PARADIGM OF INFORMATION DESIGN IN CHINA FROM 2009 TO 2019 BASED ON THE
CONTENT ANALYSIS OF THE CHINESE DESIGN ACADEMIC JOURNAL *ZHUANGSHI*

By

Mr. Xing YANG

A Thesis Submitted in Partial Fulfillment of the Requirements

for Doctor of Philosophy DESIGN ARTS (INTERNATIONAL PROGRAM)

Graduate School, Silpakorn University

Academic Year 2020

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โดย

Mr.Xing Yang

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต

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By	Xing YANG
Field of Study	DESIGN ARTS (INTERNATIONAL PROGRAM)
Advisor	Associate Professor Sone Simatrang

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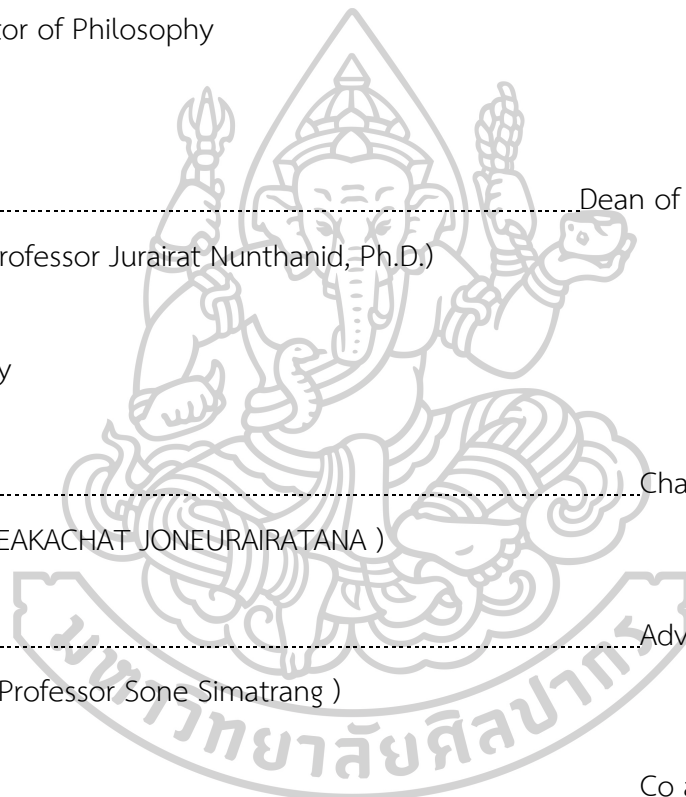
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Keyword : CHINESE DESIGN, INFORMATION DESIGN, DESIGN PARADIGM, CLASSFICATION

MR. XING YANG : PARADIGM OF INFORMATION DESIGN IN CHINA FROM 2009 TO 2019 BASED ON THE CONTENT ANALYSIS OF THE CHINESE DESIGN ACADEMIC JOURNAL *ZHUANGSHI* THESIS ADVISOR : ASSOCIATE PROFESSOR SONE SIMATRANG

Communication processes and media have changed as a result of advances in information technology. The new paradigm of Chinese information design is forming as Mainland China is leading in information technology.

To construct a set of design paradigm research models, this study combines perspectives from design history research, art history research, and science history research. Following that, using the Chinese comprehensive design academic journal ZHUANGSHI as a database, this research uses the content analysis approach to decode the paradigm of information design in China (2009–2019).

As a result, design paradigm research models including a new design classification model, a relationship model among paradigms, and a design paradigm descriptive indicator system were created. And, China is forming an information design paradigm that focuses on long-term benefits and balancing relationships rather than creating artifacts, which is dually affected by the development of global information technology and China's domestic economic, cultural, and design education development strategies. Design practitioners are more and more willing to set design goals from the perspective of the supply-side and are carrying out extensive design cooperation on data-driven platforms.

In practice, understanding the emerging model will help practitioners grasp the latest growth direction of information design. The design paradigm models, in theory, will provide researchers with research tools.

ACKNOWLEDGEMENTS

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1.1 Background of the Study

Changes in information technology have resulted in changes in communication processes and media, bringing the fourth industrial revolution to a crucial juncture. The emerging paradigm of Chinese information design is forming, as Mainland China is leading in information technology and is the world's largest manufacturing economy.

Toffler (1984) argued in his far-reaching book, *The Third Wave*, that information technology brought humans into the information age. The concept of Industry 4.0, which was widely discussed at the 2011 Hannover Messe, brought people to face the upcoming new changes. The World Economic Forum's organizer and executive chairman Klaus Schwab defined this change as a revolution in his 2016 book *The Fourth Industrial Revolution* (Schwab, 2016). The third and fourth technological revolutions occurred in information technology, not in the manufacturing industry like the first and second technological revolutions. The continuous development of information technology is continually updating information communication media and communication methods. This development has changed the information design.

The information technology in China has achieved a leap from the mobile internet era to the internet of things and the artificial intelligence era. On January 7, 2009, China synchronous world entered the 3G (mobile internet) era (Feng & Huang, 2009), and on June 6, 2019, China led the world into the 5G era (internet of things and artificial intelligence) (X. Zhang, 2019). Information industry practices are forcing China's information design to adjust to new developments in productivity. (Figure 1)
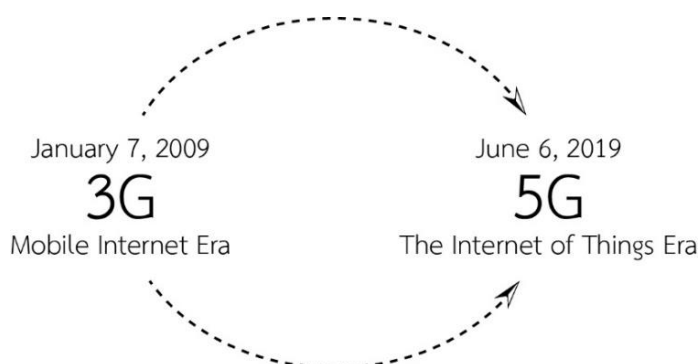
Figure 1. Date of Information Technology from 3G to 5G in China

By Xing YANG

China's information technology has led the world and can sustain the paradigm shift in China's information design with technological support.

The first industrial revolution began in the 18th century, and signify Europe on the road to industrialization. About 40 years later, the United States opened its industrialization process European development experience. In the 1860s, Japan launched the Meiji Restoration under the capitalist economy's impact, which enabled Japan to begin its industrialization earlier than China. China's industrialization began in 1979. Since then, the Chinese government has adopted the policy of reform and opening up, shifting national development to economic construction.

Nowadays, in the seven frontier areas of wireless communications, China has surpassed the United States in two of them, according to the *Sino-US Science and Technology Level Assessment* issued by the Chinese Academy of Sciences in 2019 (CAS, 2019). (Figure 2)

Figure 2. The Industrialization Processes of Europe, America, Japan, and China

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IANS (2019) published an article, *Huawei Bags 50 Commercial 5G Contracts Worldwide*, on the *Expresscomputer* website on June 27, 2019, which cited the Huawei Deputy Chairman Ken Hu's address at the Mobile World Congress (MWC) in Shanghai. 'We already have 50 commercial 5G contracts globally (excluding Chinese orders)'.

At the same time, ZTE Corp said it had secured more than 25 commercial 5G network contracts to date, according to the Tao (2019)'s report of *ZTE Secures more than 25 Commercial 5G Network Contracts as it Steps up Turnaround Efforts* on the *South China Morning Post* website on June 25, 2019.

The 2 Chinese companies Huawei and ZTE Corp's main competitors are Nokia (Finland) and Ericsson (Sweden). Nokia CEO Rajeev Suri claims the company has wined 42 deals of 5G (Daws, 2019), according to the report of *TELECOMS* on June 11, 2019, and Khan (2019) said Ericsson had 22 publicly announced 5G networks in his article published on *Telecome.com* on June 26, 2019.

The total number of 5G orders between Huawei and ZTE has exceeded that of Nokia and Ericsson. China achieved a leading global position in information technology in the 5G era.

For adapting to the new development, leading design universities in China set up subjects in information design. The Academy of Art & Design, Tsinghua University established the Department of Information Art & Design in 2005, which has three professional directions: information design, animation design, and digital entertainment design; the Central Academy of Fine Arts established the major of art and science in 2019, focusing on interdisciplinary cooperation with robotics, artificial intelligence, biotechnology, and other fields; Tongji University integrated two majors of digital media and visual communication, and its training direction is very diverse, including graphic design, dynamic image, interaction design, game design, and service design; Hunan University Based on industrial design, the professional direction was re-established and divided into three professional directions: high-end equipment and transportation, intelligent products and interaction design, media art and social innovation (X. Wang & Li, 2019).

It is clear that under new industry needs, the last professional divisions are gradually being replaced in China's leading design universities and new education modules are forming. However, no clear classification standard has yet been seen in the exploration stage, especially in design fields related to the information industry. As the cultural and creative industries and the information technology industry become China's development strategies, making the scope and future direction of information design discipline clear become an urgent issue.

1.2 Statement of Problem

Since the 1970s, scholars' various descriptions of information design have been unable to adapt to China's current development of information design. There are endless new design names, such as interaction design, experience design, service design, innovative design, design management, digital media, intertwined with information design. This situation makes information design educators, researchers, designers, students, managers confused.

Besides, most of China's information design practitioners and educators come from graphic design, visual communication, and industrial design. The development of new technology has increasingly made their original skills inadequate. If they cannot clearly understand the future direction of information design, anxiety will rise.

Researchers usually start from the design object and design concept to describe the design paradigm, rather than describe the paradigm in all aspects. This situation caused the design research to be one-sided.

A questionnaire survey, involving 48 Chinese participants who are information design educators, researchers, designers, students, managers were conducted to prove it is a collective problem mentioned above rather than an individual one.

This questionnaire contains only three easy-to-understand questions, including:

(1) Your abilities earned from university can meet future information design;

(2) The information design is the same as before;

(3) You can accurately describe the information design.

The participants also need to fill four basic questions: their age, occupation, gender, and living area.

All three questions are single-choice questions. Choose the option that meets the participants' level of agreement. There are five cognition levels, strongly agree, agree, not sure, disagree, and strongly disagree. Each option corresponds to a different statistical value, and the details are shown in Figure 3.

Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
0	25	50	75	100
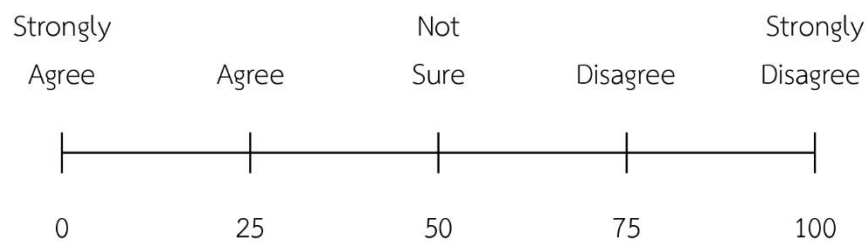
Figure 3. Questionnaire Evaluation System

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The survey was published on the WJX.CN website and participants filled out the questionnaire online by invitation. Forty-six valid questionnaires were finally recovered. All participants were people involved in the Chinese information design field. Among them were 20 men and 26 women; Ten were 20-24 years old, 16 were 25-29 years old, ten were 30-34 years old, ten were 35 years old and older; 17 were from Beijing and 17 were from Shanghai, three were from Guangdong Province, six were from Heilongjiang Province, and three were from Zhejiang Province; 16 students, 18 educators and researchers, and 12 designers and managers. (Figure 4)

Male: 20
Female: 26

20-24: 10
25-29: 16
30-34: 10
35 and older: 10

Beijing: 17
Shanghai: 17
Guangdong: 3
Heilongjiang: 6
Zhejiang: 3

Student: 16
Educator: 18
Designer: 12
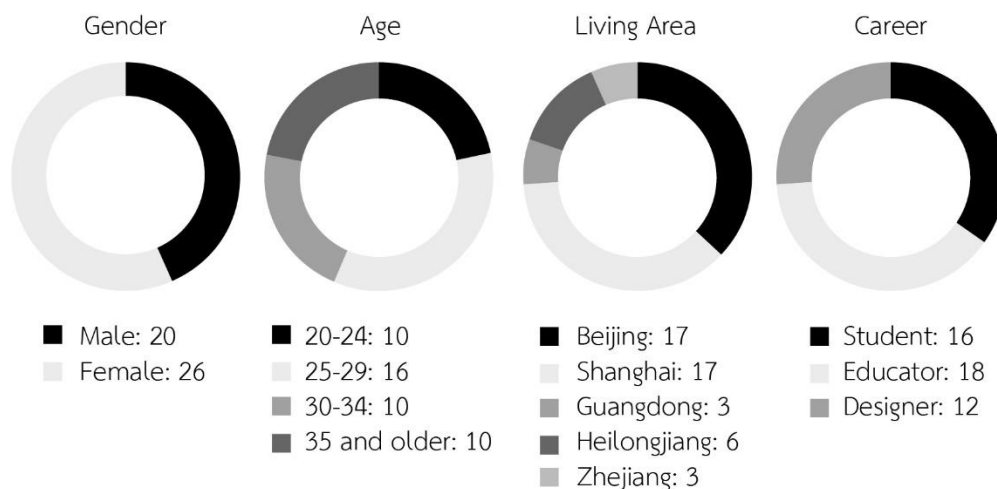
Figure 4. Participant Statistics

By Xing YANG

The result shows that all the answers are negative, as Figure 5 shows.
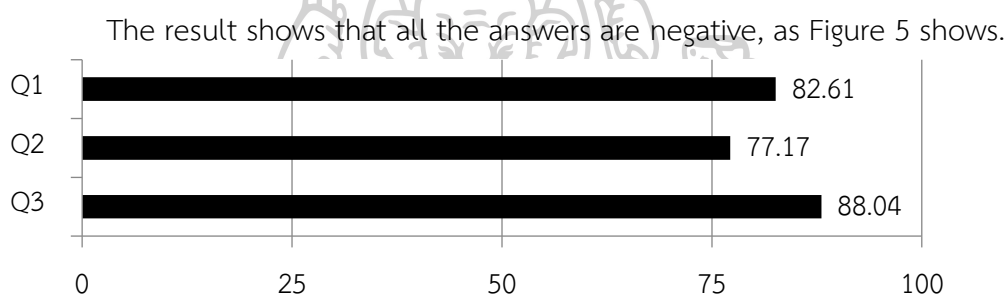
Figure 5. The Statistics Values of the 3 Questions

By Xing YANG

1.3 Significance

The design paradigm models, in theory, provide researchers with a range of methods for studying design paradigms.

In practice, understanding the emerging paradigm can help practitioners grasp the latest growth direction of information design.

1.4 Hypothesis

The hypothesis proposed in this study is that China is developing a new paradigm of information design. The following are the two explanations.

First, this study finds that the creation of manufacturing centers is the leading indicator of the formation of a new design paradigm by analyzing the history of modern design. Europe and the United States developed their own design

paradigm after being the world's manufacturing centers, shaping the rest of the world. Furthermore, there is a coexistence relationship between various paradigms.

The Great Exhibition of the Works of Industry of all Nations held in the United Kingdom in 1851 proclaimed that Britain had realized industrialization and became the world's manufacturing center. Stimulated by industrialization, modern design sprouted from Britain. Subsequently, Europe went through the critical stages of modern design, such as The Arts & Crafts Movement, Art Nouveau, Deutscher Werkbund, and Bauhaus. After 70 years of efforts to build modern design, Europe became the world's modern design center. The design of this center is oriented by quality and function.

With the expansion of fascism in Europe, the Bauhaus only survived for 14 years. The teachers and graduates of this essential design school left Europe; most went to the United States. During World War II, the United States did not suffer from war. After that, the United States surpassed European countries and became the world manufacturing center. Therefore, since the 1950s, a new business-oriented design paradigm was formed in the United States, and the United States became the center of this design paradigm. The business-oriented design concept is spreading to the world along with American products.

Although the United States has become the center of the new design paradigm, it does not mean that the United States has replaced the European design center's status, nor that the American design paradigm has replaced the European design paradigm. The two design paradigms coexist until now. Predictably, these two design paradigms will also move into the future with the newer design paradigm.

After the Second World War, the world has experienced more than 80 years of globalization. Although globalization is receiving challenges recently, globalization is still an irresistible trend in the foreseeable future. Driven by globalization, ideas are spreading faster around the world, and design exchanges are getting closer. The world's economic and cultural landscape is undergoing fundamental changes. The new design paradigm that is being formed will surely take root somewhere in the world, and the center of the new paradigm is also being formed.

It can be seen from the history that Europe and the United States have successively become global design centers of different design paradigms. The formation of design centers depends on the international influence of products. In other words, it depends on the global influence of a country or regional manufacturing industry. The style and pattern of the design will go to the world along with the goods. When Europe was the first to complete industrialization, Europe became a design center, and when the US economy led the world, the United States became a design center.

The People's Republic of China has been the world's largest manufacturing economy since 2014, according to data from The National Accounts Section of the United Nations Statistics Division on gross domestic product from manufacturing (1970–2018) at current prices. (National Accounts, 2020; Figure 6)
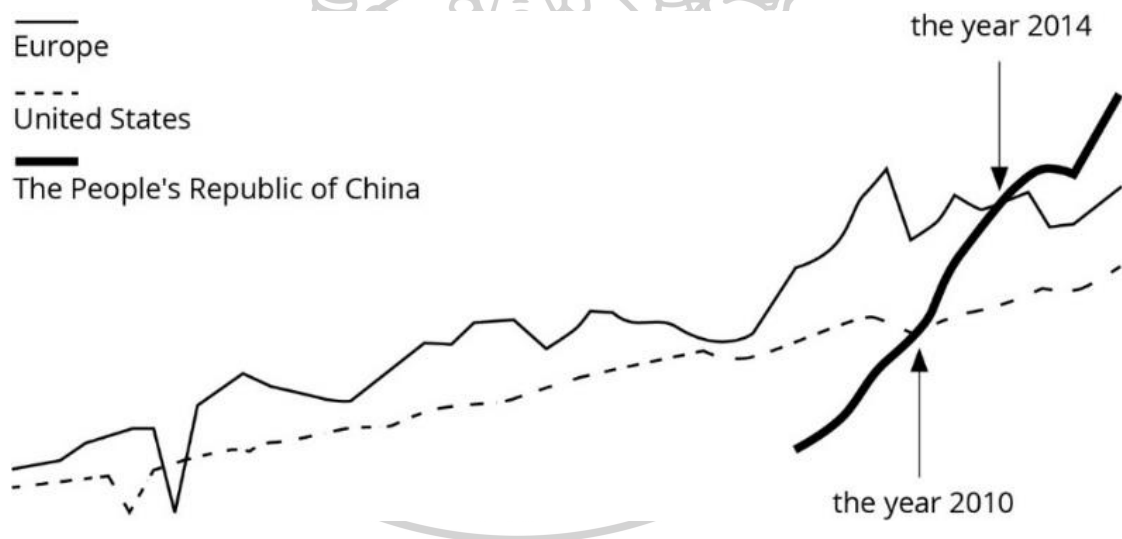
Figure 6. Trends of Gross Domestic Product from Manufacturing (1970–2018) between the United States and The People's Republic of China

By Xing YANG

Second, China is becoming a new global design center. The Creative Cities Network (UCCN) of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) was established in 2004 to encourage collaboration with and among cities that have recognized creativity as a strategic factor for long-term urban growth. Crafts and Folk Arts, Media Arts, Film, Design, Gastronomy, Literature, and Music are among the seven artistic fields covered by the Network. This study

counted the global cities of design and found that: China occupies four cities and has become the country with the most city of design titles. (UNESCO, 2020; Figure 7)

Africa	Arab States	Asia and the Pacific	Europe and North America	Latin America and the Caribean
		Shanghai ⎫ China's Cities	Graz	
		Shenzhen ⎬	Kortrijk	
		Wuhan ⎪	Budapest	
		Beijing ⎭	Bilbao	
		Kobe	Saint-Etienne	
		Nagoya	Dundee	
		Asahikawa	Turino	
		Seoul	Helsinki	
		Bandung	Berlin	
		Hanoi	Kolding	
		Cebu	Kaunas	Curitiba
		Bangkok	Baku	Brasilia
		Singapore	Detroit	Puebla
		Geelong	Montreal	Mexico City
Cape Town	Dubai	Istanbul		Buenos Aires

Figure 7. Global Cities of Design

By Xing YANG

1.5 Scope of the Study

This study focuses on the paradigm research on information design in China in 2009-2019. Therefore, there are three main parts involved, including information design as the research field, design paradigm as the research perspective, and China (2009-2019) as the research setting. (Figure 8)
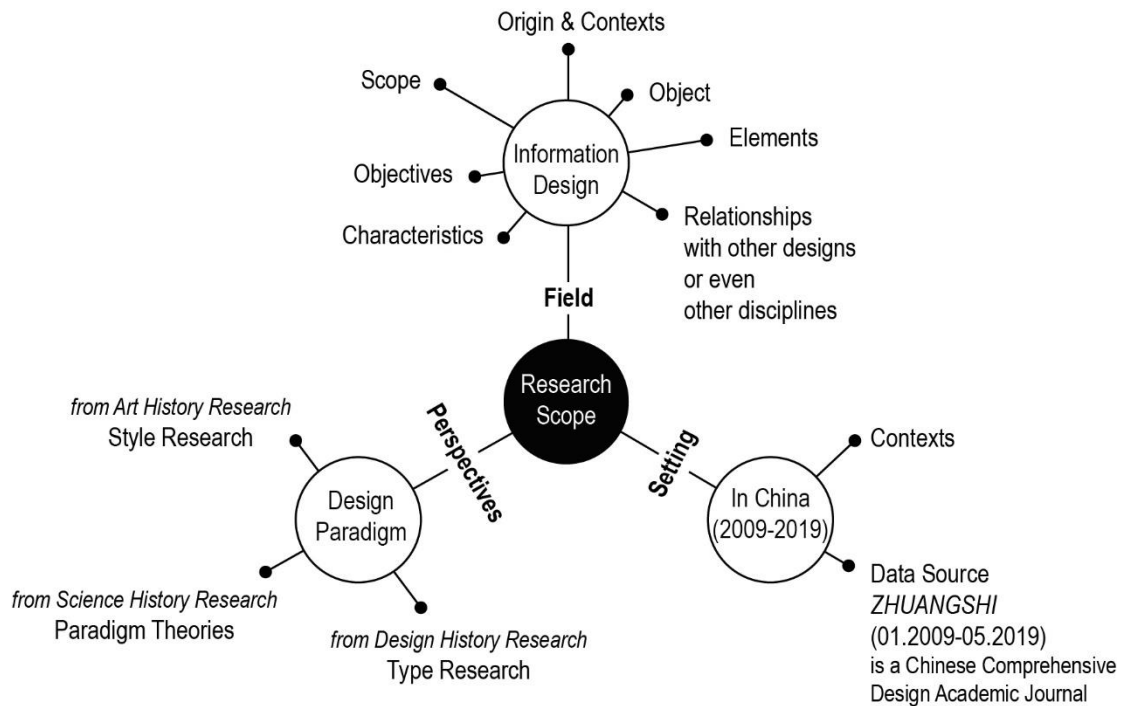
Figure 8. Scope of the Study

By Xing YANG

1.5.1 Information Design as the Research Field

This study answers two questions on information design: information design and the differences between information design and other designs or even other disciplines. To answer what information design is, a critical review was taken to identify the origin, context, objective, object, elements, characteristics, and scope of information design by analyzing the shift from graphic design to visual communication design and eventually to information design. Answering what are the differences between information design and other designs or even other disciplines, this study applied a case study and critical review to create a design classification model.

1.5.2 Design Paradigm as the Research Perspective

This study answers two questions on a paradigm: paradigm and the relationship between paradigms; describing a design paradigm. For answering these two questions, this study adopted theoretical deduction, including Thomas S. Kuhn's paradigm theory, Paul K. Feyerabend's, and Margaret Masterman's views on the paradigm theory. Type research and style research perspectives from art history

research and design history research were adopted to create a relationship model among paradigms and a design paradigm descriptive indicator system.

1.5.3 In China (2009–2019) as the Research Setting

This thesis used the Chinese comprehensive design academic journal *ZHUANGSHI* as the data base for decoding the paradigm of information design in China (2009–2019).

High-quality, continuously published academic journals can effectively record a research field's development within a specific region within a certain period, and provide accurate materials and clues for historical research. It is an effective method to examine a specific topic's historical development by using an academic journal as research samples and a clue.

For example, the thesis from Nanjing University, *On the Eastern Miscellany (1904-1948): An Important Fountain of Modern Culture* (Tao, 2013), and the thesis from Shanghai University, *The Fashion Magazine, and The Middle-Class Feminine Identity: 'ELEE' as a Special Case* (F. Liu, 2006).

The design academic journal *ZHUANGSHI* is a sufficient sample to research China's modern design history due to its influence. For instance, the thesis from Northeast Normal University, *From the Techniques of All Sorts of Crafts to the Modern Design: Research on the 40 Years Development of Magazine Art & Design* (the design academic journal *ZHUANGSHI*'s former English name*)*. (Ma, 2014)

Tsinghua University publishes *ZHUANGSHI*, China's only comprehensive design academic journal, which was published in 1958 and is included in the Chinese Social Science Citation Index (CSSCI). The design academic journal *ZHUANGSHI*'s composite impact factor was 0.577, comprehensive impact factor was 0.354, and ranked first in art and design journals. (CNKI, 2019)

Introduction to the design academic journal *ZHUANGSHI* (ZHUANGSHI, 2009)

- One of China's leading arts and design journals

- Listed in the Chinese Social Science Citation Index (CSSCI)

- Published on Tsinghua University's behalf (Beijing, China)

- First published in 1958, with 12 issues each year

- Standard serial number: CN11-1392/J and ISSN0412-3662

ZHUANGSHI relies on Tsinghua University, high-level education, and scientific research platform to make continuous efforts to influence China and overseas. As the only core journal in domestic art design, the design academic journal *ZHUANGSHI* is based on academics and society, covering all professional art design fields. It is essential reading for professional designers, design educators, and students and enjoys a high reputation in the professional field. (Figure 9)

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Composite Impact Factor Comprehensive Impact Factor

0.577 0.354

ZHUANGSHI ranks first in art and design journals.

