Grid Design under the Context of Chinese

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ABSTRACT

This study was carried out to investigate the history of Chinese character grid design. Still, it seldom involves the understanding and use of the grid in the Chinese context, that is, the information transmission of Chinese characters. There is little research on the grid design of Chinese information applied to multimedia. This research aims to conduct the cross-disciplinary, diachronic study and qualitative research with ethnography. Moreover, examining the history of the use and recognition of grids in design, and its relationship with visual design in different ages and historical transitions in China. Besides, this research outlines the unique change track of grid design consciousness in the context of Chinese visual communication and information transmission and the historical and cultural enlightenment from the perspective of cultural exchange and comparison between China and foreign countries.

1. Grid design under the context of communication for Chinese

This special issue explores the relationship between Chinese culture and grid design. It deeply discusses the grid culture in Chinese history, which connects with research into complex and diversity grid that are historical, structural, and practised. The grid design is one of the designer's tools, and Visual communication designer organizes the information content and information transmission efficiently by using it. According to the survey, the current grid design is widely used in Latin design applications. The carrier of information is not only limited to English information but also needs to be explored in Chinese information visual design.[2]

The study will raise such questions as to whether the grid system constructed with the Latin script is suitable for Eastern Chinese characters. The golden ratio used by the Western grid system has set a universal design paradigm with its strict rational and scientific logic. In ancient China, all kinds of rhymes have specific rhythms to build the structural skeleton of the language. In the first part of the paper, the application of Chinese grid in design is discussed, Chinese characters measured in squares

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[2] Duan, R. (2009). Extension and application of writing grid. *Art Circles,* (001), 139. http://www.cnki.com.cn/Article/CJFDTotal-YISJ200901026.htm

seem to be more suitable for vectorized grid calculation and layout. And in the second part,[3] whether western grid design is suitable for Chinese typesetting is discussed. We need the principle of geometric boundary to construct the grid system of Chinese characters, learn the design consciousness of controlling the beauty and order, obtain the conscious way to constitute the aesthetics of reading, and master the methodology reflecting the rhythm design of oriental text. Question: Is there the "grid" concept in art and design of Chinese tradition? What are they? Use historical research methods to explore which traditional Chinese culture is related to the grid.

2.   What is the concept of a "Grid"

What is the Grid? Swiss designer Müller-Brockmann (1996) said: "the grid is to divide the 2D design into smaller areas or 3D space into smaller compartments. The size of these areas or compartments can be the same or different". American scholar Williamson (1986) also has a definition of the Grid. He said that "the Grid is a typographic design matrix used to control the position of fonts and images". It is a coordinate system that's divided by vertical and horizontal axes and proportioned. In addition to being a methodology for graphic design, the Grid is also of perfect relevance to the human worldview and symbolic system. In the post-modern graphic design, the Grid with visible decoration has also become an essential component of post-movidern graphic design. He divided four basic types of grid subordinates: coordinate-based, cross-coordinate, module-based, and line-based. The first two belong to the point-based type, and the latter two belong to the area-based type.[4]

The Grid includes the baseline grid, the Column grid, the Modular Grid, the Manuscript grid, the Pixel grid, the Hierarchical Grid. Designer Andrew Wilshere state that the Grid is a system for organizing layout, which could be for print or the screen. That is, Grid is a functional design tool. The current definition of the Grid is the existence of the one-sided perspective. The Grid can be a data collation tool in graphic design and digital media design, and Grid is a spatial framework tool in landscape design.[5] The Grid's development has been mature in visual information design over the past 150 years. Joseph miller-Brockmann, a Swiss graphic designer, introduced the design principles and methodology of grid design with a large number of examples in the book. Joseph miller-Brockmann express: "The grid system is an aid, not a guarantee. It permits a number of possible uses, and each designer can look for a solution appropriate to his personal style. But one must learn how to use the Grid; it is an art that requires practice" (Müller-Brockmann, 1996).

