tools can be seen in the Eastern concept of numbers. We will use the example of Ho Tu (the Yellow River Map)[A] to examine the concept of numbers as understood in the East.

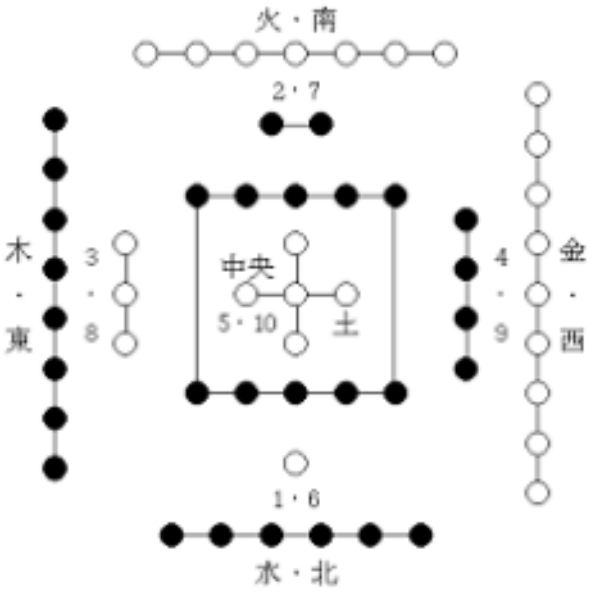


Fig. 3. Ho Tu (Yellow River Map)

A study of the meaning of numbers in Ho Tu (the Yelow River Map) tells us that the number 1 has a tendency to become 2. This can be seen as the same principle with which cells divide. In contrast, 2 has a tendency to become one again. This is similar to the tendency of men and women trying to become one. The number 3 signifies the dynamic representation of the hidden innate nature of 1. Namely, the tendency to separate itself. The number 4 has, in turn, the nature of unification.

The 5 in the center, representing earth, includes the four agents surrounding it, the 1,2,3,4, which signify water, fire, wood, and metal, respectively. As we can see here, numbers in the East are not symbols representing a mathematical and quantitative entity, but a symbol inclusive of meaning.

Let us apply this concept of numbers to interface. First, 1 was exaplained as having a tendency to divide into two. Such can be compared to the human tendency to use tools. The number 2 was described to have a tendency to unify with another. Applied to the relationship between humans and tools, this number can be compared to the attempt to bridge the distance between humans and tools. And 3 can be interpreted as the conflict between humans and tools (difficulty for humans to understand and use tools)

because 3 has a tendency to separate as explained above. Since 4 was described to have a tendency to unite, it can be interpreted to signify harmony, in other words tools that are easy for humans to understand and use.

From this perspective, interface can be interpreted as an effort to strike a balance between humans and tools by adding easiness to difficulties that arise between humans and tools. Take note that in order to become the state of 1 where humans and tools are united, difficulty and easiness need to coexist. This is not an easy concept to consider in the existing interface design. The existing interface design thought a state where no difficulties of understanding or usage existed and where the user could use the tool with his/her existing knowledge or experience without any new education or training was optimal. But the new concept of interface design using Eastern philosophy deviates widely from this view.

Study Result: We can conclude that the Eastern people started using numbers not simply as quantitative entities but also as meaning-inclusive entities. From the representation and meaning of numbers, we can understand the importance of balancing the difficulty and easiness of using tools in order to strike a balance between humans and tools.

3) Case Study3. Logic Simulator(Development of Logic Formula that Represent Production-Dominance Relationship) [R3]

Study Subject: This study developed a logic simulator that implemented the production-dominance relationship of Yin Yang and Wu Hsing on the computer to intepret or design inter-relationships between color, shape, sound, and so on. The basic structure was designed such that the data of one agent out of the five are given as input to the simulator, which would then calculate the changed values of the five agents and return the values.

In this process, each element of the five agents is influenced by the next agent (which forms a production relationship with this agent), the agent twice removed (forming a dominance relationship with the first agent), the previous agent and the last remaining agent, forming an endless circular movement. Therefore, the inter-relationship of the five agents is not a static state; there is always dynamic movement. This is a very valid model to explain an object that changes with the passing of time. More specifically, a description of a situation that changes with time will be outdated even as the description is made because the object of the description, the situation, will change with time. Therefore, the description or interpretation of a situation with the passing of time is, in principle, a model that changes ceaselessly following a certain logic, as we have seen in the production-dominance model.

Study Result: Adjustment of the weight given to production and dominance in the logic simulator tells us that when production weights are increased, the values of all five agents ultimately converge to the maximum value. And when the dominance weights are increased, the values of the five agents gradually expand. This result indicates that the production-dominance logic simulator can be applicable to the interpretation of time sequence or a very complicated inter-relationship and that the expansion and contraction can be controlled by both the object attributes and relationship setting.