Literature Keywords Distribution (2010-2019)

Number of Literature

▬▬▬▬▬▬	119	Design
▬▬▬	50	Interactive Design
▬▬▬	48	Innovation
▬▬▬	47	Industrial Design
▬▬▬	46	Service Design
▬▬▬	45	Public Art
▬▬	41	Package Design
▬▬	40	Design Education
▬▬	40	Product Design
▬▬	38	Interior Design
▬▬	36	Teaching
▬▬	35	Decoration
▬▬	33	Intangible Cultural Heritage
▬▬	31	Design Teaching
▬	28	Local Cuture
▬	28	Arts and Design
▬	27	Landscape Design
▬	26	User Experience
▬	26	Fashion Design
▬	26	Design Thinking

Figure 9. Academic Influence Factor and Reported Fields of the Design Academic

Journal ZHUANGSHI

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The average annual number of papers issued in the past ten years (2010-2019) is 646.2. (CNKI, 2019, Figure 10)
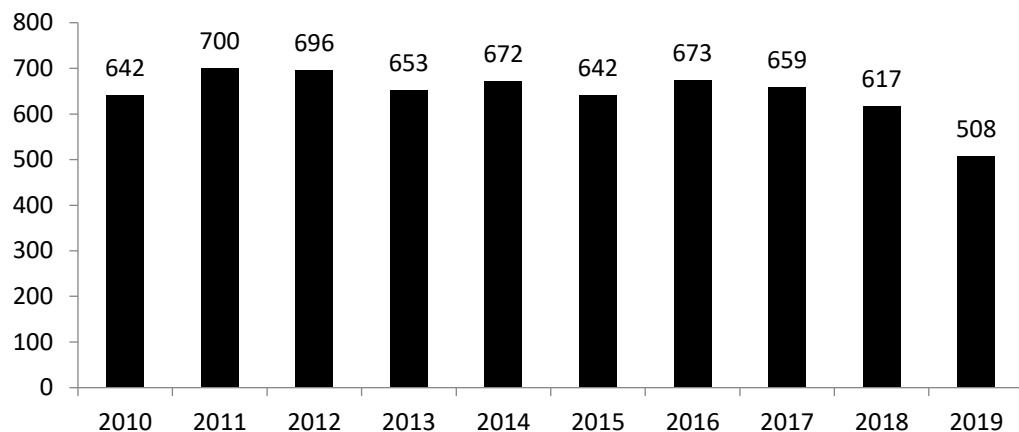
Figure 10. Annual Total Literature of the Design Academic Journal ZHUANGSHI (2010–2019)

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1.6 Questions of the Study

Accordingly,three research questions are posed in this study, each with its own set of sub-questions.

Question 1: What is information design?

(1) What is the identity of information design?

(2) What are the differences between information design and other designs or even other disciplines?

Question 2: How can a design paradigm be described?

(1) What is a paradigm, and how the relationship between multiple paradigms be understood?

(2) What are the design paradigm description indicators?

Question 3: What is the paradigm of information design in China (2009–2019)?

1.7 Objectives of the Study

To answer the three questions, this study sets three research objectives:

Objective 1: to identify information design

Objective 2: to create design paradigm description models

(1) A design classification model

(2) *A relationship model among paradigms*

(3) *A design paradigm descriptive indicator system*

Objective 3: to decode the paradigm of information design in China (2009-2019).

1.8 Outcomes of the Study

Outcome 1: instructions of design paradigm models, which Introduces how to use the design paradigm models.

Outcome 2: an online dada story on information design in China (2009–2019), which tells the story on the paradigm of information design in China by data, and shares the research data for further research communication

1.9 Terminologies of the Study

Design Case: it refers to the specific projects being designed, such as designing a book, designing a service system, designing an interactive interface, etc.

Design Goal: in this study, the design goal is the final expected effect of the design cases.

Design Practitioner: in this research, this term refers to people involved in the design circle, including design educators, researchers, designers, students, managers, etc.

Design Values: how practitioners of information design think about design on a philosophical level.

Design Work Mode: information design practitioners' approach for organizing and implementing design research, education, and practice.

1.10 Thesis Structure

There are five chapters in this thesis.

Chapter 1: Introduction

This chapter focuses on the background, problem, significance, hypothesis, scope, questions, objectives, outcomes, key concepts, and thesis structure of the study.

Chapter 2: Literature Review

This chapter focuses on the critical analysis of information design, paradigm theories, and the research status on China's information design to

understand the research topic and identify the research gaps and the theoretical framework.

Chapter 3: Methodology

This chapter focuses on the research framework, methodology, process, data, and methods. This study sets the research framework according to the research objectives and the research questions mentioned above. The overall research applies a quantitative and qualitative mixing methodology. In the research process, the specific methods include data analysis, case study, theoretical deduction, and historical comparative analysis, etc.

Chapter 4: Results

The chapter aims to carry out the methodology setting in the third chapter and data analysis to achieve research objectives.

Chapter 5: Conclusions

The task is to concentrate on explaining and reviewing the findings of this study, clearly stating the answer to the key research question, making suggestions for future research on the subject, and demonstrating what new information this study has added.
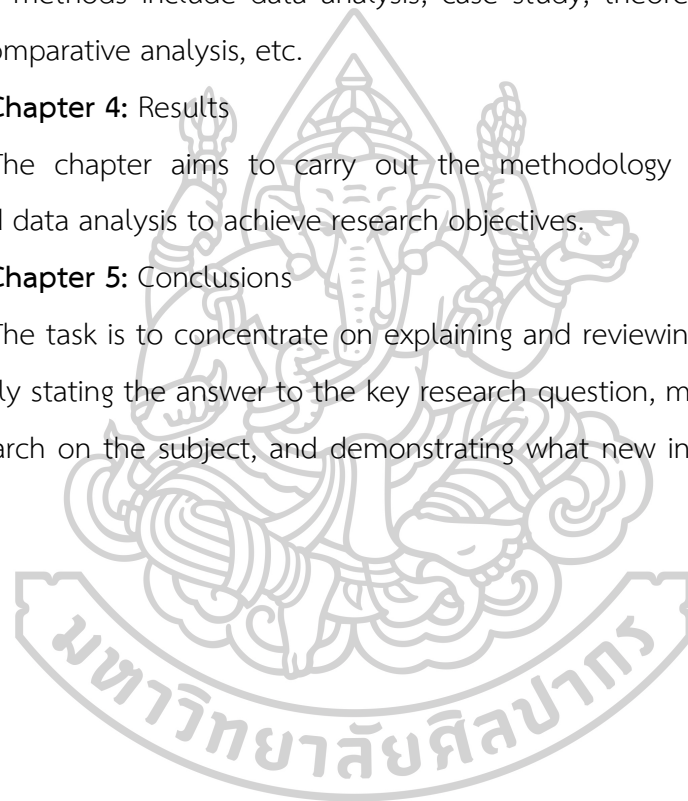
Chapter 2: Literature Review

This chapter explores the current theoretical and practical status in information design and identifies the theoretical framework for this study.

2.1 Information Design

The Internet had a transformative influence on information technologies in the mid-1990s. After decades of evolution, information design now encompasses all study and practice realms of graphic design and visual communication. It continues to grow, resulting in a scope that appears to be too wide. Now is a significant point in the technology shift; thus, clarifying information design's identity is essential.

This study conducted a critical review to decode the origin, context, objective, object, elements, characteristics, and scope of information design by analyzing the shift from graphic design to visual communication design and eventually to information design.

As an emerging discipline, no highly accurate definition of information design exists (Chen, 2011). Defining the concept of information design is difficult, often referred to different terminology (Rune, 2002).

In an age of information bombardment, the boundaries between what is and is not considered information design have become blurred, and different people define it differently. Some scholars believe that information design merely is data visualization, whereas others consider it as the communication of messages in any form. (Kathryn & Andy, 2014)

What is information design? This question is always asked and debated on different definitions (Rob, 2008). It's nearly impossible to come up with a single comprehensive meaning for the concept 'information design' (O'Grady, 2008). The aim of this research is to describe information design from a variety of perspectives.

Both visual communication and graphic designs, according to several researchers, are information designs. Ryan Hembree believed that graphic design is visual communication (Hembree, 2008). Alternative terms for graphic design have been suggested by educators and professionals, including information design, interface design, and visual communication design, with visual communication design

referring to the evolution of graphic design (Mauricio & Chu, 2014). Besides, in its broadest sense, all graphic designs are information designs. Graphic design can be distinguished as the organization of elements that can typically communicate independently, such as words, photographs, and illustrations. Information design incorporates the elemental particles of data and thus requires increased interpretation of authorship from the designer to enhance its message's fluency (Kathryn & Andy, 2014).

This study decodes the shift from graphic design to visual communication design and eventually to information design by comparing their origin, context, and objective. In terms of information design, in addition to the three perspectives above, a detailed discussion is included on its object, elements, characteristics, and scope to realize the definition of information design from historical and practical dimensions.

2.1.1 From Art to Graphic Design

2.1.1.1 Context and Origin of Graphic Design

The definition 'graphic design' first appeared in William Addison Dwiggins' essay 'New Kind of Printing Calls for New Design' in 1922. However, in reality, the practice dates back to the earliest artworks created by humans. (Addison, 1922)

Practitioners of printing art recognized the differences between graphic design and art. William Addison Dwiggins emphasized two facts: printing is not an art, and art is not essential to printing (Addison, 1922). Ryan Hembree held the same view that graphic design is not the same as fine arts (Hembree, 2008). (Figure 11)

In 1922,
William Addison Dwiggins
recognized the difference
between GD and art.

Art

GD
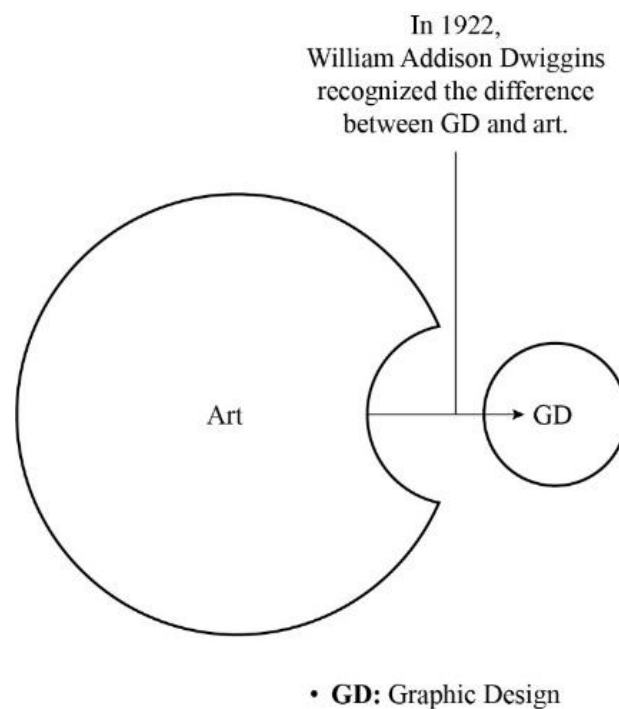
• **GD:** Graphic Design

Figure 11. Origin of Graphic Design

By Xing YANG

Printing practitioners realized that only by clearly distinguishing the essential differences between art and design can graphic design be liberated from printing art and effectively promoting information communication.

In addition to determining the boundaries between art and design, the keyword 'engineering' should be mentioned. Design often swings between art and engineering. Thus, drawing a clear line between design and art and between design and engineering is necessary and worthy of further discussion.

The design derives from the practice of art, architecture, and sculpture (Kathryn & Andy, 2014). Therefore, initial designs focused on decoration. For example, Analysis of Beauty, written and published by William Hogarth in 1753 with the view of fixing the fluctuating ideas of taste, is the earliest design monograph in the West and analyzes lines (Yin & Shao, 2016). In the book The Grammar of Ornament, Owen Jones emphasized that beauty balances vision, reason, and emotion. Simultaneously, Jones emphasized the relationship between function and beauty and believed that a form suitable for its purpose is beautiful (Jones, 2016).

The design also originated from art and began by focusing on beauty, but; differs considerably from art, that offers a focus on function and beauty as combination. Fine art is typically self-serving, personally motivated, and expressive (Hembree, 2008). By contrast, the ultimate goal and highest level of design are to solve the problem of making people's living environment and the relationship between people and creatures and between people and objects harmonious (Yin & Shao, 2016). Moreover, William Morris, an advocate of the Arts and Crafts Movement, proposed two principles of design: design serves the public, and design is a collective, rather than individual, labor (Vial, 2017). Meanwhile, Japanese designer Kenya Hara shared the same beliefs and stated that art is the personal expression to society, and design is not self-expression but the discovery of problems that people encountered. He likewise expressed that such behavior should be solved (Hara, 2017).

Engineering often involves the application of scientific expertise to the design, construction, and operation of machines, highways, bridges, and electrical equipment (Oxford Dictionaries, 2020). As a result, engineering is used to solve object-to-object problems.

In summary, fine art describes individual labor for self-expression; the design is collective labor to solve problems to enhance harmony between people, environments, creatures, and objects; and engineering involves solving problems among objects. (Figure 12)
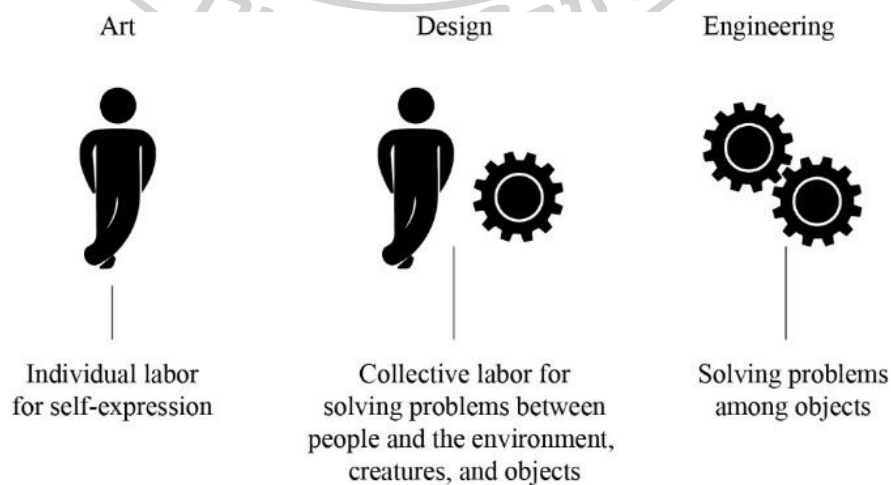
Figure 12. Differences between Art, Design, and Engineering

By Xing YANG

2.1.1.2 Objective of Graphic Design

Scholars believed that the objective of graphic design is visual communication. Graphic design serves improve society through effective communication, thereby making complicated ideas easy to understand and use (Hembree, 2008). According to Jorge, however, graphic design focuses on the graphic, physical element and ignores other important aspects of the profession—the main goal is to create meaningful communications, not graphic types (Jorge, 2004). (Figure 13)
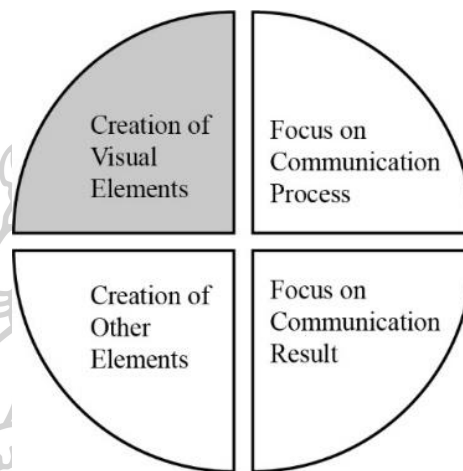
Figure 13. Objective of Graphic Design

By Xing YANG

2.1.2 From Graphic Design to Visual Communication Design

2.1.2.1 Context and Origin of Visual Communication Design

The rapid evolution of technology changed its influence on people's lives. Digital media transformed not only designers' practice but also the role of communication in people's lives (Davis & Hunt, 2017). Graphic design, with graphics, text, and color, is far from meeting ever-changing media and audience needs, and the content of two-dimensional design can no longer cover certain types of new media. Therefore, visual communication design was born (Chen, 2011; E. Ryan & E. Conover, 2004).

The term 'visual communication design' emerged during the World Design Conference in Tokyo, Japan, in 1960. (Chen, 2011; E. Ryan & E. Conover, 2004; Figure 14)

In 1960,
the term VCD emerged,
as GD could not meet
ever-changing media
and audience needs.

GD ⟶ VCD
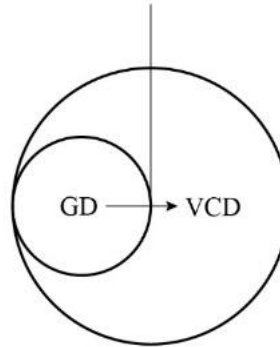
- **GD:** Graphic Design
- **VCD:** Visual Communication Design

Figure 14. Origin of Visual Communication Design

By Xing YANG

2.1.2.2 Objective of Visual Communication Design

Visual communication design, with two basic concepts of visual symbols and communication, is delivering specific ideas through visual forms. It involves conceiving, programming, projecting and realizing visual communication. (Chen, 2011; E. Ryan & E. Conover, 2004; Jorge, 2004; Figure 15)
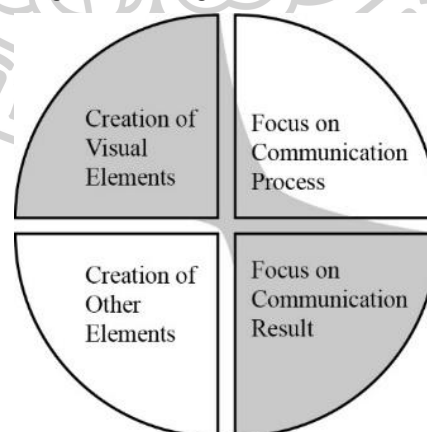
Information Communication

Figure 15. Objective of Visual Communication Design

By Xing YANG

2.1.3 From Visual Communication Design to Information Design

2.1.3.1 Context and Origin of Information Design

Context. The Internet had a transformative influence on society, commerce, and technology in the mid-1990s (Martin & López, 2011). Thus, visual communication design needed to shift fundamentally (Vodeb, 2012). Currently, an expanding practice in the interactive and dynamic visual display for information can be observed. Furthermore, besides visual methods, practitioners pay attention to other ways of communicating information, such as through sounds, sensations, tastes, smells (Chen, 2011; Meirelles, 2013).

Origin (Time). According to comprehensive records in the literature, the term 'information design' was first used in the graphic design community in the 1970s. The academic status of information design was formally established in 1979 and gradually developed into a new discipline in the 1980s.

Many graphic designers started using the word 'information design' in the 1970s, and the term gained traction in the academic world after the publication of the Information Design Journal in 1979. In 1986 and 1991, the International Institute for Information Design (IIID) and the Information Design Association (IDA) were created, respectively. (Chen, 2011; IIID, 2020; Rob, 2008)

During the same period, Edward R. Tufte offered a statistical graphics course and the textbook The Visual Display of Quantitative Information published in 1982. Since then, scholars focusing on statistical charts and quantitative information used the term 'information design'. (Chen, 2011)

In the late 1980s, information design was separated from the subfields of statistics and graphic design and became an independent field. (IDA, 2014; W. Wang, 2017)

Origin (Fields). Information design derives from science and graphic design and experienced four stages of development, namely, scientific expression (illustrations), quantitative expression (statistical graphs), qualitative expression (infographics), and user-centric communication (e.g., London Underground map). (Chen, 2011; W. Wang, 2017)

Information design also originates from science. In 1800, Scottish economist and engineer William Playfair (1793-1823) invented bar, line, and pie charts, which was the first step toward information design (Kathryn & Andy, 2014). In 1982, the concept of data graphics was defined by Edward R. Tufte, which marked the beginning of information design style (R. Tufte, 2001).

The use of computer-supported, interactive, visual representations of abstract data to amplify cognition is referred to as 'data visualization' or 'information visualization' in the scientific community. (Meirelles, 2013)

Information design likewise comes from graphic design. The map created by Napoleon's Russian Campaign in 1861 is one of the most typical infographic samples (W. Wang, 2017). In the 1970s, the term 'information design' was first used among graphic designers (Chen, 2011). In 1979, the design firm Pentagram published a book of their works and grouped their graphic works in a chapter titled 'Information Design' (Rob, 2008).

The graphic design community uses two main terms: 'infographics' and 'information design,' for the visual display of information. The term 'information design' is used to describe a wide range of communication design practices. (Meirelles, 2013). Moreover, it refers to a new way of expressing graphic design and visual communication design creation (W. Wang, 2017).

To summarize, the origin of information design is shown in Figure 16.
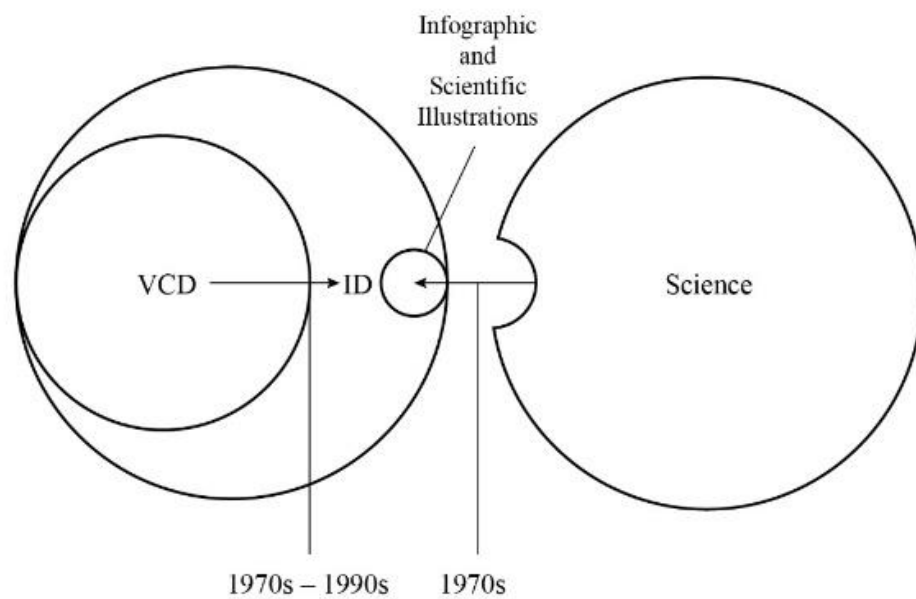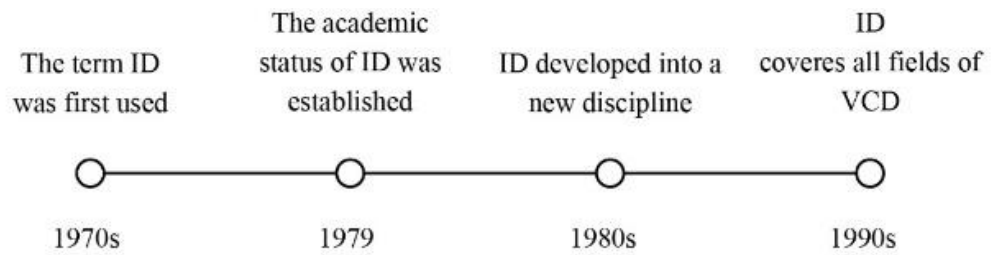
- **GD:** Graphic Design   • **VCD:** Visual Communication Design   • **ID:** Information Design

Figure 16. Origin of Information Design

By Xing YANG

2.1.3.2 Objective of Information Design

Clear communication with the complex world across a broad range of media is essential (O'Grady, 2008). The ultimate goal of information design is to record information, convey meaning, facilitate discovery, and support perceptual inferences (Braun, 2017; Chen, 2011; Meirelles, 2013). Information design, according to Pettersson Rune, can be described as 'satisfying the information needs of the intended receivers.' Analyzing, preparing, presenting, and comprehending a message are all aspects of information design (Rune, 2002).