3.   About western grid design and Chinese design

In the Renaissance period (covering the 15th and 16th centuries), the Grid appeared in the design for the first time. At that period, the perspective rule was established through grid lines to convey the visual reality and sense of space. However, this does not prove that this is the first appearance of the Grid. The following work will discuss the form of Grid in ancient China.[6]

The grid system was born in the writing culture of the pre-Qin period in China, and has matured in the inscriptions in the Han Dynasty. The grid system that is consistent with the vertical and horizontal is closely related to the commemorative writing in ancient China. This tradition has also been affected in later generations and has been fixed in the future movable type, the "Juzhen version". However, the grid system does not commonly used in Chinese design. Chinese designers had a lot of knowledge about modernist layout design and internet in the 1920s. In the design of books, newspapers and periodicals in the Republic of China, a large number of design works for modernist languages, such as Qian Juntao, appeared in 1930. The style master Mondrian respects the right angle shape composed of horizontal lines and vertical lines. He believes that all the elements that are opposed to each other in

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[3] Huang, A. G. (2015). Dimensional space study of calligraphy art (Unpublished master's thesis). Guangxi Normal University, Nanning. http://cdmd.cnki.com.cn/Article/CDMD-10602-1015407495.htm

[4] Lv, J. R. (2006). Forerunner of modern art design——Kohei Sugiura on the occasion of the opening "*Thunderstorm——Kohei Sugiura's magazine design half a century China exhibition*". *Oriental Art*, (018), 78-89. http://www.cnki.com.cn/Article/CJFDTotal-DFYS200618008.htm

[5] Müller-Brockmann, J. (1996). *Grid systems in graphic design: A visual communication manual for graphic designers, typographers and three dimensional designers*. Teufen: Braun Publish. https://www.semanticscholar.org/paper/Grid-systems-in-graphic-design-%3A-a-visual-manual-%3D-Müller-Brockmann/5edb8d98f71cd79aa58fcc1e4807f1064b23863d

[6] Qi, Y. L. (2010). Research on the application of fabric grid pattern in modern graphic design (Unpublished master's thesis). Zhejiang University of Technology, Hangzhou. http://cdmd.cnki.com.cn/Article/CDMD-10337-1011255977.htm

nature can be simplified into shapes that intersect horizontally and vertically.[7] This artistic style has a certain influence on the layout design in the period of the Republic of China. For example, Qian Juntao's Special Issue on the 10th Anniversary of the Founding of Shen Shi Telecom, whose design is based on a deconstructed word "Shen". The entire design strictly follows the horizontal and vertical style principles. From the perspective of grid design, the work can be divided into five equal divisions horizontally from top to bottom, and can be divided into three equal divisions vertically from left to right, that is to say, this work is designed from 15 grid units, using Western grid lines the form has an oriental charm.[8]

4. About Chinese Character Grid in Chinese history

Before the invention of movable clay printing (1041AD), a system based on optimal proportions had been used to arrange handwritten text on pages. One such layout system, known as the Jiege, was in use in China.

In the history of China, Jiege, vertical lines, Siheyuan. Have all discussed the application of information grid design of Chinese characters. Duan (2009) once said that the writing grid is the bounding grid, which is a rational norm form based on perceptual writing, which is convenient for people to grasp the structure of the font structure and the position of the stippling. Among them, due to its characteristics of standardization and standardization, it can design concise and clear visual effects. It is currently extended and applied in web design, font design, book layout, newspaper layout, advertising, packaging and other graphic design fields. The following study discusses what the calligraphic grid, and the relationship between calligraphic grid and the Chinese information design is.

5. Calligraphy Jie grid
5.1 The calligraphic grid is an accurate folding or delineating grid line on paper

In calligraphy, the grid is a "magic weapon" for Information layout, which makes it neat and beautiful. As Huang (2015) surmises: "the practical value of dimension space in calligraphy art, trying to clarify the internal relationship between dimension space and calligraphy art in theory." In the field of calligraphy, people pull in the concept of two-dimensional space, three-dimensional space, four-dimensional space, and other dimensional space categories, thereby broadening the sense of space and beauty of the picture.[9]

Figure 1. Calligraphy Jie Grid

Calligraphy Jie Grid has a long history. In the six years of Tang Zhenguan (A.D.632), "Jiucheng Palace Stele" and "Yan Qinli Stele" have found cinnabar Jie Gridlines, indicating that the ancients attach great importance to the writing Jie Gridlines. In ancient China, the traditional manual-folding of Jie Gridlines is achieved by folding the writing paper into a corresponding size (Fig.1). By folding the writing