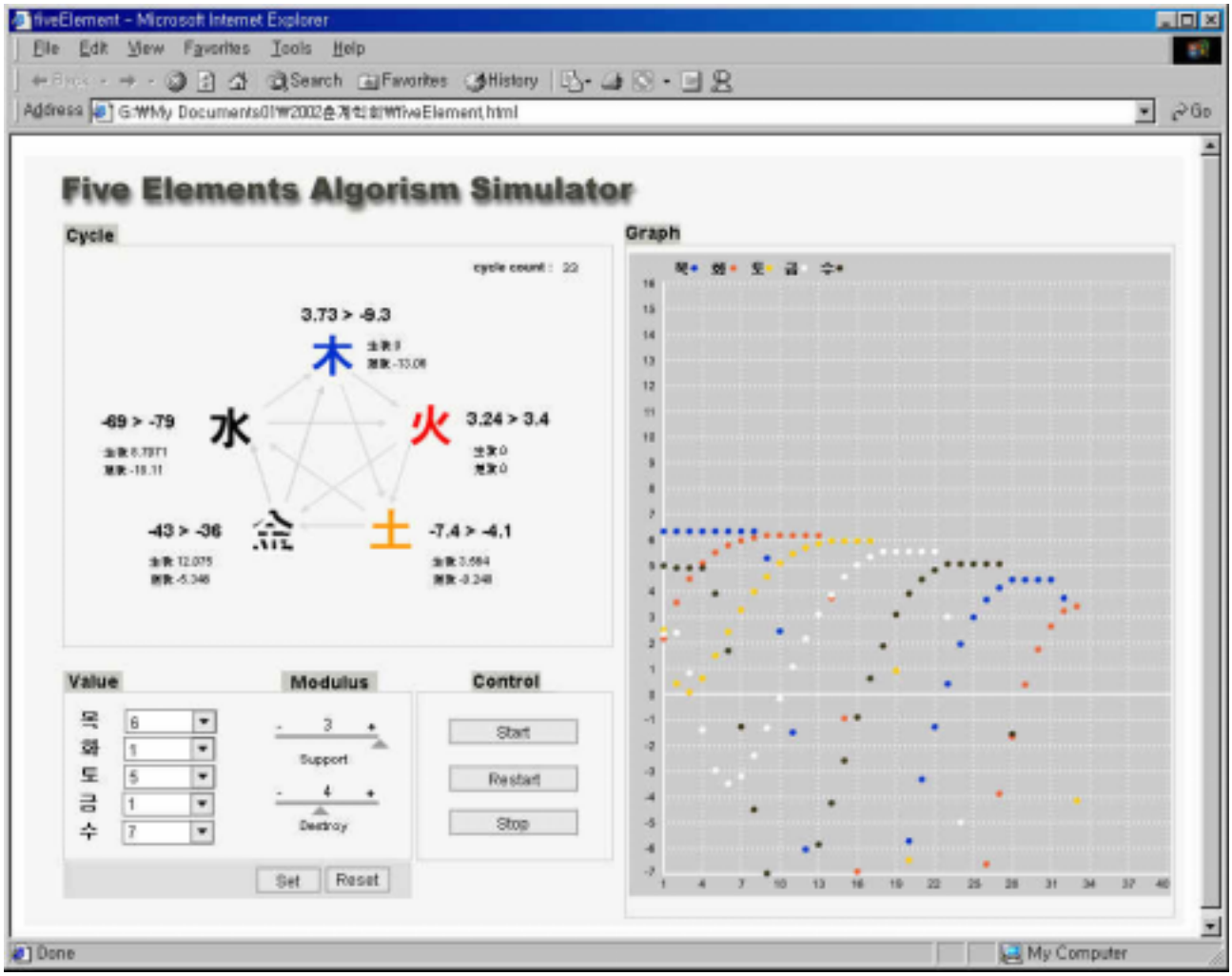


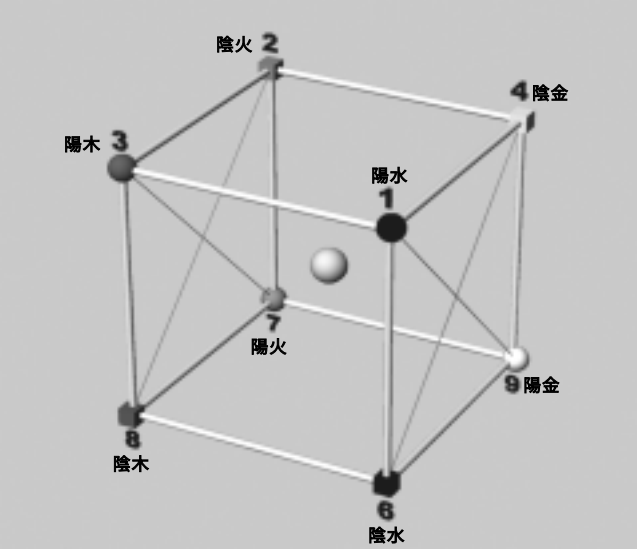
Fig. 4. Production-Dominance Logic Simulator