Thus, information design's objective is the same as graphic design and visual communication design, that is, information communication. The difference between the three domains is that graphic design focuses on creating visual elements, visual communication design emphasizes the creation of visual elements and the result of communication, and information design highlights the creation of not only visual elements but also those from the other four senses. Information design focuses on communication but emphasizes not only the result but also the process and user experience. (Figure 17)

Figure 17. Objective of Information Design
By Xing YANG
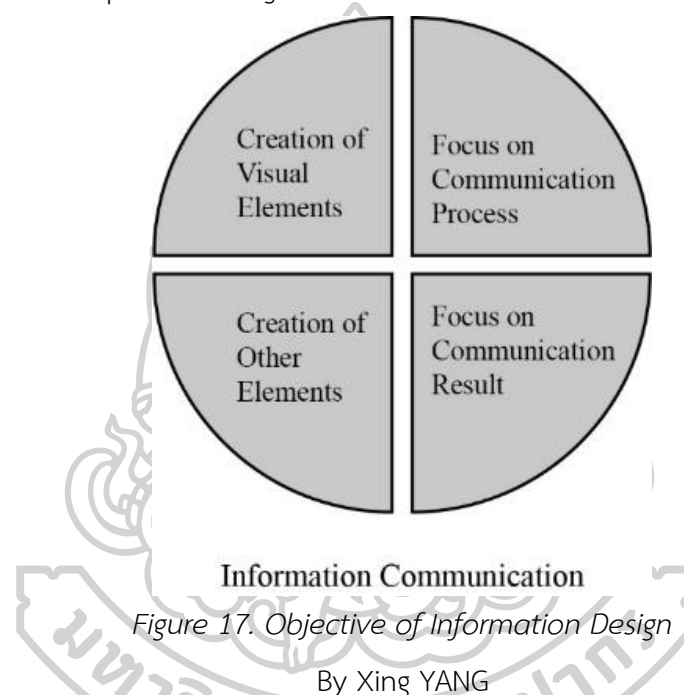
2.1.3.3 Object of Information Design

Information is the object of information design. (Rob, 2008; Rune, 2002)

For example, Edward R. Tufte provided a prescriptive definition based on aesthetics and function when referring to visualizations, as graphical displays should accomplish several things, that is, show data, avoid distorting the message that the data want to convey, and show the data at various levels of detail, from a high-level summary to a fine-grained structure. (Braun, 2017)

Information. As facts or details that tell a story about a circumstance, individual, or event are the object of information design. (Longman Dictionary, 2014)

The word 'information' comes from the Latin noun 'information', which means 'conception' or 'idea'. (Rune, 2002). Information is defined in information theory as an ordered sequence of alphabetic symbols, such as an input X and an output Y, that answers the question, 'What is an entity?' (B. Wicker & Kim, 2003; MerriamWebster, 2020)

Information, data, and knowledge have a relationship. Understanding the significance of information requires distinguishing between the three principles of information, data, and awareness.

Peter Simlinger suggested that data are bits and bytes and various signals disregarded by intended or unintended receivers. Information manipulates and organizes data to add to the knowledge of the receiver. (Simlinger, 2000)

Also, Russell Ackoff believed that data are symbols. Information is processed in order to make it usable and to answer who, when, where, and when questions. Awareness, on the other hand, is the use of data and information to provide answers to how-to questions. The information does not emerge until the received data, such as a text or picture, are interpreted by the receiver to form ideas or mold the mind. (Ackoff, 1989)

Thus, information, data and knowledge are linked because data is meaningful information that represents values assigned to parameters, and knowledge denotes comprehension of an abstract or concrete definition. (MerriamWebster, 2020)

2.1.3.4 Elements of Information Design

Physical signs and symbols (e.g., pictures, words, colors, and graphic devices, such as lines and shapes) used to convey the subject of a message are known as information design elements. (Davis & Hunt, 2017)

Infographics, for example, are visual displays in which graphics (such as images, icons, charts, and diagrams) are combined with verbal language to express knowledge that would otherwise be difficult to convey. (Meirelles, 2013)

Symbols help make the intangible tangible, where combination of others factor can enhance the perceptive concreteness. Moreover, symbols have meaning only when infused them by people. Meaning exists in people's minds, not in items. A

symbol can only have significant power if the meaning, cause, or belief is clear. Meanwhile, for signs, meaning is established by prior rules (social or cultural conventions). (Flach, 2018)

2.1.3.5 Characteristics of Information Design

Information design involves interdisciplinary research(Chen, 2011). Language, art and aesthetics, content, communication, actions and cognition, business and law, and media production technologies all influence this multidisciplinary, multidimensional, and international sector. (Rune, 2002)

Similarly, Jenn Visocky O'Grady expressed that information design is human-centered and interdisciplinary, intersecting with typography, illustration, communication studies, ergonomics, psychology, sociology, linguistics, computer science, and other fields. (O'Grady, 2008)

An academic or professional background in anthropology, diagramming, architecture, ergonomics, ethnography, human factors, knowledge management, interaction design, law, linguistics, marketing, programming, psychology, analysis, simplification, sociology, software, typography, and usefulness may be required of information designers. (IDA, 2014)

2.1.3.6 Scope of Information Design

Given the interdisciplinary nature of information design, its research scope is broad and dynamic. Scholars reached a necessary consensus on the scope of information design but listed several concepts, making information design seem omnipotent.

Infographics are among possible outputs in the broad information design discipline. Other possible outputs are system designs, such as information systems, wayfinding systems, and statistical data visualizations. (Meirelles, 2013)

The 2017 IIID Award highlighted 15 categories focusing on specific subject areas, such as healthcare, finance, wayfinding, traffic, and public transport, public affairs, emergency/safety, corporate design, and communications, didactics, products and services, editorials, universal design, future concepts, research, sustainability, and student works. (IIID, 2017)

Moreover, the communication category in the iF Industrie Forum Design (iF) Award is divided into ten sections, namely, websites, applications/software, film/video, corporate identity/branding, magazines/press/publishing, campaigns/advertising, annual reports, typography/signages, events, and user interfaces. (iF, 2020)

The IDA website describes information design fields, including advertising, branding, content strategy, copywriting, data journalism, data management, e-learning, e-publishing, exhibition design, information architecture, legal drafting, marketing, logo design, social media, technical writing, user experience, pathfinding, and so on. (IDA, 2014)

Information design is included in every field occupied by scholars. However, the only focus of information design is information communication. Therefore, the information design research field is broad, but its focus is only on information communication. (Figure 18)

Advertising	Emergency
Branding	Didactics
Content Strategy	Products
Copywriting	Services
Data Journalism	Editorial
Data Management	Universal Design
E-learning	Future Concepts
E-publishing	Research
Exhibition Design	Sustainability
Information Architecture	Data Visualization
Legal Drafting	Document Design
Marketing	Interaction Design
Sign Design	Animation
Social Media	Websites
Technical Writing	Apps / Software
User Experience	Film / Video
Wayfinding	Corporate Identity
Healthcare	Magazine / Press / Publishing
Financial	Campaigns / Advertising
Traffic and Public Transport	Annual Reports
Social Affairs	User Interfaces
……	……

Given the interdisciplinary nature of information design, its scope is wide, but its focus is only on information communication.

Figure 18. Scope of Information Design

By Xing YANG

Alibaba's future hotel project is a typical case. It uses space and products as platforms to provide well-experienced and systematic interactions, experiences,

and services. At the same time, industry-academia-research and industrial chain integration are achieved, and data is used as a link to achieve multi-disciplinary mixed team cooperation. It does not mean the whole process is information design, but different designs cooperation. In this case, the role of information design is a mediator to link different fields.

On December 18, 2018, Alibaba's future hotel began testing operations. Alibaba Group developed and operates the FlyZoo Hotel, which is located next to Hangzhou Alibaba Baxi Creek Park. The difference between FlyZoo Hotel and conventional hotels is that the whole operation, from check-in to check-out, can be completed using a cell phone, and the waiters are robots.

Alibaba Cloud provides the big data underlying services for FlyZoo Hotel, and the Taobao technical team provides the hotel's complete digital operation platform, AI intelligent service hub, and intelligent scene system development. AI Labs provides the latest design of intelligent robots. The DingTalk team supports the construction of the hotel's data operating platform. As the overall business leader, Fliggy coordinated all parties' ecological resources within Ali and jointly designed of the entire industry chain's experience process.

Customers enter the FlyZoo Hotel's lobby, and the check-in machine is on the left side of the lobby. When customers check-in, they only need to put their ID at the verification port, and the kiosk will start face recognition. After successful authentication, the phone will receive a confirmation code. Enter the confirmation code into the screen and click the confirmation button to complete the check-in.

Furthermore, The FlyZoo Hotel is the world's first hotel to offer a full range of facial recognition services. There are face recognition technology applications throughout the staying experience, including elevators, rooms, restaurants, gyms, bars, and many other scenarios. There is no need to press a button when entering the elevator, and the elevator will be sent to the corresponding floor through facial data. There was an electronic eye surrounded by blue lights on the room's door about the same height as the human face. After looking at each other, the door opened with notice sound. When entered, customers

can control room temperature, lighting, curtains, TV, and other indoor equipment through TmallGenie as the housekeeper.

Other services where in the restaurant, guests are served by robot waiters. At the performance bar, robotic bartenders can make a variety of different alcohols and coffees. Check out can be completed in the APP, without payment at site, Alipay will deduct after leaving the hotel.

2.1.4 Research Gap in Information Design

Although there is no accurate definition of information design, some scholars believe that information design is data visualization. In contrast, others consider it the communication of messages in any form; even numerous scholars argue it is unnecessary to define information design.

This study decodes the origin, objective, object, elements, characteristics, and scope of information design by analyzing the literature. To clarify the identity of information design, this study provides the following conclusions:

Origin: Along with the evolution of human society, information design practices have existed for a long time. However, as a concept that emerged in the 1970s, it was not until the 1980s that information design was distinguished from science and graphic design and became an independent discipline. Information design now encompasses all study and practice fields of graphic design and visual communication, and it continues to grow after decades of growth.

Objective: the objective of information design is information communication, covering the creation of visual elements and the entire communication process. (Figure 19)

Origin of ID

Objective shift in GD, VCD and ID

- **GD:** Graphic Design • **VCD:** Visual Communication Design • **ID:** Information Design
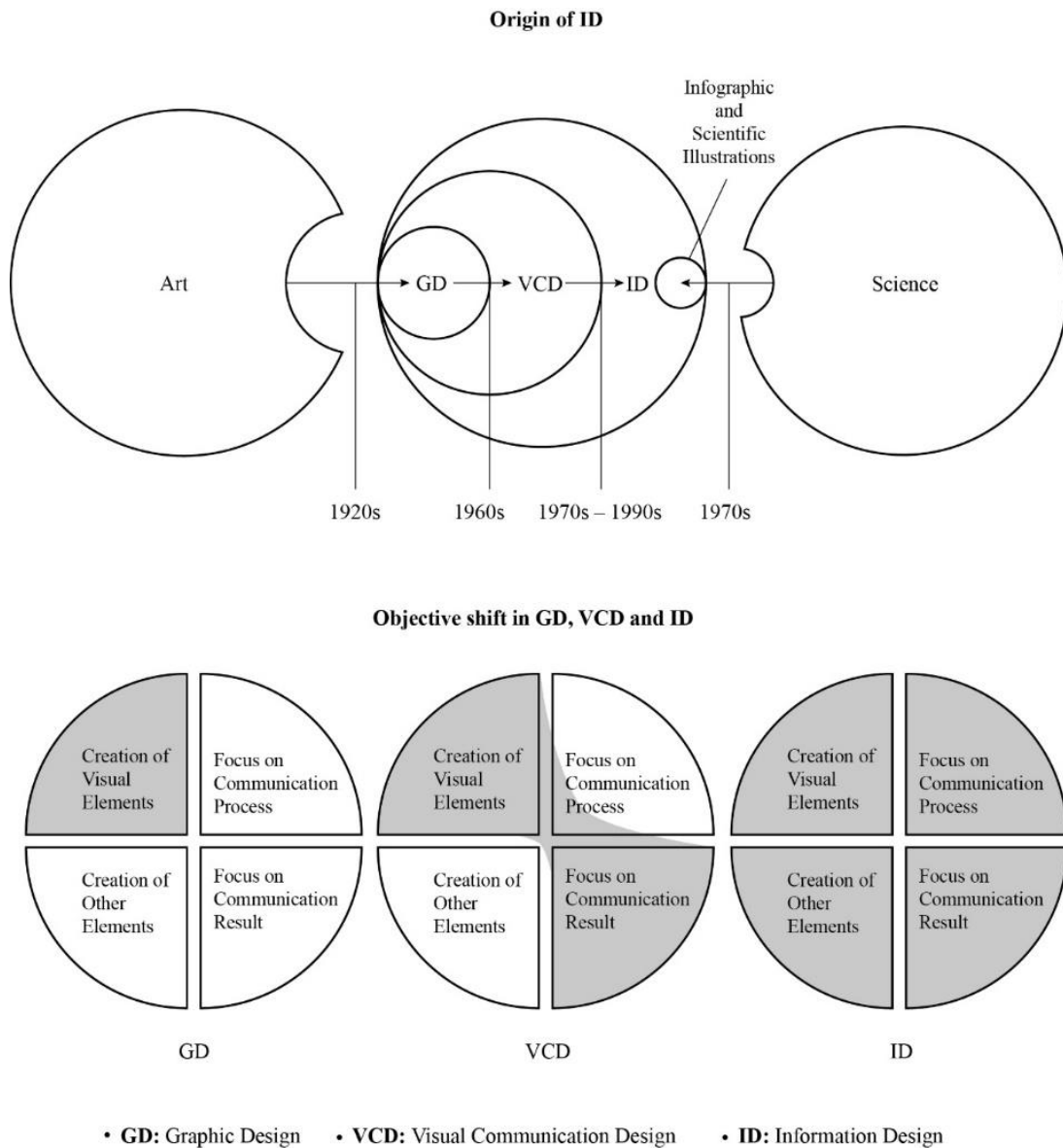
Figure 19. Origin and Objective Shift in Graphic Design, Visual Communication Design, and Information Design

By Xing YANG

Design object: information is the object of information design.

Design elements: the design elements of information design are signs and symbols (e.g., pictures, words, colors, and graphic devices such as lines and shapes).

Characteristics: information design is an interdisciplinary field.

Scope: The scope of information design is broad, but its focus is only on information communication.

However, a complete description of information design aims only to answer what is information design but also to answer what is not information design. This section answers what information design is, but there is almost no answer in the literature about the relationship between information design and other designs or even other disciplines, and further research is needed.

2.2 Information Design Research in China

The research on China's information design is generally synchronized with the world and presents specific characteristics.

2.2.1 Status of Information Design Research in China

In China, some scholars regard information design as a new form of expression for graphic design development and use this as a perspective to examine topics related to information design. For example, the paper of *Study on the Value Turn of Information Visualization Design from a Historical Perspective*, analyses the development from graphic design to information design (W. Wang, 2017); the paper of *From Graphic Design to Information Design, Social Needs Guides the Directs of Design Development* (Chen, 2011) is a similar sample.

Some scholars regarded the currently popular form of information design as the research object and applied information design as the guide to study and solve the current specific design problems. For instance, *Research on Human-Computer Interface Interaction Design Based on Product Usability* (Y. Liu, 2008), and *Application and Expression of Interactive Guide System in Art Museum* (S. Li, 2019).

Simultaneously, some design elements of information design were studied in research, such as the different Chinese fonts reading efficiency, human-machine interface color application preferences. In 2017 and 2019, the author published two papers related to these, respectively. One is, *Is Ming Typeface more Beneficial to Reading than Hei Typeface? -Study on Reading Efficiency of Chinese Serif Fonts and Sans-serif Fonts in Print Environment* (Yang, 2017); another one is *The Color Scheme Applied to the Existing Third-party Mobile Payment Applications* (Yang, 2019).

Besides, the social user experience design department of Tencent, known as ISUX, responsible for the experience, service, and creative design of Tencent's social platforms, social applications, and social entertainment products. 'It iS Ultra

eXperience' is their design belief and is committed to promoting the expansion of the design industry value and influence.

The ISUX team regularly publishes design trend reports. The latest report, *ISUX Design Trend Report*, examined the changes in technology, social culture, and user experience in the past one or two years, from five perspectives of the key users, media (devices and applications), the interactive behavior, information, and scenes, explored the future trend of user experience design, hoping to inspire. The report's conclusion answers how to do experience design, but it does not answer what user experience design is. The report is more like a trend report on visual and design methods. (ISUX, 2020)

Besides, Fan Ling, Tezign Design Artificial Intelligence Laboratory of Tongji University, wrote the design artificial intelligence annual reports every year since 2017, which gathers research, cases, and opinions on artificial intelligence in design assembled and publishes in 2019. The book explores how machine intelligence will release human creativity and capture the possibility of generalized design and generalized artificial intelligence. The research creatively proposed the 'brain-computer ratio' and discussed the re-division of labor between humans and machines in design.

Fan's study avoids the issue of ambiguous design classification by looking at the overall design pattern in the age of artificial intelligence from a macro perspective (Fan, 2019). The lack of new design classification is one of the main problems facing the design discipline. Also, this study regards global trends as a whole without further distinguishing localization characteristics.

2.2.2 Research Gap in Information Design in China

The apparent problems in information design are that the confusion of concepts and the ambiguity between different concepts make the practitioners confused. In the information design industry, practitioners' skill requirements are often not unified, leading to anxiety among future practitioners. In the information design research process, researchers are more willing to study specific design methods than discipline research and teaching systems research from a philosophical level.

Most of the current research on information design is all about design cases rather than on information design practitioners.

Although some researchers focus on information design practitioners, they do not study practitioners' training systems, design operation mode, and research focus, but allow practitioners to interpret the cases.

The people's knowledge background, working methods, and research focus are decisive information design factors. Therefore, complete information design research should focus not only on the objects but also on the design subjects.

Finally, the research on design trend, in China without further distinguishing localization characteristics. (Figure 20)
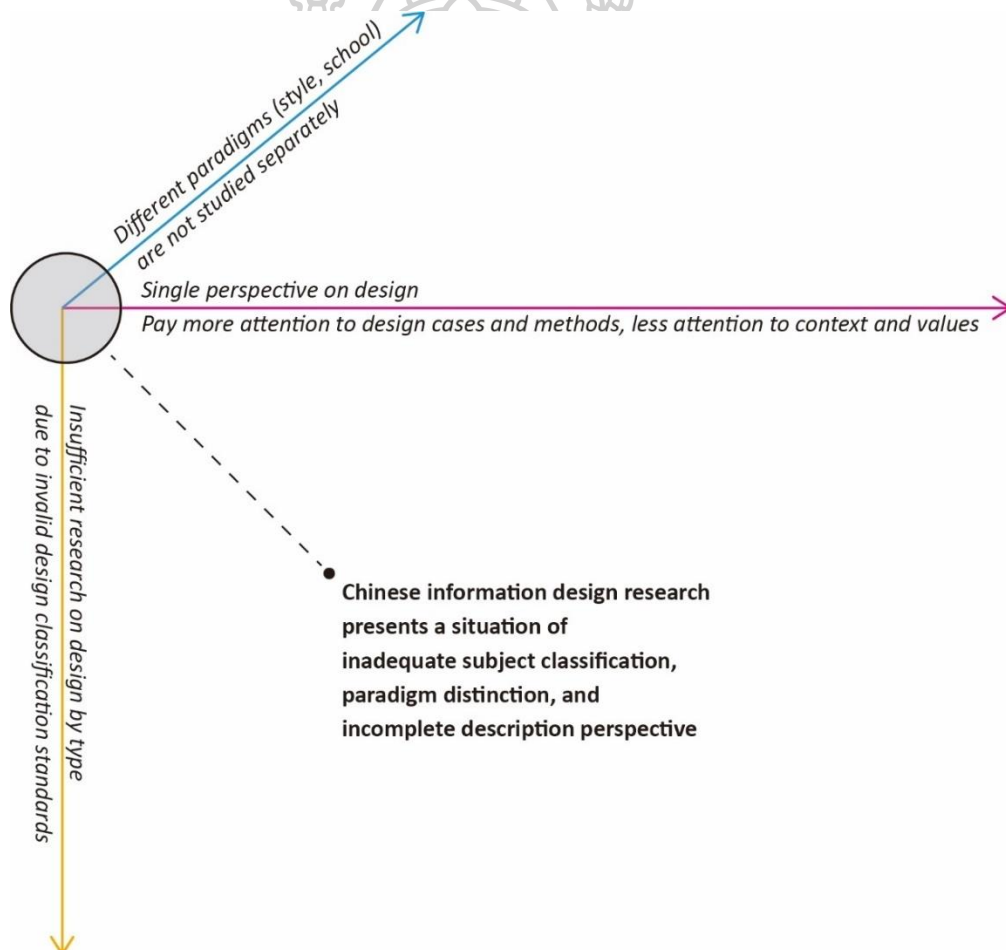
Figure 20. Research Gap in Information Design in China

By Xing YANG

2.3 Theoretical Framework

Design stepped out of art and gradually became an independent discipline. Design research inherited the art research genes, and design history research was also born out of art history research. As a science with design history as the research object, like natural science, it should follow the basic concepts and scientific research laws. Therefore, this research defines the theoretical framework from three perspectives, art history research perspective, design history research perspective, and science history research perspective.

2.3.1 Art History Research Perspective

The study of art history has progressed from the study of artists to the study of artwork to the study of the relationship between art and its context.

Western art history researchers believe that Europe only required art history research until around 1400. To meet the needs of compilation and education, scholars started to consciously compile the artist's biography chronology. (Lv, 2003)

Due to an increasing interest in archaeology and cultural artifacts in Germany in the second half of the 18th century, the study of art history gradually became the subject of what we see today. Western scholars call Johann Joachim Winckelmann of Germany the father of modern art history because he first used the term 'art history' as the title of a work published in 1764. Winckelmann emphasizes the experience and understanding of the research object. He believes that an era's art is the outcome of the 'big culture' of the time. Therefore, to understand the art of an era, we must study all aspects of this era's culture. What he wanted to write is the history of art, not the history of artists. (Lv, 2003)

Since the end of the 19th century, there had been several genres leading the way in art history. Some schools were keen on the specific grasp of artworks. Other schools focus on the influence of artistic style and historical evolution. (Lv, 2003)

2.3.2 Design History Research Perspective

The study of design history was born out of the study of art history, and it also pays attention to all aspects of the relationship between design as well as social growth. In the meantime, design research is more inclined to type research. Scholars

are accustomed to dividing the overall design into different categories for in-depth observation.

Late 18th century, Nikolaus Pevsner first proposed the term 'modern design' for the era of the global shifted idea on art and design (Pevsner & Weston, 2011), and the theory of modern design began to appear only after the 19th century.

A century later, after the Second World War, Pevsner continued to focus on design history studies. He called for the division of study design history into subjects such as the history of fashion design, the history of graphic design, and the history of furniture design. (Pevsner & Weston, 2011)

Design history originated as an independent academic discipline in the course of breaking away from art history at the 1977 conference of the Association of Art Historians (Woodham, 2001). In this way, the history of design is in sharp contrast with the history of art.

It can be said that today's design history research either inherits Pevsner or criticizes Pevsner, but it is impossible to overlook Pevsner. His research adopts 'historicism' research methods. He regarded art and design as a manifestation of the 'spirit of the times' and 'national spirit', and regarded an art style as a symbol of an era or nation, and tried to grasp the absolute spirit through the superficial phenomenon. As a pioneer in the study of design history, Pevsner has repeatedly shown us that the study of design history should not only be limited to the exploration of the history of design itself but should also focus on the connection of history of design and art, science and technology, social history, and cultural history. (Huang & Chen, 2013)

Also, Nikolaus Pevsner opened a new way of studying architecture with a typological method. Small cuts and deep excavations are used in this research process. Nonetheless, in design history analysis, this approach is becoming increasingly important. (Huang & Chen, 2013)

2.3.3 Science History Research Perspective

The comprehensiveness and intersectionality of design disciplines determine the complexity of design history writing (F. Zhang, 2013). The related concepts of general science history research can help make up for the inadequacies

of design history research. The research of design history is almost synchronized with the research of art history, focusing on the relationship between design and society in all aspects and advocating classification to research. Nevertheless, it did not consider the relationship between various design styles. and schools in the same era. In the study of the history of science, Thomas S. Kuhn's paradigm theory and its later theoretical correction researchers are providing a new theoretical perspective for the purpose of design history research.

In the field of design history study, researchers often use the words of doctrine, type, and school to classify different art and design phenomenon. Understanding from the perspective of Thomas S. Kuhn, a doctrine is equivalent to a paradigm. In this way, the change of design can also be seen as a revolutionary development process. (Fallan, 2010)

The study of art history inspired Thomas S. Kuhn's theory. Thomas S. Kuhn himself admitted that Ernst H. Gombrich's theory inspired him (Kuhn, 2012).

Indeed, literary history researchers, music history researchers, art history researchers, political development history researchers, and other historians of human activities have long described their subjects in the same way. They divide periods by terms of style, taste, and structure.

2.3.3.1 Thomas S. Kuhn's Paradigm Theory

The Paradigm Shift Theory comes from the study of scientific history. Science historians and philosophers have been thinking about whether scientific development is continuously evolving evolutionarily, and is there a general law affecting the development of science? Among them, Thomas S. Kuhn's Paradigm Shift Theory opens a new perspective for studying scientific history. (Fallan, 2010)

In his book *The Structure of Scientific Revolutions*, Thomas S. Kuhn argued against the increasing and evolutionary nature of scientific development, and he suggested two main concepts (paradigm and revolution) to clarify the nature of scientific development. The term "revolution" refers to the establishment of a new paradigm. Paradigm and Paradigm Shift became common due to Thomas S. Kuhn's theory. He believes that science's development is a revolutionary process, and a paradigm replaces the previous paradigm. Each paradigm will undergo a process of

gradual formation, stability, and broad dissemination and acceptance of problems and challenges until another paradigm replaces it. (Kuhn, 2012)

For example, Nicolaus Copernicus's Heliocentric Theory overturned the Geocentric Theory's long-standing dominance and realized the Astronomy's fundamental transformation; The invention of steam engines ushered in the 18th century's industrial revolution, which decisive proofs of Thomas S. Kuhn's theory.