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7 Samara, T. (2002). Making and Breaking the Grid: a layout design workshop. Gloucester: Rockport Publishers Inc.
https://designopendata.files.wordpress.com/2014/06/making_and_breaking_the_grid__timothy_samara.pdf
8 Sugiura, K. (2006). Books, text and design in Asia: Conversation between Kohei Sugiura and colleagues in Asia. Shanghai: Sanlian Bookstore. https://max.book118.com/html/2019/0517/7153150163002025.shtm
9 Williamson, J. H. (1986). The grid: History, use, and meaning. Design Issues, 15-30. https://www.jstor.org/stable/pdf/1511481.pdf

paper out of the corresponding size, the corresponding words of the broken line grid, and set aside the left and right boundaries and sign-off position.

In order to facilitate smooth writing, calligrapher tries to make the boundary clear and accurate, the number of rows, the number of columns, the number of words, the style, and the position of the upper, lower, left and right are equal. Experience tells us that the more accurate the grid, the smoother the writing layout and the clearer the picture. However, the larger space, the more preparation time is required. As the saying goes in China: three-point Calligraphy Jie Grid and seven-point writing, meaning that it is also essential to have a good vision with Jie Grid.[10]

In 2013, the calligraphy grid photoelectric panel came out-with the new technology elements, it is a farewell to the traditional manual-folding and folding borders and manual hooking borders that are time-consuming and laborious. Provide more time-saving, convenient and efficient paper grid for calligraphy practice and creation. The common calligraphic grids include Tian character grid, Jiugong grid, zodiac grid, etc., which are written in accordance with the style, size and size of each script. Flexible operation, suitable for most different space forms. The following will explain the relationship and role of various types of boundaries and Chinese information.

5.1.1 Application of Mizi grid in design

The Mizi grid originated from the Qing Dynasty (1636—1912AD). At that time, the Mizi grid was mostly used for Foundation in Chinese Calligraphy. Because the structure of Chinese characters is complex, the strokes are many, and it is a square font. The four lines are used as a reference for the horizontal and vertical strokes of the stroke.[11] The entire Mizi lattice is divided into eight triangles, making it easier to see the layout and aesthetic expression of each stroke. Qi (2010) and Zhou (2013) discussed: "The graphic design and the changes and innovations of the grid pattern frame and the grid pattern frame of the Chinese character grid are of great significance to contemporary design."
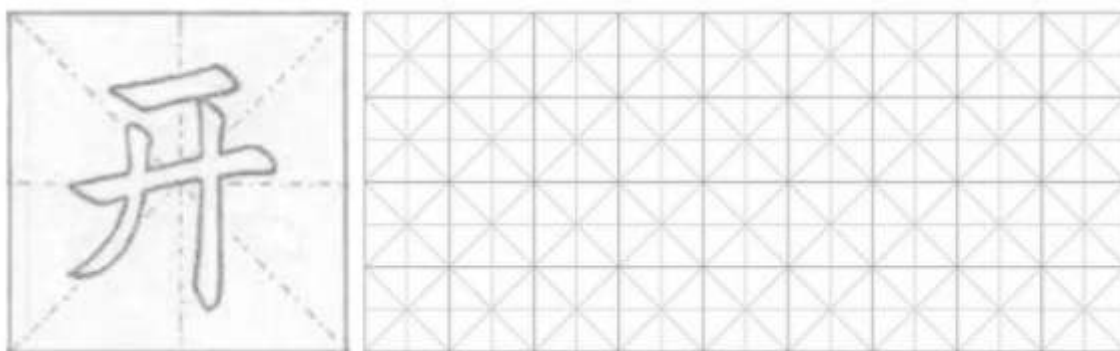

Figure 2. Mizi grid

5.1.2 Application of Tianzi Grid in design

The Tianzi grid is composed of a square, a horizontal center line, and a vertical center line. Tianzi grid was born in the early days of liberation in China, that was fifty years ago. There are four small grids in the Tianzi grid, called upper left grid, lower left grid, upper right grid, and lower right grid. Each grid and each line have different names. Many designs in East Asia adopt the layout pattern of the Tianzi grid as layout design. For example, one of the pioneers of computer-based visual design in Japan, Miki Kazui, used the grid layout of the Tianzi Grid in many of his works. Such as VISIONARY∞GENE+m (2006), LITHRONE Project-C (2003) (Fig.3). In his works, the colours are intense, and the style is outstanding.[12] With the help of unique methods such as morphology, image composition and montage processing, the

[10] Zhu, X. T. (2013). Dali Cang'er Hotel- "Wetland Jiugongge", reshaping the spirit of place. *Yunnan Architecture,* (3), 30-33.