4) Case Study 4 Form Study[R4]

Study Subject: This study used the idea that the divisions of Tai Chi, Yin Yang, Szu Hsing (four figures), Pa Kua (eight trigrams), and 64 trigrams are done by the power of 2; by representing Tai Chi as a point, Yin Yang as lines (2 points), Szu Hsing as faces (4 points), Pa Kua as a hexahedron (8 points), this study interpreted the attributes of a regular polyhedron. First, we created two regular polyhedrons according to the Ho Tu alignment and the Nak So alignment. As a result, both regular polyhedrons had two faces that corresponded to the Ho Tu, two faces that corresponded to the Nak So, one face that had a production attribute and one face with a dominance attibute. Additionally, we found that two identical regular tetrahedrons were created from these two hexahedrons and that the two regular tetrahedrons inherited the attributes of Yin Yang and Wu Hsing directly from the hexahedrons. Also, the regular octahedron that is created from the combination of two regular tetrahedrons has yin and yang balanced, such that it inherits the attributes directly from the regular hexahedron and regular tetrahedron.

Study Result: We concluded that a regular polyhedron had a perfect balance between yin and yang, between expansion and contraction, and between the five material agents. We found a very similar principle applied to Plato's circular movement of polyhedrons and the inter-relationship between regular polyhedrons. We also discovered the high possibility that Eastern predecessors placed great importance on not only the external shape of a geometrical figure but also on the attributes of the figure and its relationship with surrounding objects.

Regular Polyhedron Corresponding to Ho Tu



Regular Polyhedron Corresponding to Nak So

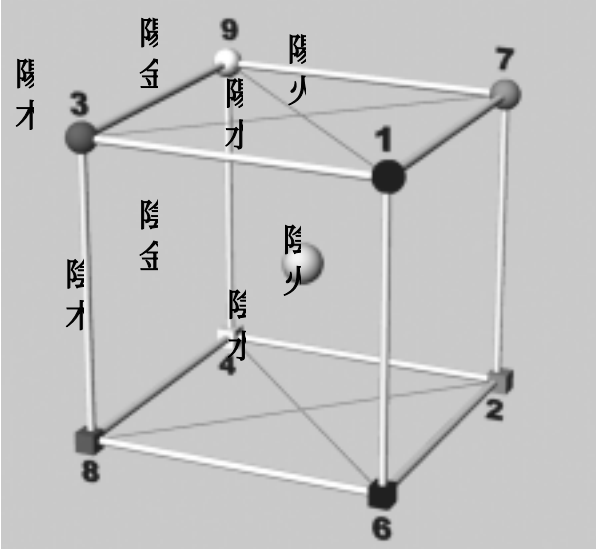


Fig. 5. Regular Polyhedrons Corresponding to the Ho Tu and Nak So

5) Case Study 5. Media Element Research (Color)

Study Subject: From the five color correspondence (wood-blue, fire-red, earth-yellow, metal-white, water-black), five secondary colors are derived by the production relationship to create ten colors. These colors, in turn, are divided again and again, diversifying the color shades.

Study Result: This color structure is different from that of Munsell or the Western color system in that, first, the West divides the colors from an optical point of view whereas the East divides colors based on their meaning and inter-relationship. Also, black and white in the West are seen to have only a shade without color. However, the East views black and white as important colors that constitute two of the five basic colors: blue, red, yellow, white and black. This leads to a fundamentally different color element and the shade of the color also becomes an important factor in producing the color.

5. Results and Discussions

This study established its long-term objective to find a system that can solve the challenge of modern design or interface design based on Eastern philosophy, and explored the possibilities through the establishment of a research structure and a few case studies.

As a conclusion, this study found that the Eastern philosophy held a high potential of presenting a new design system very different from the existing one and that the key lied in striking a balance between humans and tools. That possibility was even higher when Eastern philosophy was applied to media design, the reason being that a design system based on Eastern philosophy would be more philosophy- and concept-oriented than a system developed from an industrial production point of view. It would

also be implemented based on philosophy rather than physical laws.

A more concrete application system and practical usage of such a system based on a deeper and wider understanding of Eastern philosophy needs to be discovered in the future.

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Appendix A : Ho Tu

ChangSun JUN,YunHyung UH, The Way To Yin Yang, Seki,.Summary of Chapter4(1998).

Ho Tu is said to have originated from the pre-dynastic times in China, when Fu His, one of the Five Emperors, derived the eight trigrams from the back of a supernatural animal called a Dragon Horse that rose from the waters of the Yellow River. Nak So is said to have originated from patterns or writings found a tortoise shell that rose out of a waterfall when King Wen ruled the floods.

As the foundation of I-Ching (Book of Changes) and the theory of Yin Yang and Wu Hsing, Ho Tu and Nak So are representations of the principle with which the universe and all its objects are created and changed. Ho Tu and Nak So use shapes, which are symbolic rules, and numbers, which are formal rules, provided in Zhou Yi.