2.3.3.2 Paul K. Feyerabend's View on Paradigm Theory

Besides, Thomas S. Kuhn's theory has always been subject to numerous questions, especially whether his theory is still valid outside the natural sciences and has not reached consensus in the academia. Paul K. Feyerabend is a necessary revision of Thomas S. Kuhn's theory. Multiple paradigms could coexist, he suggested. Researchers, he believes, must embrace the current state of multi-paradigm coexistence. (Fallan, 2010)

2.3.3.3 Margaret Masterman's View on Paradigm Theory

Thomas S. Kuhn (2012) did not explicitly define the concept of paradigm in *The Structure of Scientific Revolutions*. British female scholar Margaret Masterman worked in Thomas S. Kuhn's book to find 22 different paradigm definitions. She categorized these definitions and, finally, determined three meanings of paradigm: the philosophical paradigm; artificial paradigm; a scientific habit, an academic tradition, a specific scientific achievement, which is a sociological paradigm. (Masterman, 1970)

2.3.4 Overall Theoretical Framework

Accordingly, this study adopts paradigm theories as a theoretical basis. At the same time, taking art history research perspective, this study focuses on the design cases and the relationship between design cases and their contexts. Furthermore, this study also takes the design history research perspectives and focuses only on China's information design history in 2009–2019. (Figure 21)
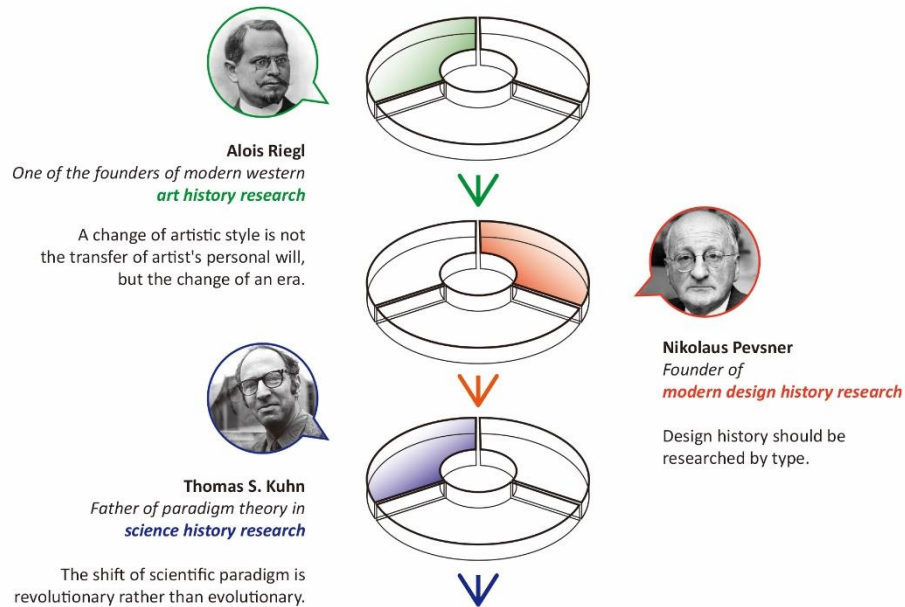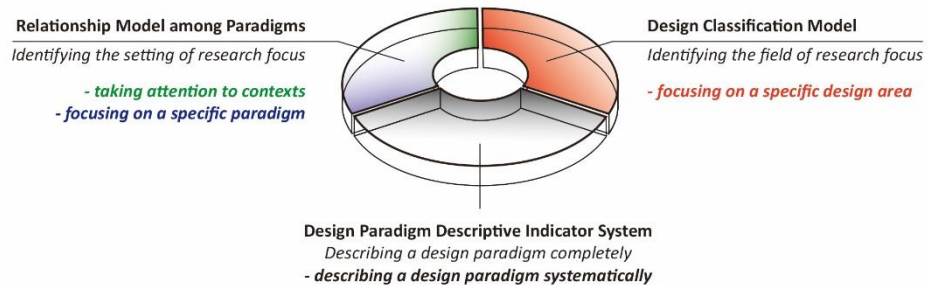
Figure 21. Overall Theoretical Framework

By Xing YANG

2.3.5 Research Gap in Theoretical Framework

After Paul K. Feyerabend's correction, Thomas S. Kuhn's paradigm theory thoroughly explains scientific development, but it still does not fully explain what a paradigm is. After Margaret Masterman's research, the final paradigm is interpreted into three meanings, but the three paradigms' relationship is not clear.

Regarding the study of paradigm theory, it is still necessary to merge and understand the main theories and explain what a paradigm is and how to describe a paradigm.

A paradigm descriptive indicator system that closely fits the design discipline is needed for design paradigm research.

2.4 Conclusion of Literature Review

Information design can be answered from a critical literature analysis, but there is almost no answer in the literature about the relationship between information design and other designs or even other disciplines. It is necessary to answer this question.

Most of the current research on information design is all about design cases rather than focusing on the information design practitioners. Although some researchers focus on information design practitioners' they do not study practitioners, training systems, design operation mode, and research focus, but allow practitioners to interpret cases. A comprehensive study on information design is needed.

Regarding the study of paradigm theory, it is still necessary to merge and understand the main theories and explain what a paradigm is and how to describe a paradigm. A paradigm descriptive indicator system that closely fits the design discipline is needed for design paradigm research.

Accordingly, this study applies paradigm theories as a theoretical basis, taking both art history research and design history research perspectives, insight in design contexts, and only focusing on information design rather than overall design.

When decoding the paradigm of information design in China (2009–2019), this study takes the Chinese comprehensive design academic journal *ZHUANGSHI* as the data source.

Questionnaire survey, case study, critical review, historical comparative analysis, theoretical reasoning, and content analysis are all part of this study's mixed qualitative and quantitative research methodology.

Chapter 3: Methodology

The research framework, methodology, procedure, data, and methods are all covered in this chapter. This study sets the research framework according to the research objectives and the research questions mentioned in Chapter 1. The overall research applies a quantitative and qualitative mixing methodology. In the research process, the specific methods include data analysis, case study, theoretical deduction, and historical comparative analysis.

3.1 Research Framework

3.1.1 George Polya's Problem Solving Process

In order to systematically decode the information design paradigm in China (2009-2019), this study applies paradigm theory as the basis of the theoretical framework, which mainly involves the theories of Thomas S. Kuhn, Paul K. Feyerabend, and Margaret Masterman, referencing art and design history research perspectives. As the conclusion in section 2.4, paradigm theory currently does not have a complete theoretical model, especially no paradigm theoretical model for design research.

Furthermore, this study is focused on information design. As mentioned at the end of section 2.1.4, the scope of information design itself is not clear yet. Therefore, this study sets three research objectives, identifying information design, creating design paradigm models, and decoding the paradigm of information design in China (2009–2019), as described in section 1.7.

In solving this systemic problem, this study adopts George Polya's Problem Solving Process as the overall approach to cover the three research objectives and processes.

George Polya wrote the book *How to Solve It* in 1945; he identifies four necessary problem-solving steps (Polya, 2015). Although he is a mathematician, his problem-solving method is also discussed and proposed from how to solve mathematical problems, but his goal is to abstract this method into a general problem-solving law. As he expected, for decades, people have applied his theory to

education, management, society, science, and other fields as a general method of problem-solving.

Polya developed his famous four-step problem-solving process, which is now widely used to help people solve problems:

Step 1: understanding the problem

What does the unknown entail? What information do you have? What is the state of affairs? Is it possible to meet the requirement? Is the situation adequate for determining the unknown? Is it adequate, or is it insufficient? Or is it a waste of time? Or are they contradictory?

Step 2: devising a plan

Determine the connection between the data and the unknown. If an immediate relation cannot be found, you will be forced to consider auxiliary issues. You can finally come up with a response strategy.

Step 3: carrying out the plan

Carry out your plan and double-check each stage. Is it clear to you that the stage is correct? Are you able to demonstrate that it is correct?

Step 4: looking back

Could you verify the outcome? Is it possible to double-check the problem? Is it possible to arrive at a different conclusion? Is it visible at a glance? Is it possible to apply the result or the approach to another problem? (Polya, 2015; Figure 22)
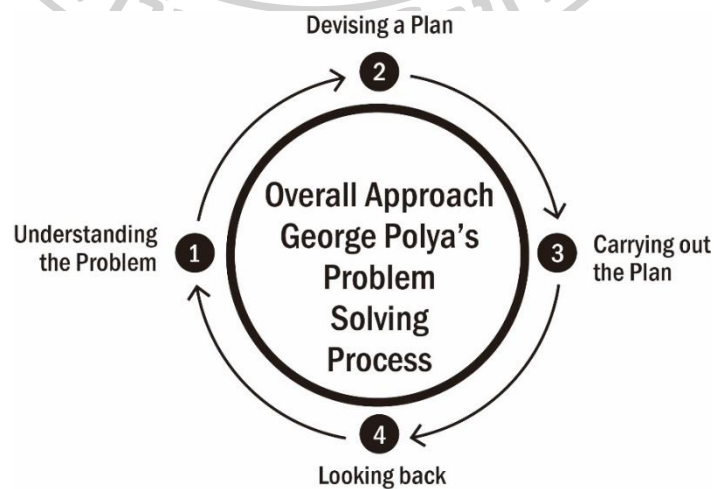
Figure 22. George Polya's Problem Solving Process

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3.1.2 Barney Glaser and Anselm Strauss's Grounded Theory

Decoding the paradigm of information design in China (2009–2019) is a systematic problem, for solving it, this study applied grounded theory as a sub-approach.

In the co-author The Discovery of Grounded Theory, published in 1967, Barney Glaser and Anselm Strauss suggested the grounded theory for the first time. The two founders, their colleagues, and students have made several improvements to this research methodology over the last half-century. (Corbin and Strauss, 2015)

The grounded theory is a qualitative research methodology, not a specialized theory (Corbin and Strauss, 2015). The difference with other approaches is that this approach builds theory from data analysis rather than deducing verifiable hypotheses from existing theories (Charmaz, 2009). Therefore, researchers should choose research samples and data to construct the theory and discover, develop and test the theory from data analysis. In the process of generating theory, researchers also need to draw on other existing theories in the academic world to form a dialogue between research experience, personal knowledge, and previous theory (Corbin and Strauss, 2015).

Grounded theory is a set of structured and adaptable guidelines that enable researchers to collect and interpret data while also allowing them to develop hypotheses based on the data (Charmaz, 2009). The grounded theory's research steps are flexible, and researchers can modify it according to different studies (Charmaz, 2009). However, its basic principles include:

data collection and data analysis are performed simultaneously;

construct analytical codes and categories from the data;

research is a cyclic process;

Each round of data collection, coding, and interpretation contributes to the overall theoretical framework;

sampling for theoretical construction (Charmaz, 2009).

The steps of grounded theory can be summarized in four steps, according to these guidelines: sampling, coding, analysis, and theory construction. The four

phases are nonlinear relationships that are part of a cyclic study mechanism that is constantly deepening. (Figure 23)
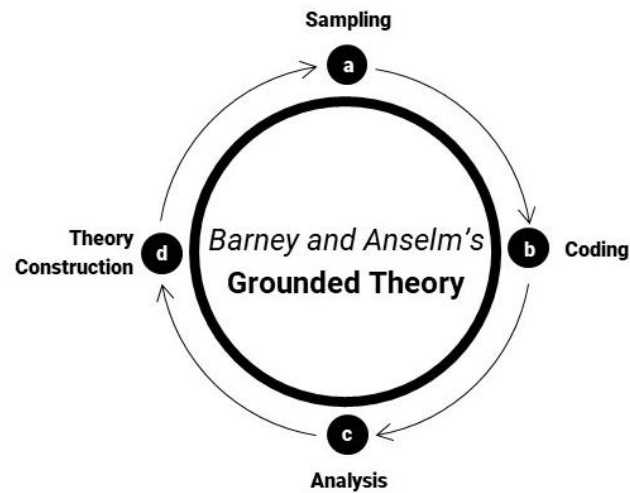
Figure 23. The Framework of Grounded Theory

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Sampling should be based on research questions and continuously screened, removed, and supplemented. This study applies the identity of information design, the design classification model, and the relationship model among paradigms to screen the right samples from *ZHUANGSHI*.

In the coding process, data coding units and categories need to be continuously formed by collecting and reading data. In the formation process, existing related theories can be combined, but it is impossible to pre-set the coding categories. The coding process is also completed by multiple rounds, and categories are continuously formed. This study's data is encoded using the design paradigm descriptive indicator system.

The process of evaluating categories and data in order to obtain the results required for theory construction is known as analysis. A theory construction combines the complete research process and data analysis results to abstract the conclusion into theories. While, grounded theory is quantitative research in nature, but since the 1990s, it has been accepted by qualitative researchers for its flexibility and rationality (Charmaz, 2009, p11).

The source of the grounded theory can be diverse, and it can be the data collected by researchers on the ground or the data collected by the Internet; it can be the data of other researchers, or it can be published materials; it can be news materials, and it can be a literary a body of work. (Corbin and Strauss, 2015)

3.1.3 Overall Research Framework

This study adopts the problem-solving process as an overall approach, including four steps, named understanding the problem, devising a plan, carrying out the plan, and looking back.

In the first two chapters, understanding the problem has been completed through critical literature analysis, questionnaire survey, and historical comparative studies. This section designs this study's research framework based on the conclusions in Chapter 2 and the research objectives.

This study divided the overall plan into three steps corresponding to three research objectives:

Step 1: to identify information design

This step includes two tasks: to identify information design, this task already completed in section 2.2 by critical review; to create a design classification model to understand the relationships between information design and other designs or even the other disciplines by case study and historical comparative analysis.

Step 2: to create design paradigm models

There are two tasks in this step. One is to create a relationship model among paradigms to understand the relationship among paradigms by theoretical deduction. Another one is to create a design paradigm descriptive indicator system by theoretical deduction as well.

Step 3: to decode the paradigm of information design in China (2009–2019)

This step involving a systematic problem; for solving it, this study applies grounded theory as a sub-approach to explore the data from *ZHUANGSHI*.

This study's data source is the published academic journal content (Chinese Design Academic Journal *ZHUANGSHI*), which can ensure both the cutting-edge content and the accuracy of the data.

Therefore, the research framework is as shown in Figure 24.
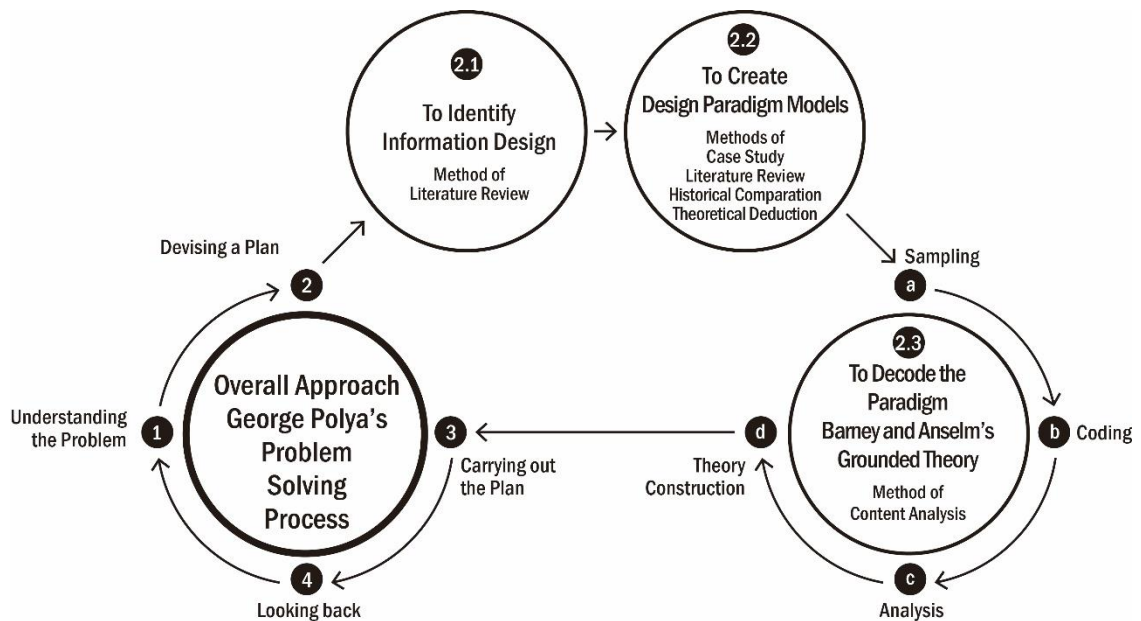
Figure 24. Research Framework

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3.2 Method for Identifying Information Design

For achieving to identify information design, this study applied the critical review method. The whole process reports elaborated within section 2.1.

3.3 Methods for Creating Design Paradigm Models

This study adopts a case study, literature review, historical comparison, and theoretical deduction methods to create design paradigm models, including a design classification model, a relationship model among paradigms, and a design paradigm descriptive indicator system.

3.3.1 For Creating a Design Classification Model

This study created a design classification model to explain further what is not information design, in other words, to answer the relationship between information design and other designs or even other disciplines.

In creating the design classification model, this study applied case study and historical comparative analysis methods, referenced Le Corbusier's objects-types theory and Nikolaus Pevsner's type research theory.

3.3.1.1 Hypothesis on Creating a Design Classification Model

After World War II, Nikolaus Pevsner introduced type research into the history of design and advocated that research design history should be divided into topics such as the history of fashion design, the history of graphic design, and the history of furniture design. (Pevsner & Weston, 2011)

Furthermore, Since Le Corbusier put forward the concept of 'object-types', the design has a classification research method. However, the boundaries between current design objects are blurred. Most of the time, designers from different design disciplines collaborate to realize the functions of different objects, and these objects eventually become complete designs. (Corbusier, 1985)

After that, the design is often divided by object into fashion design, poster design, furniture design, environmental design, etc., but today, service design, sound design, interaction design, or experience design, cannot be divided by physical or designed object. Therefore, the previous classification method has been invalidated, but there is no exact theory on dividing it.

Accordingly, this study proposed the hypothesis that the design classification can be based on design functions. For example, tomatoes can be categorized into red tomatoes, yellow tomatoes, and green tomatoes by their external characteristics. At the same time, tomatoes can be divided into tomato peels, tomato juice, and tomato seeds according to their functions (Figure 25).
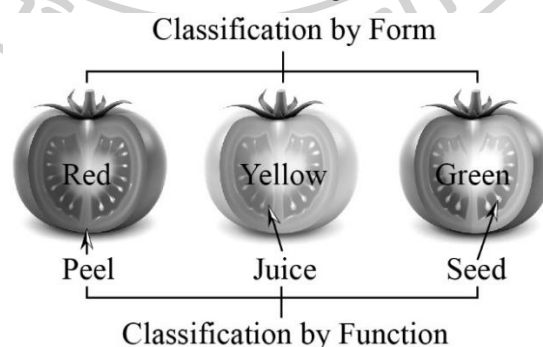
Figure 25. Divided Tomatoes by Functions

By Xing YANG

3.3.1.2 Cases Selection

According to the fourth round of China University Subject Rankings approved by the Ministry of Education of the People's Republic of China, this study selected the subjects offered by China's top 20% universities and colleges in design as cases, categorized the subjects according to design functions, and proposed a design classification model based on the function categories. (CDGDC, 2017)

This research involves a total of 18 Chinese universities and colleges (Table 1), and 109 subjects were collected from websites of 18 Universities (date accessed: 17-02-2020; Table 2). By combining the same subjects with different names, a total of 30 subject cases were got (Table 3).

Table 1. 18 Design Universities and Colleges in China's Top 20%

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Tsinghua University (10003)	China Academy of Art (10355)
Central Academy of Fine Arts (10047)	Tongji University (10247)
Soochow University (10285)	Jiangnan University (10295)
Nanjing University of the Arts (10331)	Zhejiang University (10335)
Hunan University (10532)	Beijing Institute of Fashion Technology (10012)
Communication University of China (10033)	Shanghai Jiao Tong University (10248)
Donghua University (10255)	Jingdezhen Ceramic Institute (10408)
Wuhan University of Technology (10497)	The Guangzhou Academy of Fine Arts (10586)
Sichuan Fine Arts Institute (10655)	Xi'an Academy of Fine Arts (10729)

Table 2. 109 Subjects Collected from 18 Universities

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School Code	Major Name
10003	Textile and Fashion Design; Ceramic Design; Industrial Design; Visual Communication Design; Environmental Art Design; Information Art & Design
10355	Architecture and Environmental Design; Public art Design; Dyeing and Clothing Design; Media and Image Design; Digital Publishing and

	Display Design; Art Design; Visual Communication Design; Product Design; Art and Technology
10047	Visual Communication; Digital Media; Jewelry Design; Fashion Design; Product Design; Vehicle Design
10247	Industrial Design; Environmental Design; Interactive Design; Product Service System Design; Artificial Intelligence and Data Design; Design Strategy and Management; Design History and Theory; Innovative Design and Entrepreneurship; Media and Communication Design
10285	Product Design; Clothing and Apparel Design; Visual Communication Design; Environmental Design; Digital Media Art; Art Design Theory
10295	Integrated Innovation Design; Industrial Design; Visual Communication Design; Environmental Design; Public Design
10331	Design Theory; Visual Communication Design; Environmental Design; Apparel & Fashion Design; Industrial Design
10335	Visual Communication Design; Environmental Design; Industrial Design
10532	Industrial Design; Visual Communication Design; Product Design
10012	Visual Communication Design; Environmental Design; Digital Media; Animation; Clothing and Apparel Design
10033	Game Design; Animation Design; Visual Communication Design; Design Art History; Advertising Design
10248	Industrial Design; Visual Communication; Environmental Design; Garden Design
10255	Fashion Design; Visual Communication Design; Environmental Design; Product Design
10408	Ceramic Art Design; Jewelry Design; Environmental Design; Animation Design; Product Design; Visual Communication Design; Public Design
10497	Exhibition Design; Digital Art Design; Vehicle Design; Animation Design; Environmental Design; Art Design Theory
10586	Environmental Design; Industrial Design; Product Design; Interactive Design; Dyeing and Weaving Art Design; Clothing and Apparel Design; Visual Art Design; Digital Media Art Design; Animation; Art and Technology
10655	Design History and Theory; Visual Communication Design; Digital

	Media Art; Environmental Design; Clothing and Apparel Design; Product Design; Art Design Theory
10729	Art Design Theory; Clothing and Apparel Design; Interior Design; Landscape Design; Landscape Garden; Building; Visual Communication Design; Art and Technology; Product Design

Table 3. 30 Subject Cases

By Xing YANG

Environmental Design	Architecture Design
Public Design	Exhibition Design
Landscape Garden Design	Interior Design
Textile Design	Fashion Design
Dyeing Design	Jeweler Design
Product Design	Vehicle Design
Visual Communication	Animation Design
Information Art & Design	Media and Communication Design
Media and Image Design	Media and Image Design
Digital Media	Digital Publishing and Display Design
Game Design	Advertising Design
Interactive Design	Artificial Intelligence and Data Design
Art and Technology	Product Service System Design
Innovative Design and Entrepreneurship	Design Strategy and Management
Integrated Innovation Design	Design History and Theory

3.3.1.3 Process of Creating the Design Classification Model

This study categorized the 30 cases based on the function categories and suggested a design classification model.

Furthermore, by examining the past of modern design, this study established the leading indicator of overall design progress.

3.3.2 For Creating a Relationship Model among Paradigms

By referencing and analyzing Thomas S. Kuhn's paradigm theory and Paul K. Feyerabend's view on the paradigm change, this study developed a relationship model among paradigms to explain paradigm relationships.

3.3.3 For Creating the Design Paradigm Descriptive Indicator System

By referencing and evaluating Thomas S. Kuhn's paradigm theory and Margaret Masterman's perspective on the paradigm change, this study developed the design paradigm descriptive indicator system.

3.4 Method for Decoding the Paradigm of Information Design in China (2009–2019)

This study used design paradigm models as methods, grounded theory as the analysis methodology, and the *ZHUANGSHI* (2009–2019) as the data source to decode the emerging paradigm of Chinese information design (2009–2019).

The grounded theory method was used in this research, which consisted of four steps: sampling, coding, interpretation, and theory building. The four phases have a nonlinear relationship and require a cyclic study mechanism that is constantly deepening (Charmaz, 2009).

3.4.1 Data Source

This research drew samples from all of *ZHUANGSHI*'s published articles from January 2009 to May 2019, totaling 6,325 articles in 125 issues (Table 4).

Table 4. The number of articles published in ZHUANGSHI from 01.2009 to 05.2019
By Xing YANG

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	50	51	53	51	55	49	61	53	48	47	56	47
2010	44	50	47	55	55	51	54	52	58	56	58	59
2011	64	62	54	55	57	57	64	72	57	56	48	55
2012	57	53	55	52	58	53	56	71	50	55	51	74
2013	53	54	56	51	53	58	57	52	56	53	52	46
2014	57	55	55	50	51	44	54	99	47	49	53	53
2015	46	53	39	52	53	53	50	63	52	34	54	38
2016	70	54	51	49	52	49	57	50	49	47	50	52
2017	47	49	50	51	30	45	49	46	45	55	49	44
2018	44	44	46	40	40	40	39	36	37	34	39	38
2019	37	42	36	39	37							

Total: 6,325 articles, 125 issues

3.4.2 Sample Population

This study used four principles to select the sample population:

(1) To compile a list of articles about information design.

The design classification model was used to determine which articles were relevant to information design and which were not.

(2) To gather design-related articles rather than art and engineering-related articles.

By analyzing the literature, this study was able to distinguish between art, design, and engineering.

(3) To compile papers published after 2009 that address the related topics.

This principle was applied in this study based on the content of the articles.

(4) Articles about the printing paradigm should be removed

This research claims that paradigms coexist, based on the paradigm relationship model. Although the evolving paradigm of Chinese information design is unknown at the time of this study, the printing paradigm is not. In order to retain a consistent emphasis in the data gathered, papers with a subject relevant to the printing paradigm should be removed.