[11] Tu C. Visual Semiotic Thinking Strategy: A Hypothetical Dialogue between Visual Graphics and Audience Construction [J]. 2019.
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12 Fan Yingxia. On the design philosophy of Miki Katsui. [J]. Western Leather, 2019(18): 7-9.
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elements that were initially missed in time and space are confronted with each other, thereby generating new time and space. His unique design form of Tianzi grid and novel communication method both bring new weather to Japanese design and provide more possibilities for China's future design. His design concept has a significant influence on the design field today. The designer Fan Yingxia also stated in the paper "On the Design Concept of Mitsumi Sakai" that the composition of the Chinese character and the poster works of Mikado Sakai is closely related.
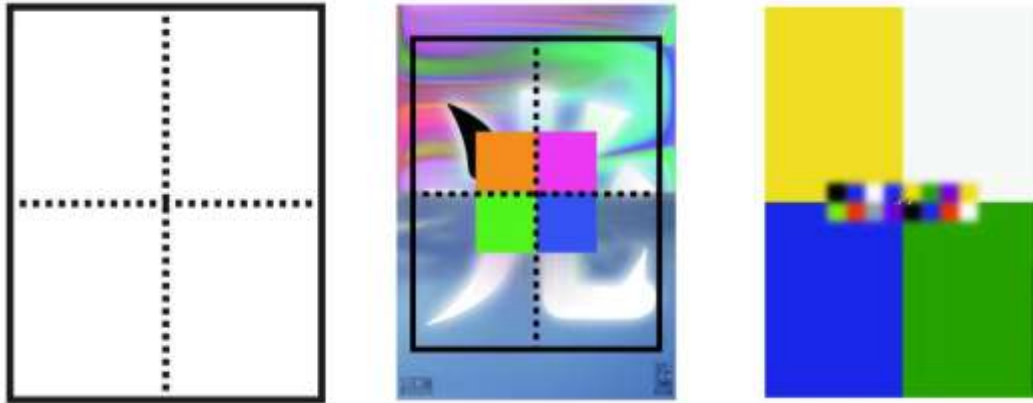

Figure 3. VISIONARY∞GENE+m (2006), LITHRONE Project-C (2003)

5.1.3   Application of Nine Squares Grid in design

Nine squares grid is said to have been created by Tang Dynasty calligrapher Ouyang Xun. In ancient China, it was used to arrange the positions of glyphs and stippling, or used as a tool to reduce and enlarge fonts. Jiugongge can help and assist many disciplines. It is suitable for management, architecture, garden design, etc. For example, the Dali Cangshan Hotel in 1995 (Zhu, 2013), also known as the "wetland Jiugongge" is constructed using the Jiugongge space frame. Not only that, the layout of the newspapers in the Republic of China period also adopted the form of a nine-grid grid, such as the early 20th century, The Chinese Times, Art, etc. (Fig.4)During the period of the Republic of China, the Chinese style of books was still vertical layout, mostly using movable type printing. Designers prefer to arrange newspapers in a small square form, especially the Jiugong grid form.
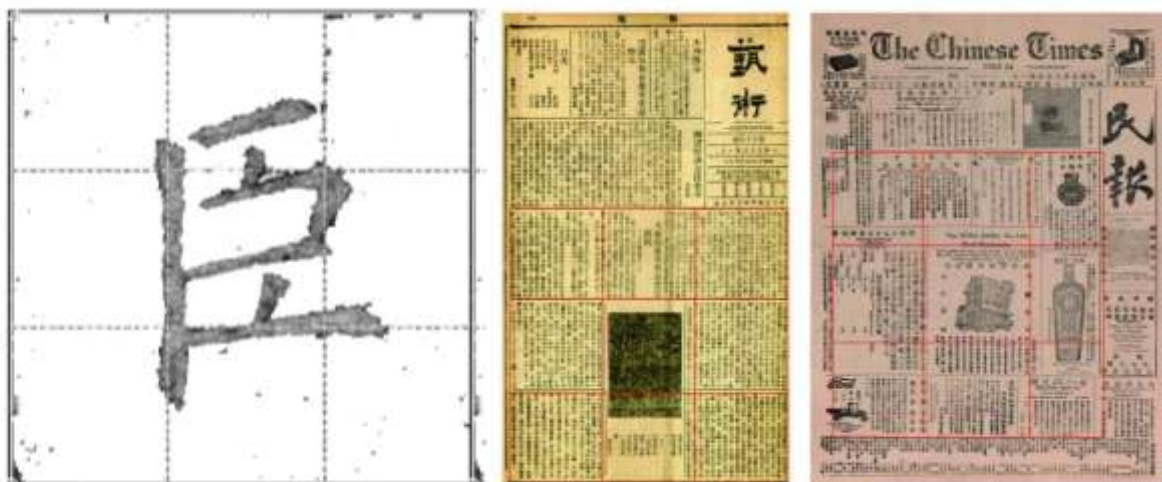