A sample population of 295 was obtained. (Table 5)

Table 5. Sample Population

By Xing YANG

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2009	1	0	0	1	1	0	1	0	1	1	2	4	12
2010	6	1	0	0	1	5	1	7	3	2	1	0	27
2011	3	4	3	3	1	3	2	1	1	4	0	0	25
2012	2	2	2	1	1	1	0	2	3	4	4	3	25
2013	9	4	1	3	5	4	1	1	1	1	2	1	33
2014	3	8	2	2	2	6	2	3	0	2	2	4	36
2015	6	3	2	1	2	4	1	3	0	0	0	1	23
2016	2	3	3	2	5	4	4	5	3	3	7	2	43
2017	6	5	1	6	2	2	1	0	1	0	1	4	29

2018	7	1	3	0	0	3	3	0	1	4	0	1	23
2019	8	3	2	2	4								19
Total					295 articles								

3.4.3 Sample Size

For confirming the sample size, this study followed three principles:

(1) Based on the minimum sample year (2009), 12 samples were screened each year to make the annual sample size equal.

(2) For news articles, this study selected summaries and interviews and deleted newsletter articles.

(3) For research articles, this study selected theoretical ones and deleted practical ones, excluding case studies from well-known Chinese enterprises.

A sample size of 132 was obtained, with a sampling ratio of 45%.
The study compiled the final 132 samples into the final sample list. (See Appendix 1)

3.4.4 Coding

The authors' opinions inferred from the 132 sample articles were encoded as study data to answer five questions based on the design paradigm descriptive indicator system's five indicators.

3.4.4.1 To Encode the Data on Value Orientation

Opinions are used to address how information professionals understand design on a philosophical level under the 'design values' indicator.

This study detected the opinions on design values held by the authors and encoded them in the 'Value Orientation' category through multiple rounds of exploring sample articles. This study encoded the opinions from two dimensions: 'Artifact, Business, Human, Relationship' and 'Immediate Benefits, Long-term Benefits'. Besides, some sub-categories were created. All the meanings of sub-categories are listed in Table 6.

Table 6. Coding Table of Value Orientation

By Xing YANG

	Immediate Benefits Group (These design values pay	Long-term Benefits Group (These design values

	more attention to the present and the near future.)	pay more attention to the future.)
Artifact Group *(These design values pay more attention to design objects.)*	**Decoration Oriented** *(The task of design is to style artifacts. Sample: 44)* **Beauty Oriented** *(The task of design is to make artifacts Beautiful. Samples: 10, 12, 36, 39, 41, 48, 52, 57, 86, 92, 102, 117, 129)* **Function Oriented** *(The task of design is to ensure availability. Samples: 14, 17, 27, 36, 47, 53, 57, 92, 102)*	**Culture Oriented** *(The task of design is to inherit Culture for future. Samples: 24, 26, 30, 41, 48, 89, 91, 95, 111, 116, 121, 122, 123, 124, 125)*
Business Oriented Group *(These design values pay more attention to whether the design benefits marketing.)*	**Business Oriented** *(The task of design is to promote sales. Samples: 4, 13, 18, 22, 23, 25, 27, 34, 38, 51, 53, 54, 59, 61, 65, 66, 68, 70, 75, 79, 87, 91, 92, 96, 98, 105, 106, 112, 116, 132)*	
Human Group *(These design values pay more attention to people.)*	**Client Oriented** *(The task of design is to satisfy the client. Sample: 5)* **Customer Oriented** *(The task of design is to satisfy the customer. Sample: 55)*	**Human Oriented** *(The task of design is to meet human needs. Samples: 24, 33, 62, 82, 104, 110)*

	User Oriented	
	(The task of design is to meet users' needs. Samples: 1, 11, 25, 31, 32, 35, 42, 51, 60, 64, 75, 88, 114, 123, 126, 129)	
	Public Oriented	
	(The task of design is to meet the public's needs. Samples: 30, 63)	
Relationship Group *(These design values pay more attention to the relationships between human and others.)*	**Service Oriented** *(The task of design is to supply service rather than artifacts. Samples: 51, 63, 73, 76, 80, 83, 85, 103, 107, 108, 122, 125)*	**Problem Oriented** *(The task of design is to solve problems. Samples: 2, 9, 14, 15, 16, 33, 37, 40, 54, 58, 61, 82, 92, 94, 99, 103, 104, 107, 108, 109, 118, 119, 121, 124, 129)*
	Society Oriented *(The task of design is to service the social relationship. Samples: 40, 41, 51, 58, 59, 61, 62, 66, 67, 69, 71, 76, 82, 83, 87, 95, 99, 101, 107, 108, 109, 111, 114, 116, 119, 121, 125)*	**Innovation Oriented** *(Design is mean of innovation. Samples: 1, 7, 8, 59, 61, 62, 66, 67, 69, 70, 71, 77, 82, 97, 98, 99, 101, 103, 107, 109, 118, 121, 125, 129, 132)*
	Mediator Oriented *(The task of design is to supply a platform for balancing relationships. Samples: 6, 13, 15, 29, 45, 49, 51, 63, 74, 76, 78, 80, 82, 83, 84, 92, 103, 107, 108, 114, 115, 121, 126)*	**System Oriented** *(The task of design is to supply a system for balancing relationships for present and future. Samples: 51, 62, 76, 82, 99, 109, 119, 125)* **Sustainable Orientation**

	(The task of design is to help sustainable development. Samples: 69, 76, 82, 95, 99, 109, 121, 123, 124, 125) **Future Oriented** *(The task of design is to meet longtime needs. Samples: 41, 82, 95, 109)*

According to the coding table above, this study encoded the author's opinions on value orientation detected from each sample to get the data under the value orientation indicator. (Table 7)

Table 7. Value Orientation Reflected from Sample Articles

By Xing YANG

Sample	Value Orientation
1	Innovation Oriented; User Oriented
2	Problem Oriented
3	Not Mentioned
4	Business Oriented
5	Client Oriented
6	Mediator Oriented
7	Innovation Oriented
8	Innovation Oriented
9	Problem Oriented
10	Beauty Oriented
11	User Oriented
12	Beauty Oriented
13	Mediator Oriented; Business Oriented
14	Problem Oriented; Function Oriented
15	Problem Oriented; Mediator Oriented
16	Problem Oriented
17	Function Oriented

18	Business Oriented
19	Not Mentioned
20	Not Mentioned
21	Not Mentioned
22	Business Oriented
23	Business Oriented
24	Culture Oriented; Human Oriented
25	User Oriented; Business Oriented
26	Culture Oriented
27	Business Oriented; Function Oriented
28	Not Mentioned
29	Mediator Oriented
30	Public Oriented; Culture Oriented
31	User Oriented
32	User Oriented
33	Human Oriented; Problem Oriented
34	Business Oriented
35	User Oriented
36	Beauty Oriented; Function Oriented
37	Problem Oriented
38	Business Oriented
39	Beauty Oriented
40	Society Oriented; Problem Oriented
41	Society Oriented; Culture Oriented; Future Oriented; Beauty Oriented
42	User Oriented
43	Not Mentioned
44	Decoration Oriented
45	Mediator Oriented
46	Not Mentioned
47	Function Oriented
48	Beauty Oriented; Culture Oriented
49	Mediator Oriented

50	Not Mentioned
51	Service Oriented; Business Oriented; User Oriented; System Oriented; Society Oriented; Mediator Oriented
52	Beauty Oriented
53	Function Oriented; Business Oriented
54	Business Oriented; Problem Oriented
55	Customer Oriented
56	Not Mentioned
57	Beauty Oriented; Function Oriented
58	Society Oriented; Problem Oriented
59	Society Oriented; Business Oriented; Innovation Oriented
60	User Oriented
61	Innovation Oriented; Business Oriented; Society Oriented; Problem Oriented
62	System Oriented; Innovation Oriented; Society Oriented; Human Oriented
63	Service Oriented; Mediator Oriented; Public Oriented
64	User Oriented
65	Business Oriented
66	Innovation Oriented; Business Oriented; Society Oriented
67	Innovation Oriented; Society Oriented
68	Business Oriented
69	Innovation Oriented; Sustainable Orientation; Society Oriented
70	Innovation Oriented; Business Oriented
71	Innovation Oriented; Society Oriented
72	Not Mentioned
73	Service Oriented
74	Mediator Oriented
75	User Oriented; Business Oriented
76	Mediator Oriented; System Oriented; Service Oriented; Society Oriented; Sustainable Orientation
77	Innovation Oriented
78	Mediator Oriented
79	Business Oriented

80	Service Oriented; Mediator Oriented
81	Not Mentioned
82	Innovation Oriented; Human Oriented; Society Oriented; Problem Oriented; Future Oriented; Sustainable Orientation; System Oriented; Mediator Oriented
83	Service Oriented; Society Oriented; Mediator Oriented
84	Mediator Oriented
85	Service Oriented
86	Beauty Oriented
87	Business Oriented; Society Oriented
88	User Oriented
89	Culture Oriented
90	Not Mentioned
91	Business Oriented; Culture Oriented
92	Function Oriented; Beauty Oriented; Mediator Oriented; Business Oriented; Problem Oriented
93	Not Mentioned
94	Problem Oriented
95	Sustainable Orientation; Society Oriented; Culture Oriented; Future Oriented
96	Business Oriented
97	Innovation Oriented
98	Innovation Oriented; Business Oriented
99	Sustainable Orientation; Society Oriented; System Oriented; Problem Oriented; Innovation Oriented
100	Not Mentioned
101	Society Oriented; Innovation Oriented
102	Function Oriented; Beauty Oriented
103	Service Oriented; Innovation Oriented; Problem Oriented; Mediator Oriented
104	Human Oriented; Problem Oriented
105	Business Oriented
106	Business Oriented
107	Service Oriented; Mediator Oriented; Innovation Oriented; Problem Oriented; Society Oriented

108	Service Oriented; Problem Oriented; Society Oriented; Mediator Oriented
109	Future Oriented; Society Oriented; Sustainable Orientation; System Oriented; Innovation Oriented; Problem Oriented
110	Human Oriented
111	Society Oriented; Culture Oriented
112	Business Oriented
113	Not Mentioned
114	User Oriented; Mediator Oriented; Society Oriented
115	Mediator Oriented
116	Culture Oriented; Business Oriented; Society Oriented
117	Beauty Oriented
118	Problem Oriented; Innovation Oriented
119	System Oriented; Problem Oriented; Society Oriented
120	Not Mentioned
121	Problem Oriented; Innovation Oriented; Society Oriented; Mediator Oriented; Culture Oriented; Sustainable Orientation
122	Service Oriented; Culture Oriented
123	Culture Oriented; Sustainable Orientation; User Oriented
124	Culture Oriented; Problem Oriented; Sustainable Orientation
125	Innovation Oriented; Culture Oriented; Sustainable Orientation; System Oriented; Society Oriented; Service Oriented
126	Mediator Oriented; User Oriented
127	Not Mentioned
128	Not Mentioned
129	User Oriented; Problem Oriented; Innovation Oriented; Beauty Oriented
130	Not Mentioned
131	Not Mentioned
132	Innovation Oriented; Business Oriented

3.4.4.2 To Encode the Data on Context

Opinions are used in the 'context' indicator to determine what social, economic, and technical factors influence design values.

This study detected the opinions on context those effect design values and encoded them in the 'Context' category from the sample articles. This study encoded the opinions from two dimensions: 'Technology, Society, Economy, Culture, Other' and 'International, National'. Besides, the meanings of sub-categories are listed in Table 8.

Table 8. Coding Table of Context

By Xing YANG

	International *(These contexts are global.)*	**National** *(These contexts are local.)*
Technology *(These are the contexts on technologies affecting design development.)*	Technological Development; New Technology; Digital Technology; Information Revolution; New Materials; Mobile Internet; Artificial Intelligence; Cloud Computing; Big Data; Somatosensory; Internet of Things; Wearable; Virtual Reality; Blockchain; Machine Learning *(Samples: 2, 7, 15, 16, 18, 21, 28, 32, 36, 40, 42, 43, 45, 46, 47, 49, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 74, 76, 78, 79, 82, 83, 90, 96, 97, 101, 102, 103, 106, 107, 108, 114, 115, 116, 118, 120, 122, 127, 129, 130, 131)*	China's Information Technology Keeps Pace with the World or Even Leads *(Sample: 29)*

Society *(These are the contexts on social status those design occurring in.)*	Information Society; Internet Era; Smart City; Big Data Era; New Media Society; Digital Media Society; Smart Society; Intangible Society; Sustainable Development; Non-paper Society; Diversified development *(Samples: 1, 2, 3, 6, 9, 14, 15, 17, 20, 21, 23, 32, 33, 35, 37, 57, 58, 61, 62, 67, 68, 72, 77, 82, 85, 91, 92, 95, 117, 127)*	Urbanization Strategy; 'Internet +' Strategy *(Samples: 5, 91, 107)*
Economy *(These are the economic contexts affecting design development.)*	Globalization; E-commerce; New Industry; Industrial Chain Integration; Experience Economy; Creative Economy; Knowledge Economy *(Samples:4, 8, 9, 13, 18, 29, 39, 70, 73, 79, 82, 98, 106, 119)*	Industrial Upgrading Strategy; Focusing on the Cultural and Creative Industry; Calling for Innovation and Entrepreneurship; 'Internet +' Strategy; Focusing on Data Industry *(Samples: 27, 29, 55, 61, 69, 71, 91, 97, 107)*
Culture *(These are the cultural contexts affecting and supporting design development.)*	Internet Culture; Digital Life; Social Media Popularity *(Samples: 6, 11, 12, 24, 31, 34, 80)*	Promote Harmonious Values; Cultural System Reform; Cultural Self-confidence; Digital Cultural Preservation; Traditional Village Protection; 'Internet +' Strategy; Cultural and Technological Innovation Strategy *(Samples: 30, 56, 91, 107, 122,*

		125)
Other *(These are the spare contexts affecting and supporting design development.)*	Products Become Information Terminals; Smart Devices Popularity *(Samples: 41, 50, 51, 63, 75, 87, 88, 99, 107)*	Teaching Reform of Design Talents; Design Discipline Upgrade; New Design Major Establishment; Local Design Theory Construction *(Samples: 38, 52, 54, 69, 73, 100, 111, 112)*

According to the coding table above, this study encoded the author's opinions on context detected from each sample to get the data under context indicator. (Table 9)

Table 9. Context Reflected from Sample Articles

By Xing YANG

Sample	Context
1	Information Society
2	Digital Technology; Intangible Society
3	New Media Society
4	New Industry
5	Urbanization Strategy
6	Internet Culture; Non-paper Society
7	New Technology
8	Experience Economy
9	Non-paper Society; E-commerce
10	Not Mentioned
11	Digital Life
12	Digital Life
13	Globalization
14	Information Society

15	Information Society; Digital Technology
16	Digital Technology
17	Information Society
18	Globalization; Technological Development; Creative Economy
19	Not Mentioned
20	Diversified Development
21	Technological Development; New Media Society
22	Not Mentioned
23	Digital Media Society
24	Internet Culture
25	Not Mentioned
26	Diversified Culture
27	Focusing on the Cultural and Creative Industry
28	Technological Development
29	New Industry; China's Information Technology Keeps Pace with the World or Even Leads; Industrial Upgrading Strategy
30	Promote Harmonious Values
31	Internet Culture
32	Mobile Internet; Internet Era
33	Information Society
34	Social Media Popularity
35	Information Society
36	Information Revolution; Artificial Intelligence
37	Information Society
38	Design Discipline Upgrade
39	Globalization
40	Technological Development; Sustainable Development
41	Smart Devices Popularity
42	Information Revolution; Digital Technology; Cloud Computing; Big Data
43	Digital Technology
44	Not Mentioned
45	Information Revolution

46	New Technology
47	Big Data
48	Technology Development
49	Technological Development; Internet of Things
50	Internet Era; Smart Devices Popularity
51	Smart Devices Popularity
52	Local Design Theory Construction
53	Not Mentioned
54	New Design Major Establishment; Teaching Reform of Design Talents
55	Industrial Upgrading Strategy; Focusing on the Cultural and Creative Industry
56	Digital Cultural Preservation
57	Information Society
58	Information Society; Smart City
59	Cloud Computing
60	Somatosensory
61	Big Data Era; Focusing on Data Industry
62	Information Society; Internet of Things; Cloud Computing; Big Data; Mobile Internet
63	Big Data; Cloud Computing; Products Become Information Terminals
64	Information Revolution; New Materials
65	Mobile Internet
66	Big Data
67	Big Data Era
68	Big Data Era
69	Design Discipline Upgrade; Focusing on the Cultural and Creative Industry
70	Knowledge Economy
71	Calling for Innovation and Entrepreneurship
72	Information Society
73	New Design Major Establishment; New Industry
74	Technological Development
75	Smart Devices Popularity
76	Wearable; Big Data; Technological Development

77	New Media Society
78	Technological Development
79	E-commerce; Mobile Internet
80	Social Media Popularity
81	Not Mentioned
82	Mobile Internet; Internet of Things; Cloud Computing; Big Data Era; Technological Development; New Industry
83	New Technology
84	Not Mentioned
85	Information Society
86	Not Mentioned
87	Products Become Information Terminals
88	Smart Devices Popularity
89	Challenge the discourse power of western design methodology
90	Information Revolution
91	New Media Society; 'Internet+' Strategy
92	Information Society
93	Not Mentioned
94	Not Mentioned
95	Smart Society
96	Artificial Intelligence
97	Calling for Innovation and Entrepreneurship; Mobile Internet; Internet of Things
98	Industrial Chain Integration
99	Smart Devices Popularity
100	New Design Major Establishment
101	Information Revolution
102	Big Data; Artificial Intelligence; Virtual Reality
103	Mobile Internet
104	Not Mentioned
105	Not Mentioned
106	New Industry; New Technology
107	Mobile Internet; Smart Devices Popularity; 'Internet+' Strategy

108	Mobile Internet
109	Not Mentioned
110	Not Mentioned
111	Teaching Reform of Design Talents
112	Teaching Reform of Design Talents
113	Not Mentioned
114	Mobile Internet; Somatosensory; Internet of Things
115	Artificial Intelligence
116	Blockchain
117	Smart Society
118	Artificial Intelligence
119	Experience Economy
120	Virtual Reality
121	Technology Development
122	Machine Learning; Traditional Village Protection; Cultural Self-confidence
123	Not Mentioned
124	Not Mentioned
125	Cultural System Reform; Cultural and Technological Innovation Strategy
126	Not Mentioned
127	Smart Society; Internet of Things
128	Not Mentioned
129	New Technology
130	New Technology
131	Big Data
132	Not Mentioned

3.4.4.3 To Encode the Data on Design Case

Opinions are used to address design cases that information design professionals concentrate on under the 'Design Case' indicator.

From the sample articles, this analysis determined which design cases the information design practitioners concentrated on and coded them in the 'Design Case' category. This study encoded the design cases in two subcategories: 'Tangible'

and 'Intangible'. Besides, some further subcategories were created. All the meanings of sub-categories are listed in Table 10.

Table 10. Coding Table of Design Case

By Xing YANG

Tangible	**Simple Tangible Cases Group** *(The outcomes of these design cases can be seen. Samples: 1, 2, 4, 5, 6, 10, 12, 26, 27, 29, 33, 34, 37, 44, 46, 47, 49, 56, 58, 59, 80, 81, 84, 85, 88, 89, 93, 94, 105, 112, 113, 121, 123, 124, 125, 128, 130)*	Book Design; Font Design; New Media Design; Network Symbol Design; Webpage Design; Page Navigation Design; Animation Design; Visual Elements Design; E-book Design; Interactive Interface Design; Digital Media Design; Infographic Design; Icon Design; Application Design; Digitalization of Cultural Heritage Design; Social Media Design
	Comprehensive Tangible Cases Group *(The outcomes of these design cases are the collection of simple tangible cases. Samples: 3, 8, 26, 32, 41, 51, 52, 57, 77, 78, 79, 86, 91, 101, 102, 103, 104, 110, 115, 126)*	Advertisement Design; Mobile Products Design; Products Design; Space Design; Brand Design; Information Visualization Design; Display of Cultural Heritage Design
Intangible	**Simple Intangible Cases Group** *(The outcomes of these design cases cannot be*	Experience Design; Behavior Design; Interaction Design; Information Design;

	seen with a single design target. Samples: 7, 13, 14, 15, 17, 28, 30, 31, 35, 36, 37, 39, 44, 49, 52, 53, 54, 60, 61, 72, 73, 74, 75, 80, 84, 85, 86, 92, 96, 99, 100, 106)	Sound Design; Time Design; Distance between Human and Products Design
	Complex Intangible Cases Group *(The outcomes of these design cases cannot be seen with systematic design targets. Samples: 9, 11, 16, 62, 70, 76, 82, 87, 98, 107, 108, 114, 116, 118)*	Smart City System Design; Business Model Design; Service System Design; Overall Design; Charity Model Design; Interactive System Design; Management System Design

According to the coding table above, this study encoded the author's opinions on the design case detected from each sample to get the data under the design case indicator. (Table 11)

Table 11. Design Case Reflected from Sample Articles

By Xing YANG

Sample	Design Case
1	Visual Elements Design
2	E-book Design
3	Advertisement Design
4	New Media Design
5	Interactive Interface Design
6	Network Symbol Design
7	Experience Design
8	Advertisement Design
9	Service System Design
10	Page Navigation Design

11	Service System Design
12	Book Design
13	Behavior Design
14	Information Design; Interaction Design
15	Information Design
16	Service System Design
17	Information Design
18	Not Mentioned
19	Not Mentioned
20	Not Mentioned
21	Not Mentioned
22	Not Mentioned
23	Not Mentioned
24	Not Mentioned
25	Not Mentioned
26	Animation Design; Display of Cultural Heritage Design
27	Animation Design
28	Behavior Design
29	Digital Media Design
30	Sound Design
31	Interaction Design
32	Mobile Products Design
33	Infographic Design
34	Social Media Design
35	Information Design
36	Interaction Design
37	Infographic Design; Time Design
38	Not Mentioned
39	Digital Design; Interaction Design
40	Not Mentioned
41	Products Design
42	Not Mentioned

43	Not Mentioned
44	Sound Design; Animation Design
45	Not Mentioned
46	Font Design
47	Icon Design
48	Not Mentioned
49	Interactive Interface Design; Behavior Design; Experience Design
50	Not Mentioned
51	Mobile Products Design
52	Interaction Design; Products Design
53	Sound Design
54	Interaction Design
55	Not Mentioned
56	Font Design
57	Information Visualization Design
58	Social Media Design
59	Application Design
60	Interaction Design; Behavior Design
61	Interaction Design
62	Smart City System Design
63	Service Design
64	Interaction Interface Design
65	Interaction Interface Design
66	Not Mentioned
67	Not Mentioned
68	Not Mentioned
69	Not Mentioned
70	Business Model Design
71	Not Mentioned
72	Information Design; Interaction Design
73	Behavior Design
74	Distance between Human and Products Design

75	Interaction Design
76	Smart City Design; Service System Design
77	Advertisement Design
78	Space Design
79	Mobile Products Design
80	Social Media Design; Interaction Design
81	Interactive Interface Design
82	Service System Design
83	Not Mentioned
84	Social Media Design; Behavior Design
85	Information Design; Interactive Interface Design
86	Sound Design; Information Visualization Design
87	Interactive System Design
88	Interactive Interface Design; Animation Design
89	Font Design
90	Not Mentioned
91	Brand Design
92	Information Design; Behavior Design
93	Animation Design
94	Animation Design
95	Not Mentioned
96	Experience Design
97	Not Mentioned
98	Overall Design
99	Interaction Design
100	Interaction Design
101	Information Visualization Design
102	Information Visualization Design
103	Information Visualization Design
104	Information Visualization Design
105	Interactive Interface Design
106	Experience Design; Behavior Design

107	Charity Model Design
108	Service System Design
109	Behavior
110	Information Visualization; Animation
111	Information
112	Digital Media
113	Webpage; Visual Element
114	Interactive System
115	Display of Cultural Heritage
116	Management System
117	Sound
118	Management System
119	Interaction
120	Behavior
121	Digitalization of Cultural Heritage
122	Not Mentioned
123	Digitalization of Cultural Heritage
124	Digitalization of Cultural Heritage
125	Digitalization of Cultural Heritage
126	Experience; Space
127	Interaction
128	Digitalization of Cultural Heritage
129	Interaction
130	Interaction; Interactive Interface; Behavior; Experience
131	Not Mentioned
132	Not Mentioned

3.4.4.4 To Encode the Data on Design Goal

Opinions are used to address the information design practitioners' objectives to be accomplished in particular design cases under the 'Design Objective' indicator.

The opinions on design goals to be accomplished in particular design cases were detected in the sample articles and encoded in the 'Design Goal' group.

This study categories the design goals from two dimensions, one is design goals, subcategories named 'Experience Group' 'Function Group' 'Systemization Group' 'effectiveness Group' 'Aesthetics Group' 'Innovation Group' and 'Future Group'; another one is perspectives, subcategories named 'User-side' and 'Supply-side'. All the meanings of sub-categories are listed in Table 12 and Table 13.

Table 12. Coding Table of Design Goal (1)

By Xing YANG

Experience Group *(These design goals are focusing on good feeling when using products or services. Samples: 7, 9, 10, 11, 12, 13, 30, 31, 32, 39, 41, 42, 44, 46, 48, 51, 59, 60, 61, 62, 64, 65, 73, 74, 76, 77, 79, 80, 82, 85, 86, 87, 88, 89, 92, 96, 106, 108, 109, 113, 114, 115, 117, 118, 119, 120, 121, 125, 126, 129)*	Enjoyable Experience; Immersive; Good Experience; Harmonious Audiovisual; Fun; Natural Interaction; Trustable; Multi-sensory Combination
Function Group *(These design goals are focusing on availabilities. Samples: 1, 4, 21, 23, 29, 31, 37, 47, 49, 53, 78, 81, 83, 85, 89, 92, 120, 121, 123, 124, 128)*	Content Expression; Multi-dimensional Expression; Realization of Function; Digitalization of Cultural Protection
Systemization Group *(These design goals are focusing on the whole process of products or services. Samples: 16, 37, 55, 63, 70, 76, 98, 102, 109, 110, 116, 121, 123, 124, 128)*	Systemization; Intelligence; Balancing Product Cycles; All-round Service; Digitalization
Effectiveness Group *(These design goals are focusing on efficiency improvement. Samples: 3, 13, 33, 36, 42, 88, 91, 101, 120)*	Communication Efficiency; Reducing Costs; Improving Efficiency

Aesthetics Group	Personalization;
(These design goals are focusing on aesthetic needs. Samples: 2, 3, 6, 34, 47, 51, 52, 53)	Customization; Beauty; Localization
Innovation Group	Creating Value;
(These design goals are focusing on achieving innovation. Samples: 8, 15, 22, 25, 26, 27, 28, 57, 96)	Innovation; Creative Means
Future Group	Harmony between People and Others;
(These design goals are focusing on servicing to long-term benefits. Samples: 24, 38, 40, 45, 58, 63, 99, 103, 107)	Facing the Future; Ecological Health; Achieving Strategy

Table 13. Coding Table of Design Goal (2)

By Xing YANG

User-side	User Needs;
(These design goals come from User's perspective. Samples: 2, 5, 6, 7, 9, 10, 11, 13, 17, 30, 31, 32, 39, 41, 42, 44, 46, 48, 51, 52, 53, 55, 59, 60, 61, 62, 64, 65, 73, 74, 75, 76, 77, 78, 79, 80, 82, 85, 87, 88, 89, 92, 96, 106, 108, 109, 113, 114, 115, 117, 118, 119, 120, 121, 125, 126, 128, 131)	Personalization; Customization; Enjoyable Experience; Immersive; Good Experience; Harmonious Audiovisual; User Participation; All-round Service; Fun; Natural Interaction; Trustable; Beauty
Supply-side	Content Expression;
(These design goals come from supply-side's perspective, such as designers, enterprises, organizations, etc. Samples: 3, 4, 8, 12, 13, 15, 16,	Localization; Creative Means; Multi-sensory Combination; Multi-dimensional Expression;

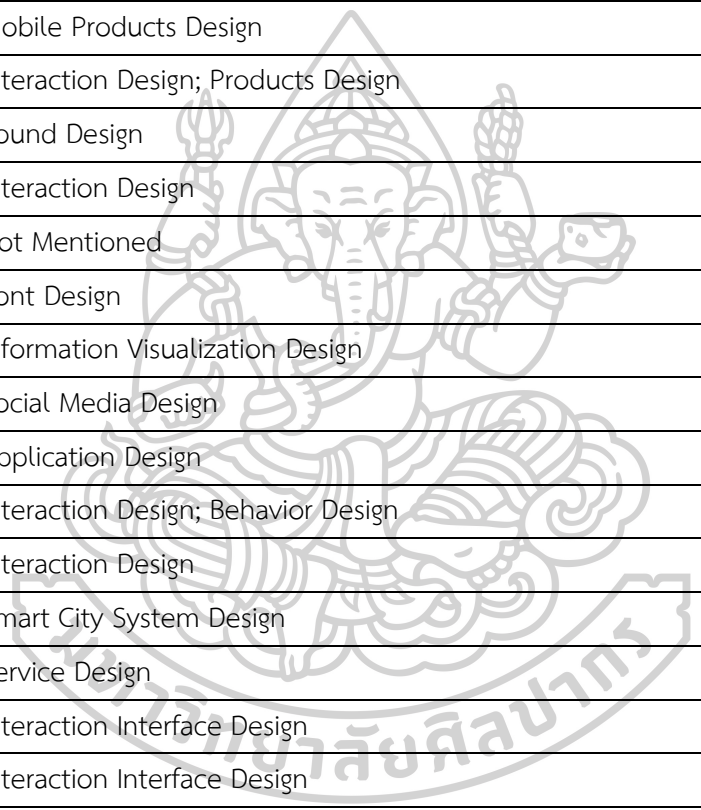| 22, 24, 25, 26, 27, 28, 29, 31, 33, 34, 36, 37, 38, 40, 42, 45, 47, 49, 53, 57, 63, 70, 76, 81, 83, 85, 88, 89, 91, 92, 96, 98, 99, 101, 102, 103, 107, 109, 110, 116, 120, 121, 123, 124, 128)	Realization of Function; Communication Efficiency; Innovation; Harmony between People and Others; Creating Value; Facing the Future; Reducing Costs; Improving Efficiency; Ecological Health; Systemization; Balancing Product Cycles; Digitalization of Cultural Protection; Digitalization; Intelligence; Achieving Strategy

According to the coding table above, this study encoded the author's opinions on the design goal detected from each sample to get the data under the design goal indicator. (Table 14)

Table 14. Design Goal Reflected from Sample Articles
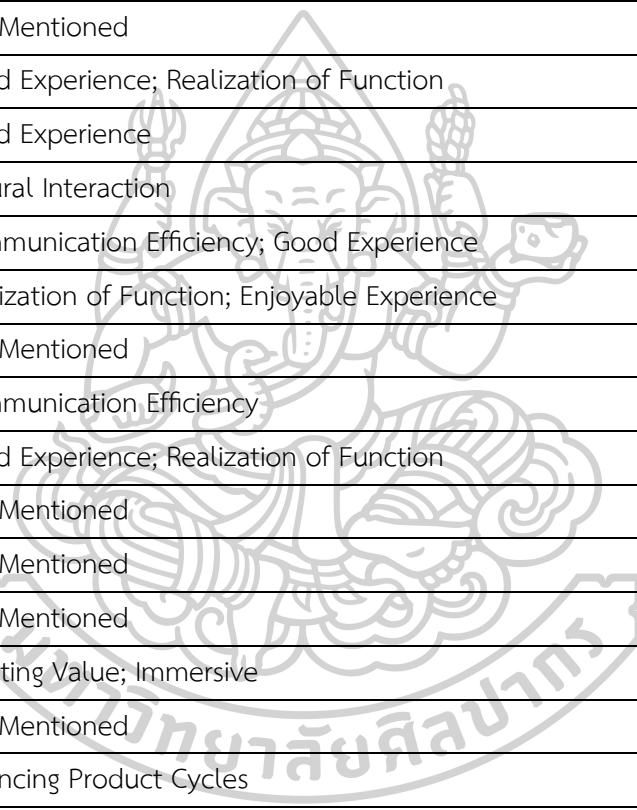
By Xing YANG

Sample	Design Goal
1	Multi-dimensional Expression
2	Personalization; User Participation
3	Localization; Communication Efficiency
4	Content Expression
5	User Needs
6	Personalization; Customization
7	Enjoyable Experience; Trustable
8	Creative Means
9	Good Experience
10	Immersive; Enjoyable Experience; User Participation
11	Good Experience

12	Multi-sensory Combination
13	Communication Efficiency; User participation; Natural Interaction
14	Not Mentioned
15	Innovation
16	Systemization
17	User Participation
18	Not Mentioned
19	Not Mentioned
20	Not Mentioned
21	Multi-dimensional Expression
22	Creating Value; Innovation
23	Multi-dimensional Expression
24	Harmony between People and Others
25	Creating Value
26	Innovation
27	Creative Means
28	Creative Means
29	Realization of Function
30	Harmonious Audiovisual
31	User Need; Good Experience; Realization of Function
32	Enjoyable Experience
33	Communication Efficiency
34	Localization
35	Not Mentioned
36	Communication Efficiency
37	Systemization; Content Expression
38	Achieving Strategy
39	Immersive; Good Experience; Harmonious Audiovisual
40	Facing the Future
41	Good Experience
42	Improving Efficiency; Reducing Costs; Good Experience
43	Not Mentioned

44	Fun
45	Harmony between People and Others
46	Good Experience
47	Realization of Function; Localization
48	Fun
49	Realization of Function
50	Not Mentioned
51	Personalization; Enjoyable Experience
52	Beauty
53	Beauty; Realization of Function
54	Not Mentioned
55	All-round Service
56	Not Mentioned
57	Creative Means
58	Ecological Health
59	Fun
60	Enjoyable Experience
61	Fun
62	Good Experience
63	Harmony between People and Others; Systemization
64	Natural Interaction
65	Enjoyable Experience
66	Not Mentioned
67	Not Mentioned
68	Not Mentioned
69	Not Mentioned
70	Systemization
71	Not Mentioned
72	Not Mentioned
73	Good Experience
74	Natural Interaction
75	User Needs

76	Intelligence; Good Experience
77	Good Experience
78	Multi-dimensional Expression; User Participation
79	Good Experience
80	Good Experience
81	Realization of Function
82	Good Experience
83	Realization of Function
84	Not Mentioned
85	Good Experience; Realization of Function
86	Good Experience
87	Natural Interaction
88	Communication Efficiency; Good Experience
89	Realization of Function; Enjoyable Experience
90	Not Mentioned
91	Communication Efficiency
92	Good Experience; Realization of Function
93	Not Mentioned
94	Not Mentioned
95	Not Mentioned
96	Creating Value; Immersive
97	Not Mentioned
98	Balancing Product Cycles
99	Harmony between People and Others
100	Not Mentioned
101	Communication Efficiency
102	Digitalization; Intelligence
103	Harmony between People and Others
104	Not Mentioned
105	Not Mentioned
106	Good Experience; Natural Interaction
107	Harmony between People and Others

108	Good Experience
109	Systemization; Immersive
110	Systemization
111	Not Mentioned
112	Not Mentioned
113	Enjoyable Experience
114	Good Experience
115	Good Experience
116	Digitalization
117	Good Experience; Immersive
118	Immersive
119	Natural Interaction
120	Good Experience; Realization of Function; Reducing Costs
121	Digitalization of Cultural Protection; Good Experience; Systemization
122	Not Mentioned
123	Digitalization of Cultural Protection
124	Digitalization of Cultural Protection
125	Immersive; Good Experience; Natural Interaction
126	Immersive
127	Intelligent Interaction
128	Digitalization of Cultural Protection
129	Good Experience
130	Not Mentioned
131	To identity user needs
132	Not Mentioned

3.4.4.5 To Encode the Data on Work Mode

Opinions are used to address how information design professionals organize to execute design research, education, and practice under the 'Work Mode' indicator.

The opinions on how to organize and execute design research, education, and practice were detected in the sample articles and encoded in the 'Work Mode' category. This study encoded the opinions from two dimensions: 'Single Design,

Interdisciplinary (internal), Interdisciplinary (external), Industry-university-research, Industry Chain, Design+' and 'User Needs, User Participation, Co-creation Platform, Dynamic Platform'. Besides, some subcategories were created. The meanings of sub-categories are listed in Table 15 and Table 16.

Table 15. Coding Table of Work Mode (1)

By Xing YANG

Single Design *(Designers in specific design areas work alone or in a group. Samples: 7, 30, 48, 70, 75, 77, 94, 105, 110, 114, 129)*	Design According to the Process; Combination of Multiple Design Languages
Interdisciplinary (internal) *(Collaboration in different design fields. Samples: 1, 2, 9, 23, 55, 83)*	Interdisciplinary (internal); Cross-border Design
Interdisciplinary (external) *(Collaboration between in different design fields and other disciplines. Samples: 4, 8, 13, 15, 17, 21, 29, 32, 33, 35, 36, 38, 54, 57, 61, 62, 63, 65. 69, 71, 72, 81, 90, 98, 99, 100, 102, 105, 106, 111, 119, 123, 125, 126, 127, 128, 130)*	Interdisciplinary (external); Multidisciplinary Cooperation; Art and Science
Industry-University-Research *(Design teaching, research and industry interaction. Samples: 13, 15, 18, 22, 23, 41, 54, 69, 97, 105, 112, 119, 132)*	School-enterprise Cooperation; Cooperation with Industry; Industry-University-Research; Combination of Theory and Practice
Industry Chain *(Design focuses on the entire product cycle from planning to logistics, storage, sales, and*	Combination of Software and Hardware; From Investigation and Research to Operation; Whole Thinking; Cooperate in the Industrial Chain

iteration. Samples: 13, 14, 30, 40, 49, 51, 55, 76, 97, 98, 99, 108, 111)	
Design+ *(Design parallel to specific industries, and deep integration of design and specific industries. Samples: 70, 82, 92, 102, 103, 107, 108, 115, 116, 118, 121, 123, 124, 125, 126, 128, 130)*	Design+; Design-driven; Cross Industry; Innovation 2.0; Business Integration

Table 16. Coding Table of Work Mode (2)

By Xing YANG

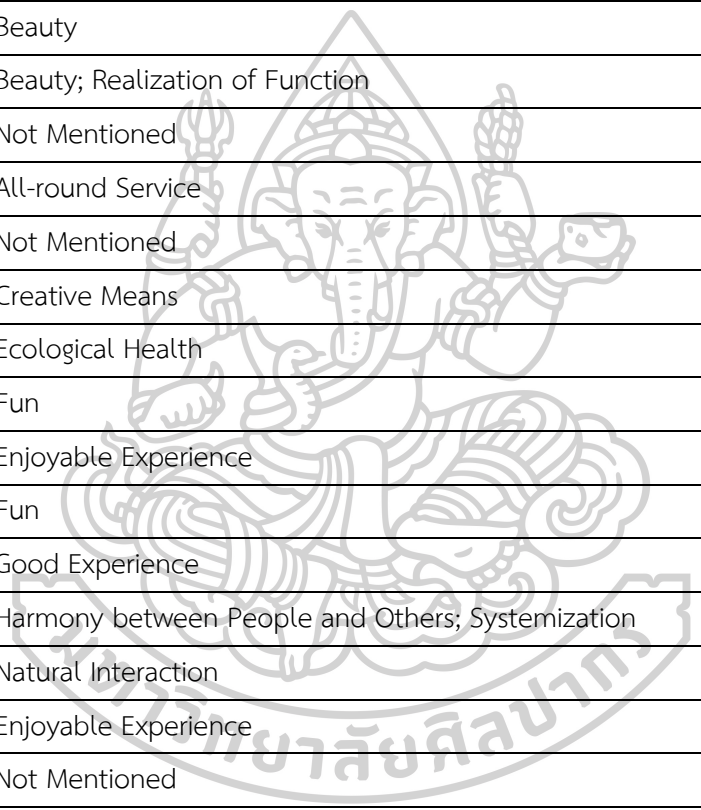|	
User Needs *(Design from the needs of users. Samples: 45, 49)*	User Needs; User-centered
User Participation *(Let users participate in the design process. Samples: 39, 76, 81, 86, 96, 108, 109)*	Consumer Participation; User Co-creation
Co-creation Platform *(Establish a cooperation platform to allow stakeholders to participate in the design. Samples: 11, 22, 23, 34, 41, 54, 58, 61, 63, 71, 72, 75, 77, 83, 90, 98, 105, 108, 111, 112, 119, 132)*	Project Team; Teamwork; Collaborative Design; Linking Design and Users; Studio; Cooperation Platform
Dynamic Platform *(Establish a data-derived dynamic cooperation platform to allow stakeholders to do design. Samples: 2, 13, 16, 24, 42, 51, 54, 59, 66, 68, 72, 75, 80, 92, 97, 98, 131)*	Co-creation Based on Information; Iterative Update; Dynamic System; Innovation Platform; Open Collaboration; Break Time and Space Limitations; Data-based

According to the coding table above, this study encoded the author's opinions on the work mode detected from each sample to get the data under the work mode indicator. (Table 17)

Table 17. Work Mode Reflected from Sample Articles

By Xing YANG

Sample	Work Mode
1	Interdisciplinary (internal)
2	Cross-border Design; Data-based
3	Not Mentioned
4	Interdisciplinary (external)
5	Not Mentioned
6	Not Mentioned
7	Design According to the Process
8	Multidisciplinary Cooperation
9	Interdisciplinary (internal)
10	Not Mentioned
11	Cooperation Platform
12	Not Mentioned
13	Combination of Software and Hardware; Data-based; Interdisciplinary (external); Industry-University-Research
14	Combination of Software and Hardware
15	Interdisciplinary (external); School-enterprise Cooperation
16	Open Collaboration
17	Interdisciplinary (external)
18	Cooperation with Industry
19	Not Mentioned
20	Not Mentioned
21	Interdisciplinary (external)
22	Industry-University-Research; Studio
23	Interdisciplinary (internal); Industry-University-Research; Teamwork
24	Break Time and Space Limitations

25	Not Mentioned
26	Not Mentioned
27	Not Mentioned
28	Not Mentioned
29	Interdisciplinary (external)
30	Design According to the Process; From Investigate and Research to Operation
31	Not Mentioned
32	Interdisciplinary (external)
33	Interdisciplinary (external)
34	Linking Design and Users
35	Interdisciplinary (external)
36	Interdisciplinary (external)
37	Not Mentioned
38	Interdisciplinary (external)
39	User Co-creation
40	Whole Thinking
41	Combination of Theory and Practice; Studio
42	Data-based
43	Not Mentioned
44	Not Mentioned
45	User Needs
46	Not Mentioned
47	Not Mentioned
48	Combination of Multiple Design Languages
49	Cooperation in the Industrial Chain; User-centered; Initiative Update
50	Not Mentioned
51	Cooperation in the Industrial Chain; Open Collaboration
52	Not Mentioned
53	Not Mentioned
54	Studio; School-enterprise Cooperation; Industry-University-Research; Interdisciplinary (external); Dynamic System
55	Cooperation in the Industrial Chain; Interdisciplinary (internal)

56	Not Mentioned
57	Art and Science
58	Collaborative Design
59	Open Collaboration; Data-based
60	Not Mentioned
61	Interdisciplinary (external); Collaborative Design
62	Interdisciplinary (external)
63	Collaborative Design; Interdisciplinary (external)
64	Not Mentioned
65	Interdisciplinary (external)
66	Iterative Update
67	Not Mentioned
68	Co-creation Based on Information
69	Interdisciplinary (external); Industry-University-Research
70	Design According to the Process; Business Integration; Design-driven
71	Interdisciplinary (external); Cooperation Platform
72	Interdisciplinary (external); Cooperation Platform; Data-based
73	Not Mentioned
74	Not Mentioned
75	Design According to the Process; Iterative Update; Teamwork
76	User Co-creation; Combination of Software and Hardware
77	Design According to the Process; Teamwork
78	Not Mentioned
79	Not Mentioned
80	Co-creation Based on Information
81	Interdisciplinary (external); User Co-creation
82	Design+; Innovation 2.0
83	Teamwork; Interdisciplinary (internal); Studio
84	Not Mentioned
85	Not Mentioned
86	User Co-creation
87	Not Mentioned

88	Not Mentioned
89	Not Mentioned
90	Interdisciplinary (external); Teamwork
91	Not Mentioned
92	Design+; Co-creation Based on Information
93	Not Mentioned
94	Design According to the Process
95	Not Mentioned
96	Consumer Participation
97	Innovation Platform; Cooperation in the Industrial Chain; Industry-University-Research
98	Cooperation in the Industrial Chain; Interdisciplinary (external); Teamwork; Dynamic System
99	Interdisciplinary (external); Cooperation in the Industrial Chain
100	Art and Science
101	Not Mentioned
102	Interdisciplinary (external); Design+
103	Design+
104	Not Mentioned
105	Design According to the Process; Project Team; Interdisciplinary (external); Teamwork; Industry-University-Research
106	Interdisciplinary (external)
107	Design+
108	Design+; Teamwork; User Co-creation; Cooperation in the Industrial Chain
109	User Co-creation
110	Design According to the Process
111	Interdisciplinary (external); Combination of Software and Hardware; Teamwork
112	School-enterprise Cooperation; Industry-University-Research; Studio
113	Not Mentioned
114	Design According to the Process
115	Design+
116	Design+

117	Not Mentioned
118	Design+
119	Interdisciplinary (external); Teamwork; Industry-University-Research
120	Not Mentioned
121	Design+; Cross Industry
122	Not Mentioned
123	Design+; Interdisciplinary (external)
124	Design+; Cross Industry
125	Design+; Interdisciplinary (external)
126	Design+; Interdisciplinary (external)
127	Interdisciplinary (external); Data Based
128	Design+; Interdisciplinary (external)
129	Design According to the Process
130	Design+; Interdisciplinary (external)
131	Co-creation Based on Information
132	School-enterprise Cooperation; Teamwork

3.4.5 Reliability Test

In addition, two peers were invited to assess the sampling and coding reliability. Peers chose two samples at random from the annual samples, for a total of 22 samples and 16.67 percent of the sample size. The aim is to determine whether the sample adheres to the sampling principle, whether data extraction is accurate, and whether the Chinese-English translation is accurate.

The two peers are as follows: (Figure 26; Figure 27)

Figure 26. Peer 1

Prof. Dongping Zhu

Faculty of Design, School of Arts, Renmin University of China (photo from Dongping Zhu)

Figure 27. Peer 2

Dr. Zhengyi Zhao

Art and Design Studies, Kyoto University of the Arts, Japan (photo from Zhengyi Zhao)

The findings indicate that the sampling and coding methods are both accurate (Table 18). The feedback forms are shown in Appendix 3.

Table 18. Results of Reliability Test

By Xing YANG

Total Agreement Percentage	
Peer 1: Dongping Zhu	Peer 2: Zhengyi Zhao
Sampling Accuracy	Sampling Accuracy
95.00%	93.19%
Coding Accuracy	Coding Accuracy
98.64%	94.55%
Chinese-English Consistency	Chinese-English Consistency
95.00%	95.91%

3.5 Validity of the Research Framework

This section adopted an expert assessment method to evaluate the validity of the research framework.

3.5.1 Invited Peers

The research methodology was evaluated by five peers in this study. Two of the five peers are specialists in design science and education, while the other three are experts in design practice and management. Their basic information is as in Figure 28.
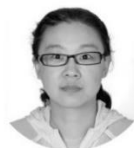
Figure 28. Invited Peers

By Xing YANG (photos from the five peers)

3.5.2 Validity Assessment

The research validity peer assessment was implemented through face-to-face and online communication from August to October 2019. The researchers explained the research design and related details one-on-one to peers and obtained assessment feedback.

3.5.3 Result of Validity Assessment

Data recovery statistics of peers' opinions are shown in Table 19 and gained 95.56% agreement of validity assessment. The feedback forms are shown in Appendix 2.

Table 19. Expert Opinions

By Xing YANG

	Mr. Sone Simatrang	Mr. Jirawat Vongphantuset	Mrs. Liang Wei	Mrs. Du Chen	Mrs. Qiao Lei
Question 1	Yes	Yes	Yes	Yes	Yes

Question 2	Yes	Yes	Yes	Yes	Yes
Question 3	Yes	Yes	Yes	Yes	Yes
Question 4	Yes	Yes	Yes	Yes	Yes
Question 5	Yes	Yes	Yes	Yes	Yes
Question 6	Yes	Yes	Yes	Yes	Yes
Question 7	Yes	Yes	Yes	Yes	Yes
Question 8	Yes	Not Sure	Yes	Yes	Yes
Question 9	Yes	Not Sure	Yes	Yes	Yes
Agreement			95.56%		

Chapter 4: Results

4.1 Results of Identifying Information Design

For achieving to identify information design, this study applied the critical review method. It is partly completed in section 2.1. In section 2.1, this study already answered information design is. For answering what is not information design (the relationship between information design and other designs or even other disciplines), this study answers by creating the design classification model.

4.2 Results of Creating the Design Paradigm Models

4.2.1 Results of the Design Classification Model

This study classified the 30 cases as mentioned in Table 3 according to design functions. The 30 cases were divided into five categories, design+, design for space, design for communication, design for use, and design theory. (Figure 29)
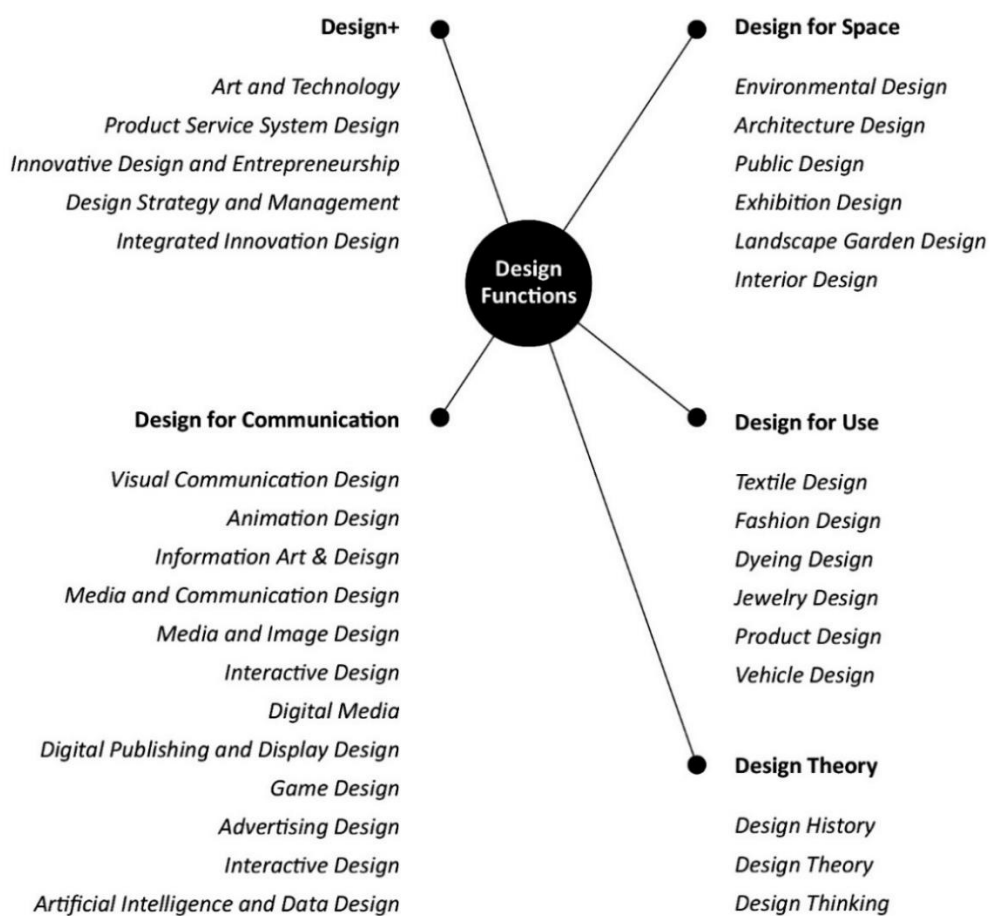
Figure 29. Classification of 30 Cases

By Xing YANG

The above grouping results show that the five main functions of the design represent three characteristics.