Figure 4. The Chinese Times and Art

5.1.4   Application of Rhombus Grid in design

The rhombus grid is a character lattice invented by contemporary calligrapher Lan Jingfu based on the shape of Chinese characters, the rule of calligraphy and aesthetic principles. Principles of calligraphy knotting: tight top and bottom loose, left tight and right loose, the centre of gravity,

etc(Fig.5). The character of this type of lattice is that the shape is a rhombus, and the inner shape has two centre lines and intersects the golden section point, which is in accordance with the aesthetic principle and visually produces the effect of tightening and loosening. Lu Jingren once commented that Sugiura Kangping incorporated Western European design expression techniques into oriental philosophy and aesthetic thinking, giving the design a new oriental cultural spirit and concept.[13] In his cover works, not only the colors are beautiful, but the composition form is also very novel. The text layout adopts a diamond-shaped layout, and the center of gravity of the layout is upward. (Fig. 5)
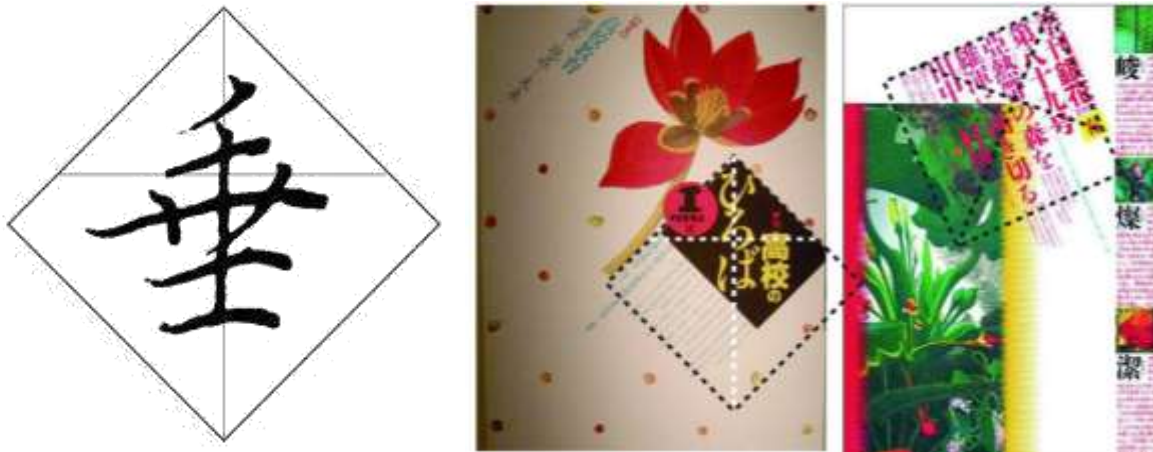

Figure 5. Kohei Sugiura Cover design works

## 6.	Vertical Setting of Types

Ancient Chinese typographic was the mainly vertical setting of types. The first person, Qian Xuantong, a pioneer of the Chinese New Cultural Movement, who changed the vertical writing of Chinese characters to horizontal writing. However, it wasn't widely replicated. After the founding of New China, Guo Moruo vigorously promoted the Chinese character "horizontal," "Guangming Daily" first responded, conducted experiments, and then gradually increased the number of responders. On January 1th, 1956, "People's Daily" was changed to a horizontal format with the approval of the Party Central Committee. There are different points about Chinese typography. Someone supports Horizontal because of reading efficiency. But for Chinese characters, the shape is complex, and the sentence structure is short. Many scholars believe that vertical row combines both classical rhythm and beautiful layout. This article analyzes the grid in ancient Chinese typesetting, as shown in Fig. 6. Bi Sheng in the Northern Song Dynasty (960-1127) invented movable clay printing. In order to make the typesetting aesthetic, he creates the movable type, spacing straps, Space-Filling blocks, which control the kerning, line spacing, side-bearings, and overall layout.
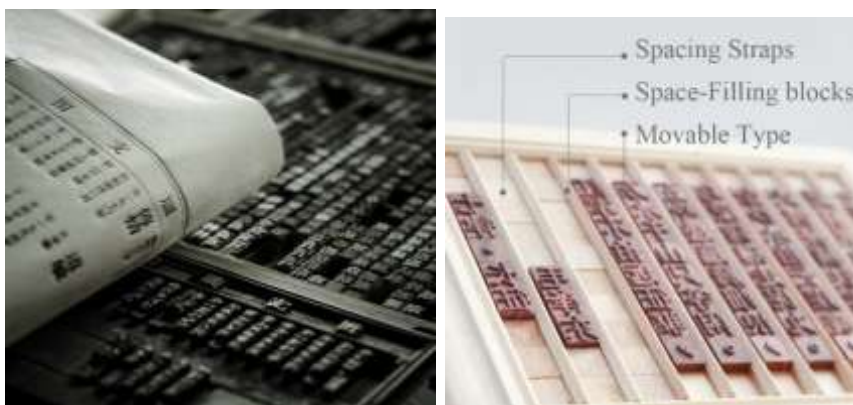

Figure 6. Movable Clay Printing

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[13] Lv Jingren. Sugiura Kangping, the pioneer of modern book art design [J]. Decoration, 2007(04):88-91.

7.   The uniqueness of Chinese character grid
7.1   Methodology used to analyze the grid in Chinese character

Through the argumentation, historical epistemology and Du Weiyun's historical methodology were used to understand the characteristics of the boundary through the objective facts, characteristics, methods, etc. of the history of each dynasty. For China, which has a long history, Jiege has a thousand years of history. Every time a dynasty changes, the boundary will change to a certain extent. Historical epistemology believes that what we want to study is how knowledge has changed with the evolution of history. Whether it is the emergence of the Jiugong grid in the Tang Dynasty or the rice-shaped grid in the Qing Dynasty, we will find that people have more and more detailed requirements on the grid. In modern times, Jiege has been used in design, and other design methods have also been incorporated, such as Sato Koji's super finishing technology, design psychology, and ergonomics. The grid system is a core issue in modern layout design. If you want to use it skillfully in the practice of typesetting, you must understand it deeply at the methodological level, and this must be traced back to the difference in the context of the understanding of freedom between Chinese and Western cultures. This article discusses the application of ancient Chinese grids in design on the basis, and establishes a layout grid system design methodology that includes the spirit, function, formulation, and breakthrough of traditional Chinese grids. The function of the grid is to accurately and systematically specify the starting and ending positions of the visual elements. The combination of Chinese and Western grids is conducive to breaking through the real freedom after the layout legislation, including visual elements covering the grid, violation of the grid according to the grid, and deconstructing the style of the grid There are three types.

7.2   Chinese characters need unique grid design

The study of writing grids for Chinese characters and Latin alphabets has both commonality and uniqueness. The unique development of the Chinese character grid is also an inevitable result. When we compare the two fonts, we will find the difference between the two characters.

First, in the late Western Zhou Dynasty (1046—771 B.C), the development of Chinese characters evolved into big seals, which laid the foundation for Chinese characters to be square characters. This strictly controlled the information of Chinese characters in a "square" grid. Second, the traditional Chinese grids include: Kouzi grid, Tianzi grid and Mizi grid. From the perspective of development, the design structure of the grid is constantly changing from "simple" to "fine" to the Han Dynasty. The legibility of Chinese characters and the writing speed has also gradually improved. Third, the structure of Chinese characters is different. The Chinese character with the least strokes is 1 stroke, and the Chinese character with the most strokes is 172 strokes. Compared with the 26 Latin letters, the Chinese characters are indeed more complicated. Fourth, in the layout design in practice, the display of Chinese characters less than 5pt is not clear, but the audience of 3pt Latin letters can also be read well. According to the Qing Dynasty's "Kangxi Dictionary", incomplete statistics of a total of 46933 different Chinese characters, these data confirm the Chinese characters Complexity, diversity, particularity.