First, the design theory group is more focused on design thinking, and the theoretical feature is obvious.

Second, design for communication group, design for space function group, and design for use function group are more focused on design doing, and practical features are obvious.

Third, design+ function group is more focused on design expanding, and the interdisciplinary feature is obvious.

Fourth, from design thinking to design doing even to design expanding, it presents the overall characteristics from theory to practice to theory plus practice.

Fifth, from design doing to design expanding, it presents the overall characteristics of expanding practice areas.

Therefore, based on these results above, designs can be classified into three layers: design thinking layer, design doing layer, and design expanding layer. Furthermore, each layer covers two characteristics: universal and local characteristics, which will be examined.

Furthermore, by reviewing modern design history, this study discovered that design for communication has consistently been ahead of other designs, establishing design for communication as a leading indicator of overall design progress. This phenomenon will become increasingly common as the fourth technological revolution, which includes the knowledge industry, continues.

When randomly open the history book of modern design, some keywords will be seen within a few pages, such as Crystal Palace, Arts and Crafts Movement, John Ruskin, and William Morris. That time is the starting point for modern design, almost entirely recognized by design historians.

From this process, it can be seen that product design was a ballast stone for the study of design history. Indeed, in the history of design, books related to architecture, graphic design, and fashion design are often punctuated in different eras, but product design is the central axis.

There are two reasons for this phenomenon: first, industrial manufacturing spawned modern design, and product design is in a dominant position in the development of design history; second, from the first industrial revolution to the present, industrial revolutions pushed human society forward continuously. Therefore, the status of product design has not been shaken in the history of design to begin with.

The term technological revolution replaced the term industrial revolution. This new statement can correct our previous one-sided understanding. Indeed, both the first technological revolution and the second technological revolution were technological breakthroughs in the industrial field, and the industrial revolution justified them. Nevertheless, the third technological revolution is informatization, and the fourth technological revolution is intelligence based on informatization. These two technological advancements are related to the industrial field and go hand in hand in information, industry, biology, medicine. In such an era, research on design trends still look at product design? The answer is negative.

In fact, before the germination of modern design in the 1850s, communication design had been mass-produced for more than 400 years. In 1439, the German Johannes Gutenberg became the first European to use movable type printing (Sivulka, 2011). It means the birth of printing design. After that, books, newspapers, and magazines were printed in large quantities, promoting knowledge and information dissemination.

The function of printing design is communication, which belongs to the design for communication group. In other words, modern design for communication was more than 400 years earlier than the modern product design. All the attributes and characteristics that modern design should have had been available since the Gutenberg era from this point, it can be said that at the beginning of modern design history, design for communication was the leading indicator of the overall design.

The third technological revolution is informatization. With the advent of personal computers and smartphones, humans had entered the Internet era and the mobile Internet era. Graphic design gradually changed its name to visual communication design and then became information design and various design

directions related to design for communication, such as interaction design, experience design, emotional design, etc. Today, standing on the fourth technological revolution threshold, information has become an important medium for coordinating the relationship between people and everything. Design for communication has become a concentration camp for almost all new design directions.

Also, design cases for communication design, such as device's applications, a new interactive interface, and an electronic display board, have all been defined as information products. At this time, the boundary between product design and information communication design is becoming indistinct. Design for communication has the leading index attributes of print design, graphic design, visual communication design, and product design attributes. Therefore, design for communication is still the leading indicator of the overall design. (Figure 30)
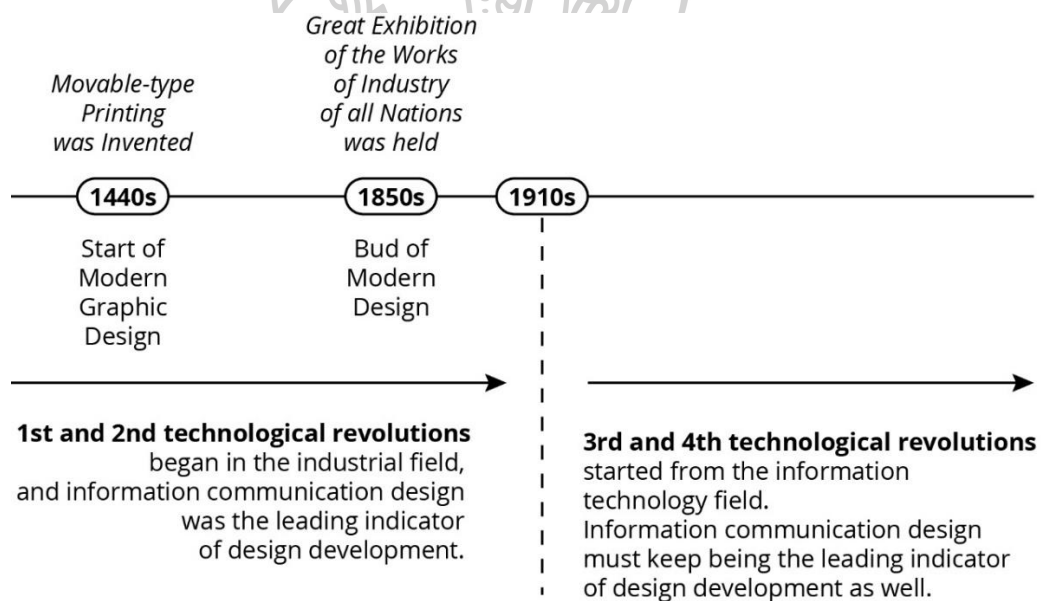
Figure 30. Design for Communication is the Leading Indicator of Overall Design

By Xing YANG

Accordingly, the design classification model was created, shown in Figure 31.
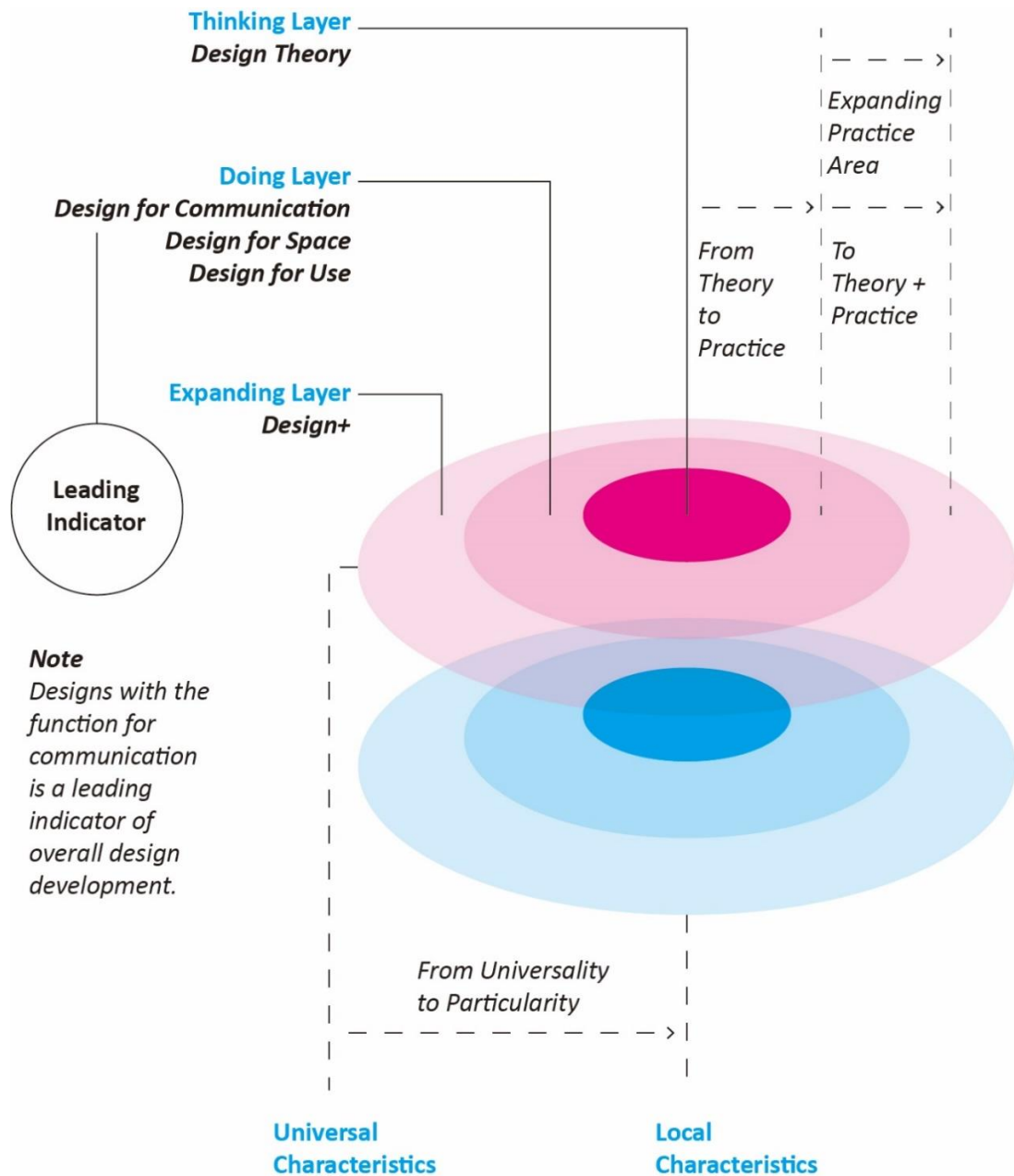
Figure 31. Design Classification Model

By Xing YANG

4.2.2 Results of the Relationship Model among Paradigms

This research developed the paradigm relationship model by referencing and evaluating Thomas S. Kuhn's paradigm theory and Paul K. Feyerabend's perspective on the paradigm shift, as detailed in Section 3.3.2.

Thomas S. Kuhn's prominent opinions on paradigm include:

(1) science development is not an evolutionary process but a revolution one. In other words, the development of science is not gradual but revolutionary. One paradigm replaces another;

(2) Each paradigm has a single life cycle, which includes gradual formation, broad distribution, and eventual extinction. (Kuhn, 2012)

Paul K. Feyerabend agrees with Kuhn's revolutionary thought but disagrees one paradigm replaces another one. He pointed out:

(1) The disappearance of one paradigm is not because another replaces it, but because the change in social context leads to the end of the life cycle of this paradigm;

(2) There is a coexistence relationship with other paradigms before one paradigm completely disappears. (Fallan, 2010)

For example, current information design paradigm characterized by printing is disappearing, but the information design paradigm characterized by the Internet is widespread, and the information design paradigm characterized by the internet of things and artificial intelligence is emerging.

When doing paradigm research, it is necessary to make clear which paradigm is the research focus. This study agrees with Feyerabend's correction of the relationship among paradigms. For easy understanding, this study created the relationship model among paradigms (Figure 32).
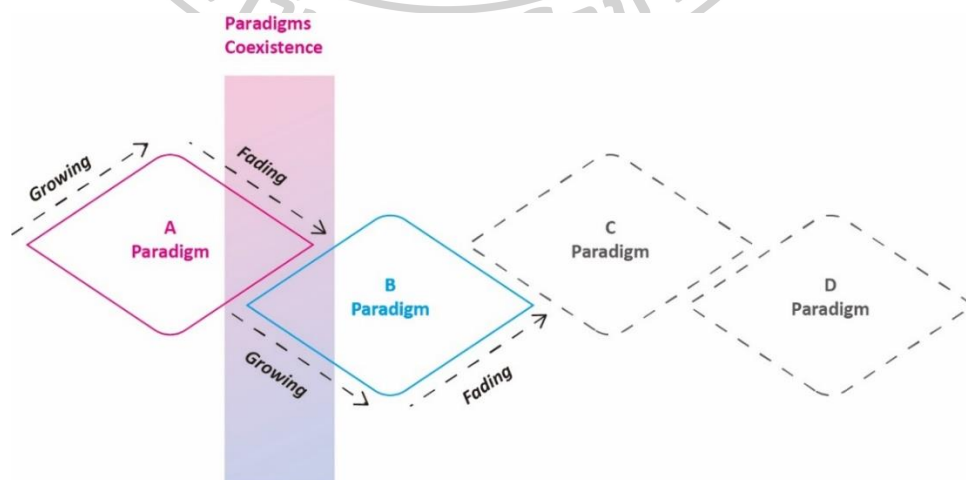
Figure 32. Relationship Model among Paradigms

By Xing YANG

4.2.3 Results of the Design Paradigm Descriptive Indicator System

This study developed the design paradigm descriptive indicator system by referencing and evaluating Thomas S. Kuhn's paradigm theory and Margaret Masterman's perspective on the paradigm shift, according to the methodology outlined in section 3.3.3.

Thomas S. Kuhn's main opinion on paradigm have mentioned in section 4.2.2, but he did not fully explain what a paradigm is. Numerous questions have been raised about Kuhn's theory, and no academic consensus has yet been achieved. Margaret Masterman, a British academic, found at least 22 different paradigm concepts in Kuhn's book. Masterman sorted through the concepts and came up with three different interpretations of the term paradigm:

(1) philosophical paradigm (philosophically, a paradigm is a way of seeing);

(2) artificial paradigm (cases); and

(3) sociological paradigm (scientific habits; Fallan 2010).

This study applied Masterman's view to create the main indicators of paradigm description. (Figure 33)
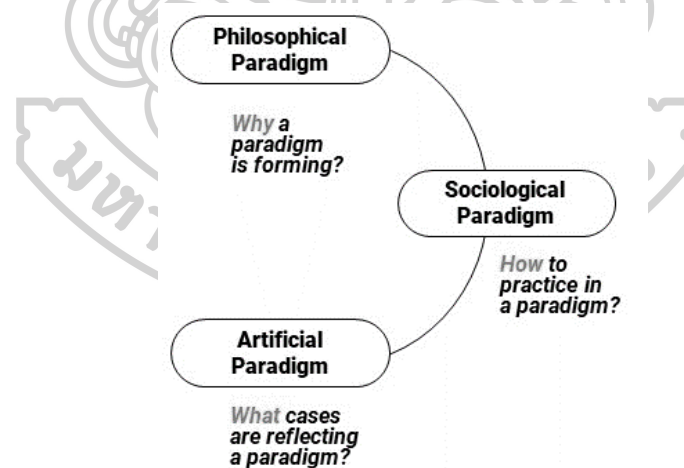
Figure 33. Main Indicators of Paradigm Description

By Xing YANG

The main indicator of paradigm description is just a common model to analyze a paradigm rather than an indicator system on design paradigm research. According to the specific meanings of the main indicators, comprehensive indicators suitable for design research were proposed.

The philosophical paradigm is a way of seeing. In other words, what is the value of seeing something? In design, it is a way of seeing the design. Therefore, two comprehensive indicators, named value orientation and context, are proposed to describe the philosophical paradigm of design.

The 'value orientation' indicator is used to determine how designers think about design on a philosophical level, and the 'context' indicator is used to determine what social, economic, and technical factors influence design values.

Simultaneously, the artificial paradigm is a way of looking at paradigms through the lens of cases. In design, it is a way of seeing the design from design cases. Therefore, two comprehensive indicators, named design case and design goal, were proposed to describe the design's artificial paradigm.

The 'design case' indicator is used to determine which design cases design practitioners concentrate on, and the 'design goal' indicator is used to determine what design projects design practitioners want to complete.

While the sociological paradigm is a practical way of describing a paradigm, it is not the only way to do so; in design, it is a way of the design practice. Therefore, this study embodied this indicator as 'work mode.'

The 'work mode' indicator is used to determine how design practitioners organize themselves in order to put design science, education, and practice into action.

For easy understanding, this study created a design paradigm descriptive indicator system. (Figure 34)
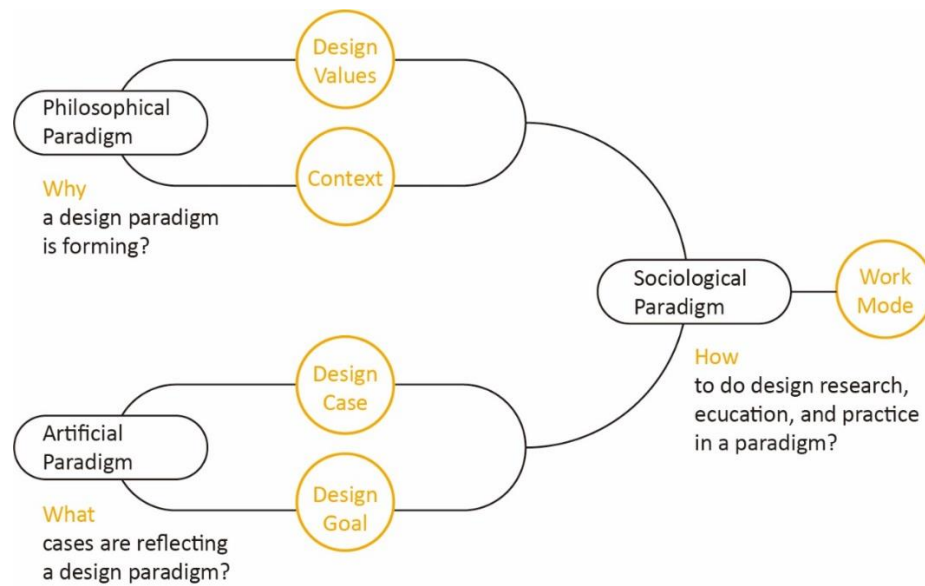
Figure 34. Design Paradigm Descriptive Indicator System

By Xing YANG

4.3 Results of the Paradigm of Information Design in China (2009–2019)

4.3.1 Results of Value Orientations

This study analyzed the data in Table 7 to find the frequency and trend of attention design value orientations.

After data analysis, the frequency of attention on different design values is shown in Figure 35.
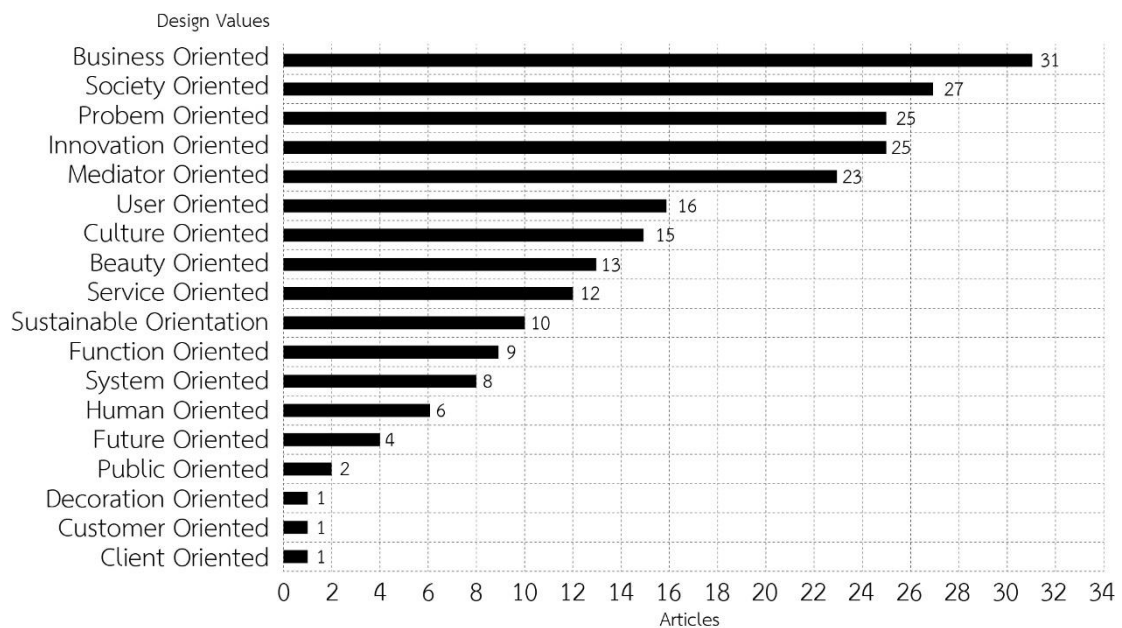
Figure 35. Frequency of Attention Statistics of Value Orientation

By Xing YANG

As a result, business orientation, society orientation, problem orientation, innovation orientation, and mediator orientation are attracting more attention. According to Table 6, the meanings as following:

- Business oriented means that the design value pays more attention to whether the design benefits marketing.
- Society oriented means that the task of design is to serve the social relationship.
- Problem oriented means that the task of design is to solve problems.
- Innovation oriented means that design is mean of innovation.
- Mediator oriented the task of design is to supply a platform for balancing relationships.

All the value orientations are all in the relationship group except business orientation. Therefore, the values of information design have two main orientations: business orientation and relationship orientation. Business orientation means information design pays attention to whether the design benefits marketing. Relationship orientation means information design pays attention to coordinating various relationships rather than creating artifacts.

This study categorized all the value orientations into four groups according to the meanings:

- Artifact Group

These design values pay attention to design objects, including decoration oriented, beauty oriented, culture oriented, and function oriented.

- Business Group

These design values pay attention to whether the design benefits marketing, including business oriented.

- Human Group

These design values pay attention to people, including client oriented, customer oriented, user oriented, public oriented, and human oriented.

- Relationship Group

These design values pay attention to the relationships between humans and others, including service oriented, society oriented, problem oriented, innovation oriented, mediator oriented, system oriented, sustainable oriented, and future oriented.

Based on the trend analysis of four value orientation groups, it is found that the business group continues to decline, while the relationship group continues to receive attention. Therefore, relationship orientation is the true value orientation of information design in China in 2009-2019. (Figure 36)
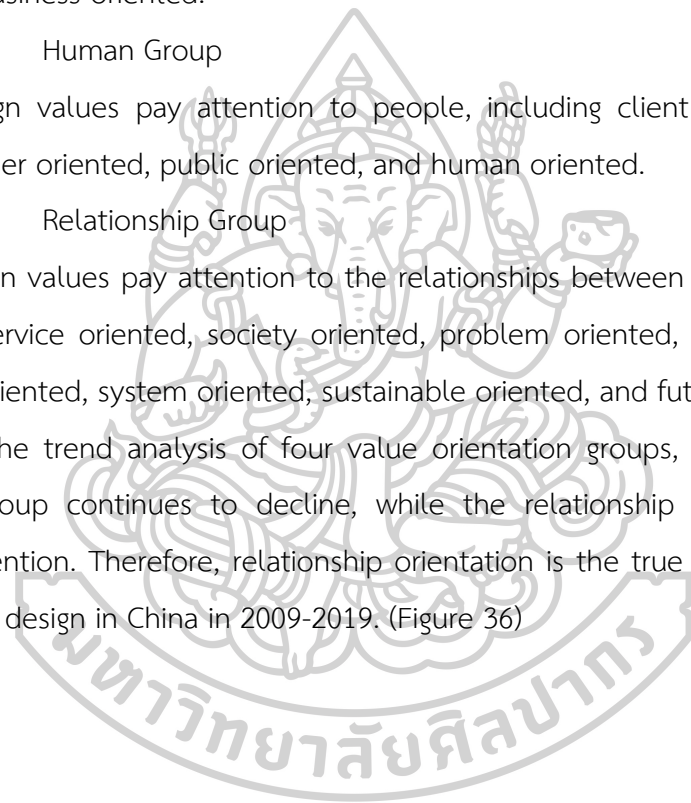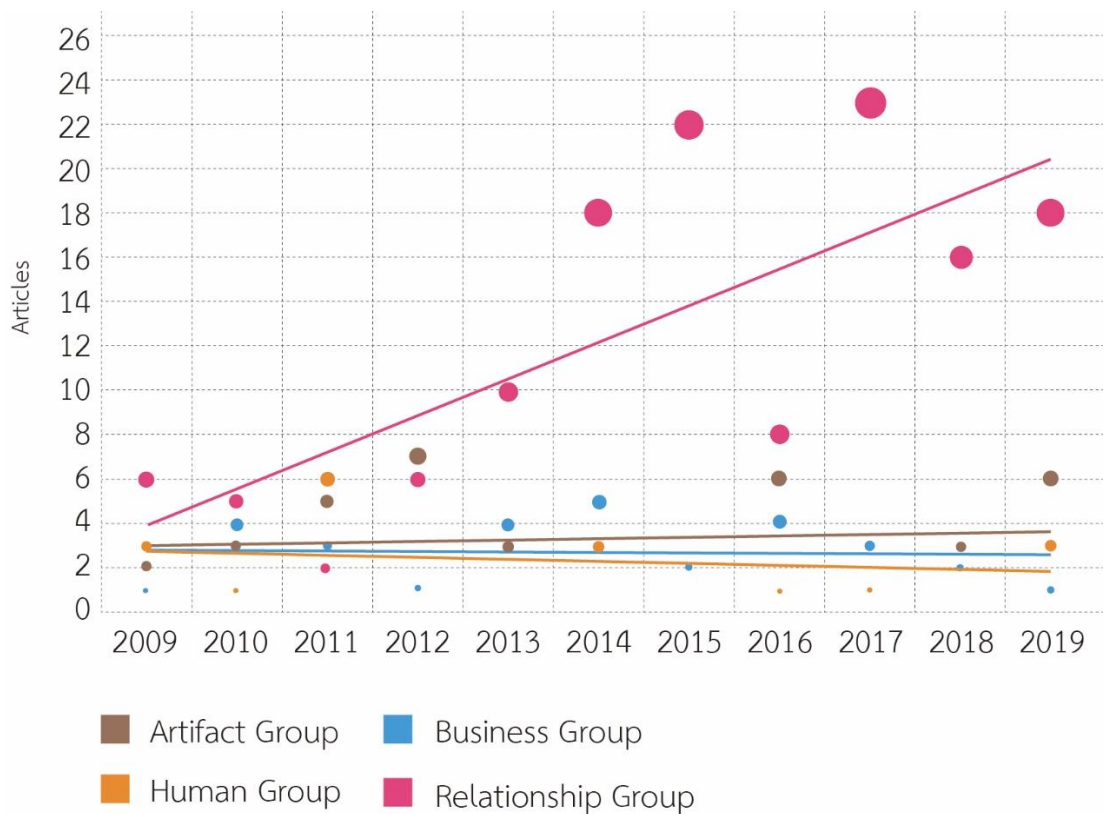
Figure 36. Attention Trend Changes Statistics of Value Orientation (1)

By Xing YANG

Relationship-oriented information design believes that the goal of information design is to coordinate social relations (human-human relations), which is reflected in:

- The task of information design is to provide services rather than artifacts;
- Information design is an innovative tool;
- The task of information design is to serve society;
- The task of information design is to solve problems.