In history, designers Kohei Sugiura and Lu Jingren have confirmed the uniqueness of the Chinese character grid through many book designs (Sugiura, 2006). Lv (2006) has systematically expounded the order and rules of the grid design layout in the book of literature and art. Compared with the free layout, the traditional layout in the grid system pays more attention to the sense of proportion, order, clarity and accuracy. This also raised the question to be studied in the future-how to design the Chinese character grid design to create its own charm and vitality. In the late 1980s, I pointed out at Mr. Sugiura Kangping: Design is the process of controlling the beauty of order. The grid establishes a control path for text to be succinctly and clearly to understand and remember. It is not a solid dialectic methodology that unravels 2D, 3D, or even time. He also confirmed the uniqueness of Chinese character grid design through practice.

The grid is used as an auxiliary line to provide a certain standard paradigm in the writing, design, and production of Chinese characters and Latin letters. Joseph Miller-Brockman's in-depth and concise discussion and a multitude of examples, which introduced the grid design principles and application methods; pointed out the need to establish a rule system that can be followed to maximize layout resource order and economy Sex; put forward the concept and organization of solving visual aesthetic,

design function, and information symbolization. The grid offers framework of design rules. The grid just opens a more orderly and more free design channel. Design requires logic, rules, attitudes and rules.

8.   Conclusions

The grid design is suitable for visual communication in English, but it is still a new field in Chinese information research. The research manifest that the grid system constitutes the basic framework and logical arrangement for the Chinese information design. Under the challenge in the Information Age, the Chinese character and its grid design system have undergone tremendous changes. However, this is not merely a process of Evolution, but a self-adaptive arrangement based on reality. Although Chinese design concepts today have been deeply influenced by western modern design concepts and methods, the grid design has always existed in the graphic design tradition of Chinese characters. Our cognition of Chinese font design and information layout is still closely related to the cultural tradition of Chinese characters. Samara (2012): graphic design that tries to make things simple is not doing anybody any real benefit. Society needs to understand how to deal with the subtlety, complexity, and contradiction in contemporary life. Studying grid design in the context of Chinese information exchange is a help rather than a guarantee. There are many possible uses for such research, and designers in each country can find solutions that suit their unique style.

From the point of view of contemporary design theory and design practice, under the dual premise of digital media and Chinese context, this paper makes a constructive research and discussion on the current situation, problems and possibilities of grid design. It focuses on the media transformation from "graphic design" to "screen design", the relationship between screen based font design and grid, and the relationship between web and mobile information architecture and grid design. This paper argues that grid system constitutes the basic framework and logical arrangement of Chinese information design. Under the challenge of modern rules, the grid design system of Chinese characters and their layout has undergone great changes, but this is not a simple self-denial, but an adaptive arrangement based on reality. Although our design concepts today are deeply influenced by western modern design concepts and methods, grid design has always existed in the graphic design tradition of Chinese characters. Our cognition of Chinese character font design and information arrangement today is still closely related to the cultural tradition of Chinese characters.

For the transmission of information in any culture, the construction of order and sense of order are extremely important. Almost all design scholars and designers discuss the essence of design when they discuss the human desire for order. For a country with a long history such as China, the deeds of government orders and information communication, as well as the promotion of culture and education, have always required the use of highly developed rational and orderly arrangements. The grid design behind the Chinese calligraphy grid revealed in this article, to a certain extent, provides a powerful tool for Chinese civilization, which is highly rational and orderly. Swiss designer Müller-Brockmann once said: "In nature, the order system dominates the growth and construction of life and matter. The continuous exploration of order makes humans different from other species, even primitive humans Create breathtaking geometric decorative patterns. This desire to rule through order reflects the deep spiritual needs of mankind."

Society is looking for order, and design is also looking for order. In the future, the grid's sense of order will be widely used. Perhaps such a beautiful grid is not only suitable for typography, but also for multimedia and environmental transformation. Grid has more possibilities in the future.

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