Relationship-oriented information design increasingly shows the concern for coordinating multiple relationships, such as human with human, human with the environment, and human with technology.

From another perspective, this study categorized all the value orientations into another two groups according to the meanings:

- Immediate Benefits Group

These design values pay attention to the present and the near future, including decoration oriented, beauty oriented, function oriented, business oriented, client oriented, customer oriented, user oriented, public oriented, service oriented, society oriented, and mediator oriented.

- Long-term Benefits Group

These design values pay attention to the future, including culture oriented, human oriented, problem oriented, innovation oriented, system oriented, sustainable orientation, and future oriented.

After analyzing the trend of the immediate benefits group and long-term benefits group. After 2018, the long-term benefits group's design values surpass the immediate benefits group and get a sharp increase. (Figure 37)
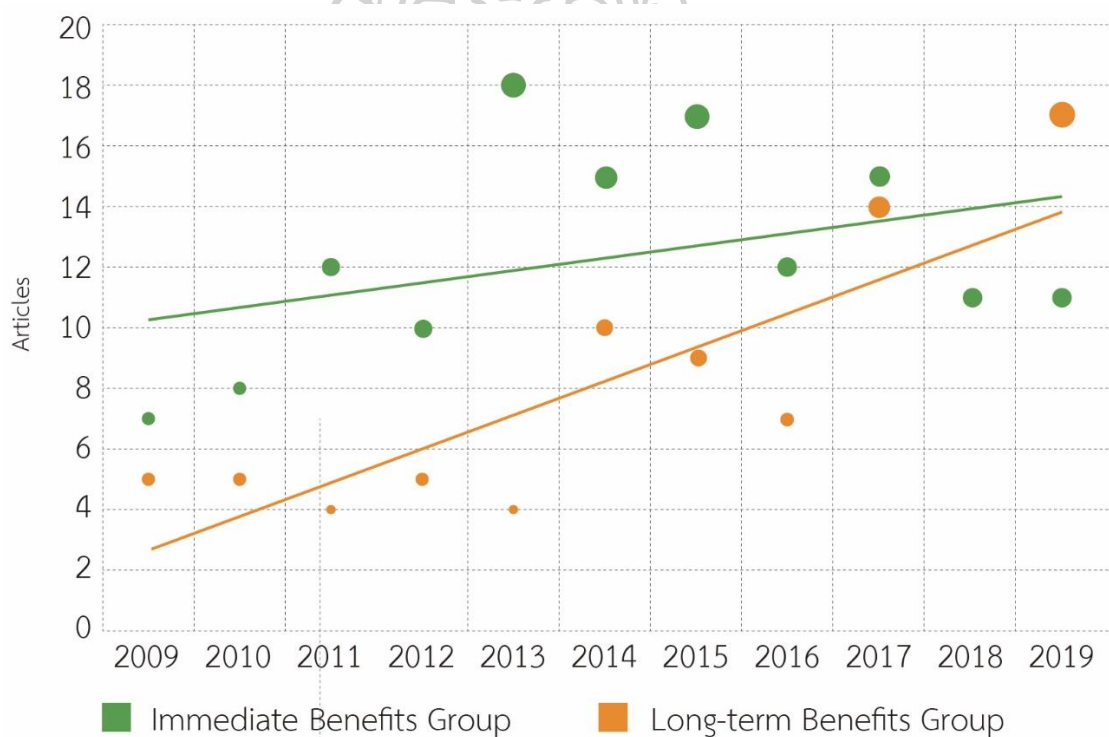
Figure 37. Attention Trend Changes Statistics of Value Orientation (2)

By Xing YANG

Long-term benefits are reflected in:

- Information design helps sustainable development;
- Information design is not to design information but to provide a platform for information exchange; even

- Information design provides an automatic information service system.

4.3.2 Results of Contexts

This study analyzed the data in Table 9 to find the frequency and trend of attention on contexts. Thus, it also divided all the contexts detected from samples from two perspectives: 'Technology' 'Society' 'Economy' 'Culture' 'Other', and 'International' 'National'.

(1) From an International Perspective

Technology is including mobile internet, artificial intelligence, cloud computing, big data, somatosensory, internet of things, wearable, virtual reality, blockchain, machine learning, digital technology, and new materials.

Society includes information society, internet era, big data era, new media society, digital media society, smart society, intangible society, sustainable development, non-paper society, and diversified development.

Economy is including globalization, new industry, industrial chain integration, e-commerce, experience economy, creative economy, and knowledge economy.

Culture is including internet culture, digital life, and social media popularity.

Other is including products become information terminals and smart devices popularity.

(2) From a National Perspective

Technology is including China's Information Technology Keeps Pace with the World or Even Leads.

Society is including urbanization strategy and 'internet+' strategy.

Economy is including industrial upgrading strategy, focusing on the cultural and creative industry, calling for innovation and entrepreneurship, 'internet +' Strategy, and focusing on data industry.

Culture includes promoting harmonious values, cultural system reform, cultural self-confidence, digital cultural preservation, traditional village protection, 'internet+' strategy, and cultural and technological innovation strategy.

Other is including teaching reform of design talents, design discipline upgrade, new design subjects' establishment, and local design theory construction.

After data analysis, the frequency of attention on different international contexts is shown in Figure 38. The results show that, from the international contexts, the critical factor affecting information design's values is technological development. All the features and trends of society, economy, culture, and others reflect the development of technology.
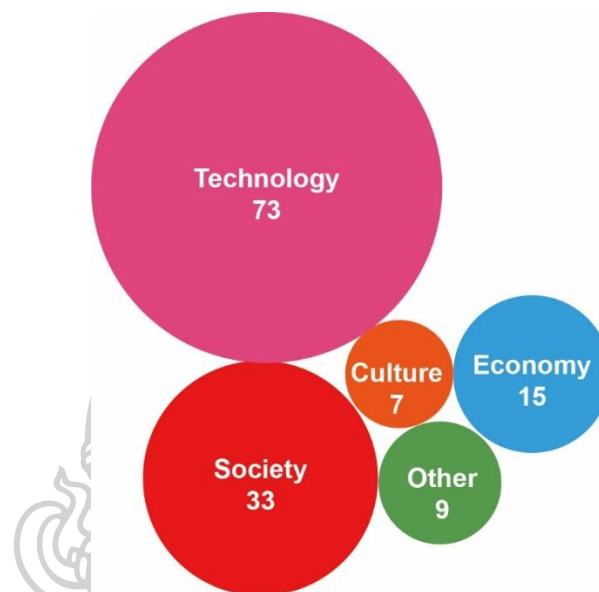
Figure 38. Frequency of Attention Statistics of International Contexts
By Xing YANG

From the perspective of the national context, economy, culture, and other national policies and strategies play a significant role in forming of China's information design values. In the other contexts group, all the issues refer to design education policies. These national policies or strategies are also objective reflections of international and domestic technological development. (Figure 39)
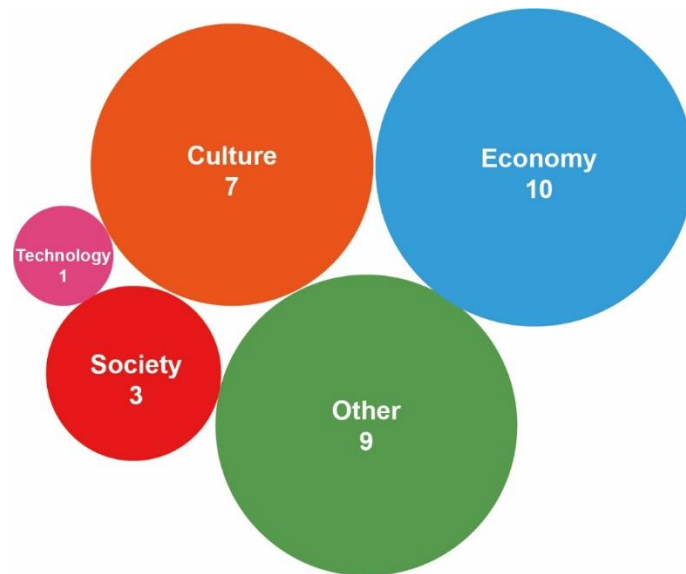
Figure 39. Frequency of Attention Statistics of National Contexts
By Xing YANG

The following are important national economic, social, and other policies and strategies that affect the formation of China's information design values:

(1) In Economy

- Industrial Upgrading Strategy;
- In 2015, Chinese Premier Li Keqiang unveiled the 'Made in China 2025' grand plan, emphasizing the importance of reform and innovation in China's economic growth.
- Strategy for developing cultural and creative industries;
  China has prioritized the development of the cultural industry since 2012, improving the current cultural industry structure and market system, innovating production and management processes, improving cultural and economic policies, and cultivating new cultural formats, propelling China's cultural industry into a time of rapid growth.
- The whole society advocates innovation and entrepreneurship;
- China has pushed for the introduction of innovation-driven growth strategies since 2012. Xi Jinping has presented several new perspectives and thoughts on creativity in recent years.
- 'Internet+' strategy;

China actively implements the network power policy, the national big data strategy, and the 'Internet+' action plan during the 13th Five-Year Plan span to support the integrated growth of the Internet, the economy, and society, allowing the fruits of Internet development to benefit all Chinese citizens and better benefit people in all countries.

(2) In Culture

- Cultural system reform;

  Since 2012, Xi Jinping has made a series of important discussions on cultural reform and development. The country is deepening the cultural system's reform, putting social benefits first, and innovating the operating mechanism of public cultural services.

- Promote cultural self-confidence;

  In 2016, Xi Jinping pointed out that 'cultural self-confidence is a more basic, broader and deeper self-confidence'.

(3) In Other (Education)

- Upgrade of the design discipline.

  In 2011, art became a new discipline in China's degree system, and design became the first-level discipline.

4.3.3 Results of Design Cases

This study analyzed the data in Table 11 to find the frequency of attention between different design cases.

This study divided all the design cases into four sub-categories, named 'Simple Tangible Case Group' 'Comprehensive Tangible Case Group' 'Simple Intangible Case Group' and 'Complex Intangible Case Group'.

The simple tangible case group means the outcomes of these design cases can be seen, including book design, font design, new media design, network symbol design, webpage design, page navigation design, animation design, visual elements design, e-book design, interactive interface design, digital media design, infographic design, icon design, application design, digitalization of cultural heritage design, and social media design.

Comprehensive tangible case group means the outcomes of these design cases are the collection of simple tangible cases, including advertisement design, mobile products design, products design, space design, brand design, information visualization design, and display of cultural heritage design.

The simple intangible case group means the outcomes of these design cases cannot be seen with a single design target, including experience design, behavior design, interaction design, information design, sound design, time design, and distance between human and product design.

The complex intangible case group means the outcomes of these design cases cannot be seen with systematic design targets, including smart city system design, business model design, service system design, overall design, charity model design, interactive system design, and management system design.

After data analysis, the frequency of attention on different design case groups are shown in Figure 40. The results show that simple intangible design cases became the focus of China's information design from 2009 to 2019, such as interaction design, behavior design, experience design, etc. These design cases have changed from focusing on interactive interfaces to focusing on interactive behaviors and feelings.
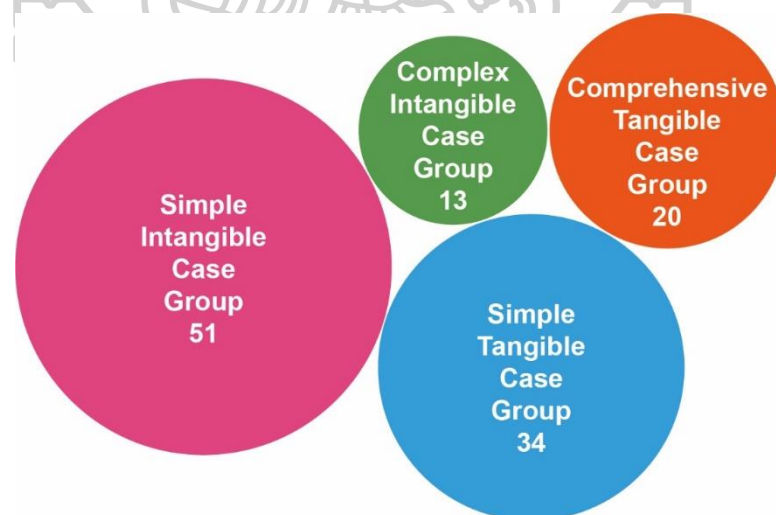
Figure 40. Frequency of Attention Statistics of Design Case Groups

By Xing YANG

However, combining the results of the value orientation and the context categories, more complex and systematic intangible design cases will gradually

replace simple intangible design cases to become the focus of attention, such as service system design, interactive system design, etc. These design objects pay attention to system, co-creation, and self-generation.

4.3.4 Results of Design Goals

This study analyzed the data in Table 14 to find the frequency and trend of attention on design goals.

This study divided all the design goals from two perspectives: 'Experience Group' 'Function Group' 'Systemization Group' 'Effectiveness Group' 'Aesthetics Group' 'Innovation Group' 'Future Group' and 'User-side' 'Supply-side'.

(1) From the First Perspective

Design goals in the experience group focus on the good feeling when using products or services, including enjoyable experience, immersive, good experience, harmonious audiovisual, fun, natural interaction, trustable, and multi-sensory combination.

Design goals in the function group focus on availabilities, including content expression, multi-dimensional expression, realization of function, and digitalization of cultural protection.

Design goals in the systemization group focus on the whole process of products or services, including systemization, intelligence, balancing product cycles, all-round service, and digitalization.

Design goals in the effectiveness group focus on the efficiency improving, including communication efficiency, reducing costs, improving efficiency.

Design goals in the aesthetics group focus on the aesthetic needs, including personalization, customization, beauty, and localization.

Design goals in the innovation group focus on the achieving innovation, including creating value, innovation, and creative means.

Design goals in the future group focus on servicing the long-term benefits, including harmony between people and others, facing the future, ecological health, and achieving strategy.

(2) From the Second Perspective

In the user-side group, design goals come from the user's standpoint, including user needs, personalization, customization, enjoyable experience, immersive, good experience, harmonious audiovisual, user participation, all-round service, fun, natural interaction, trustable, and beauty.

In the supply-side group, design goals come from the supply-side's standpoint, such as designers, enterprises, organizations, etc., including content expression, localization, creative means, multi-sensory combination, multi-dimensional expression, realization of function, communication efficiency, innovation, harmony between people and others, creating value, facing the future, reducing costs, improving efficiency, ecological health, systemization, balancing product cycles, digitalization of cultural protection, digitalization, intelligence, and achieving strategy.

After data analysis, the trend of attention between different groups is shown in Figure 41 and Figure 42.
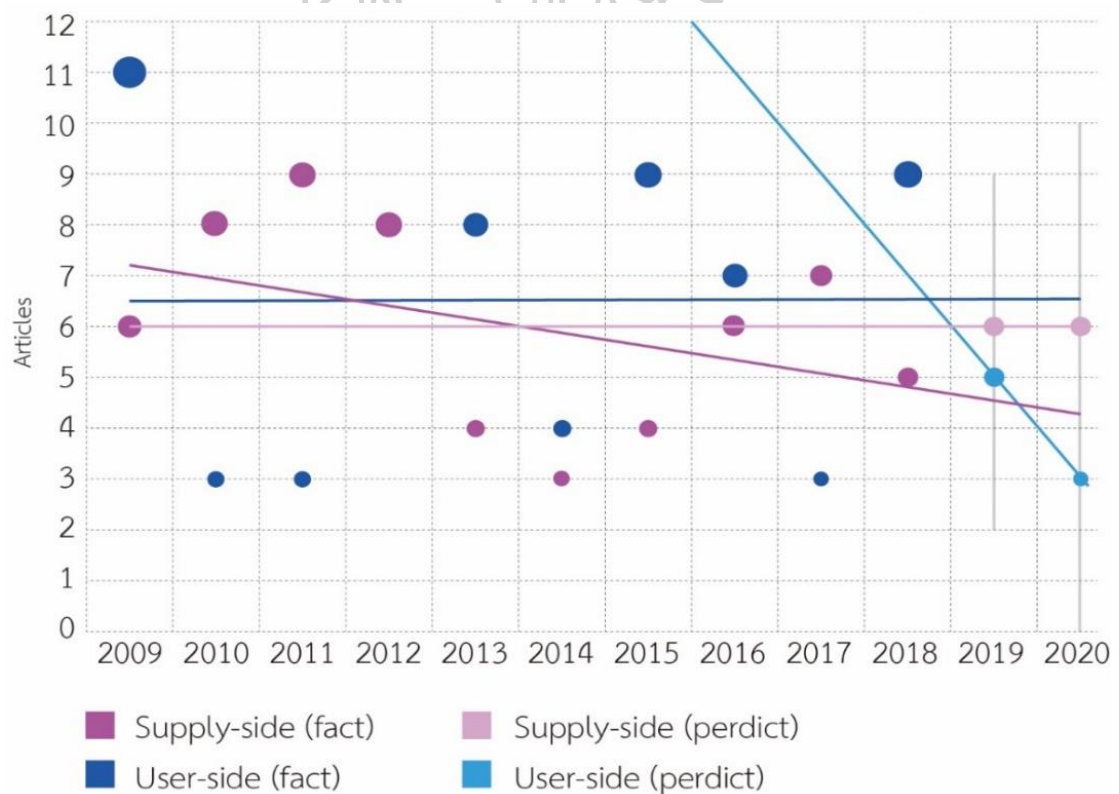
Figure 41. The Trend of Attention Statistics of Design Goal Groups (1)

By Xing YANG
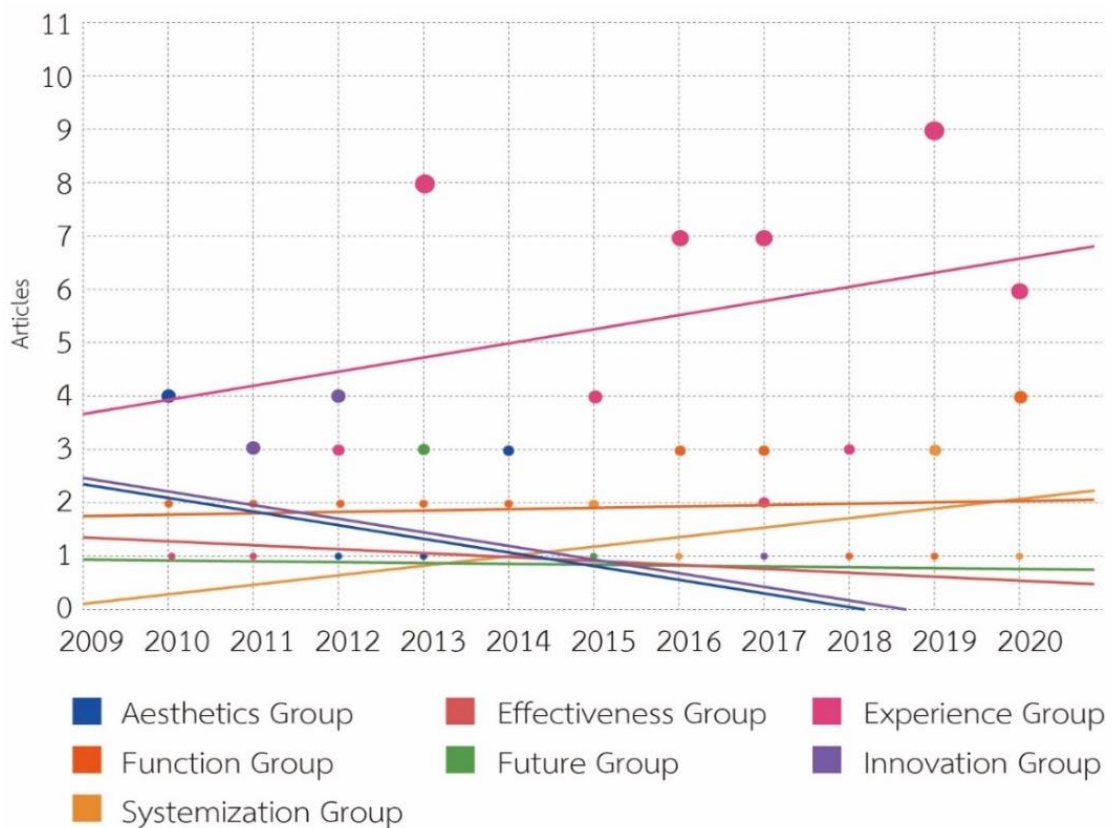
Figure 42. The Trend of Attention Statistics of Design Goal Groups (2)

By Xing YANG

As a result, the goals to be achieved in specific cases of China's information design from 2009 to 2019 are mostly equally considered from the perspectives of the user-side and supply-side, but as the result of prediction, the design goals come from the supply-side will continue to be focused, while the design goals come from user-side are getting a sharp decline.

Also, the design goals in the experience group are getting significant attention.

4.3.5 Results of Work Modes

This study analyzed the data in Table 17 to find the frequency and trend of attention on work modes.

After data analysis, the overall frequency of attention on the work modes are shown in Figure 43.

As a result, the interdisciplinary (external) work mode is getting much more attention. Interdisciplinary (external) means collaboration in different design fields and other disciplines.
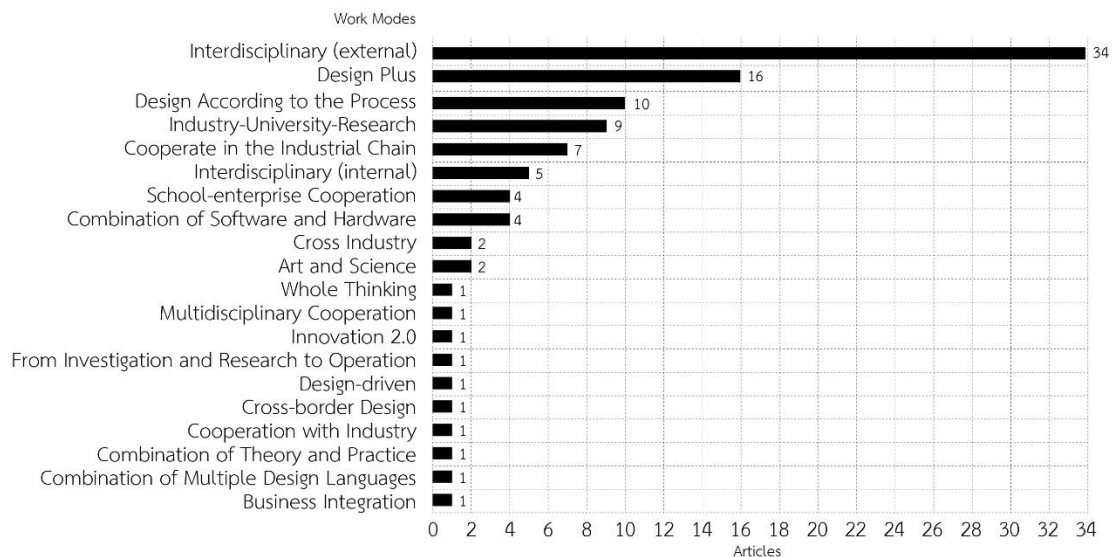
Figure 43. Frequency of Attention Statistics of Work Modes

By Xing YANG

This study divided the work modes into six groups according to different collaborative scope, named 'Single Design' 'Interdisciplinary (internal)' 'Interdisciplinary (external)' 'Industry-University-Research' 'Industry Chain' and 'Design+'.

Under the single design mode group, designers in specific design areas work alone or in a group, including design according to the process, and combination of multiple design languages.

Interdisciplinary (internal) work modes mean collaboration in different design fields, including interdisciplinary (internal), and cross-border design.

Interdisciplinary (external) work modes mean collaboration in different design fields and other disciplines, including interdisciplinary (external), multidisciplinary cooperation, and art and science.

Industry-university-research work modes mean design teaching, research, and industry interaction, including school-enterprise cooperation, cooperation with industry, industry-university-research, and combination of theory and practice.

Industry chain work modes mean design focusing on the entire product cycle from planning to logistics, storage, sales, and iteration, including combination of software and hardware, from investigation and research to operation, whole thinking, and cooperate in the industrial chain.

Design+ work modes mean design parallel to specific industries and deep integration of design and specific industries, including design+, design-driven, cross industry, innovation 2.0, and business integration.

From the trend statistics of work mode groups above, the work modes in the design+ group have much sharper increasing focuses than the work modes in the interdisciplinary (external) group and becoming a trend. (Figure 44)
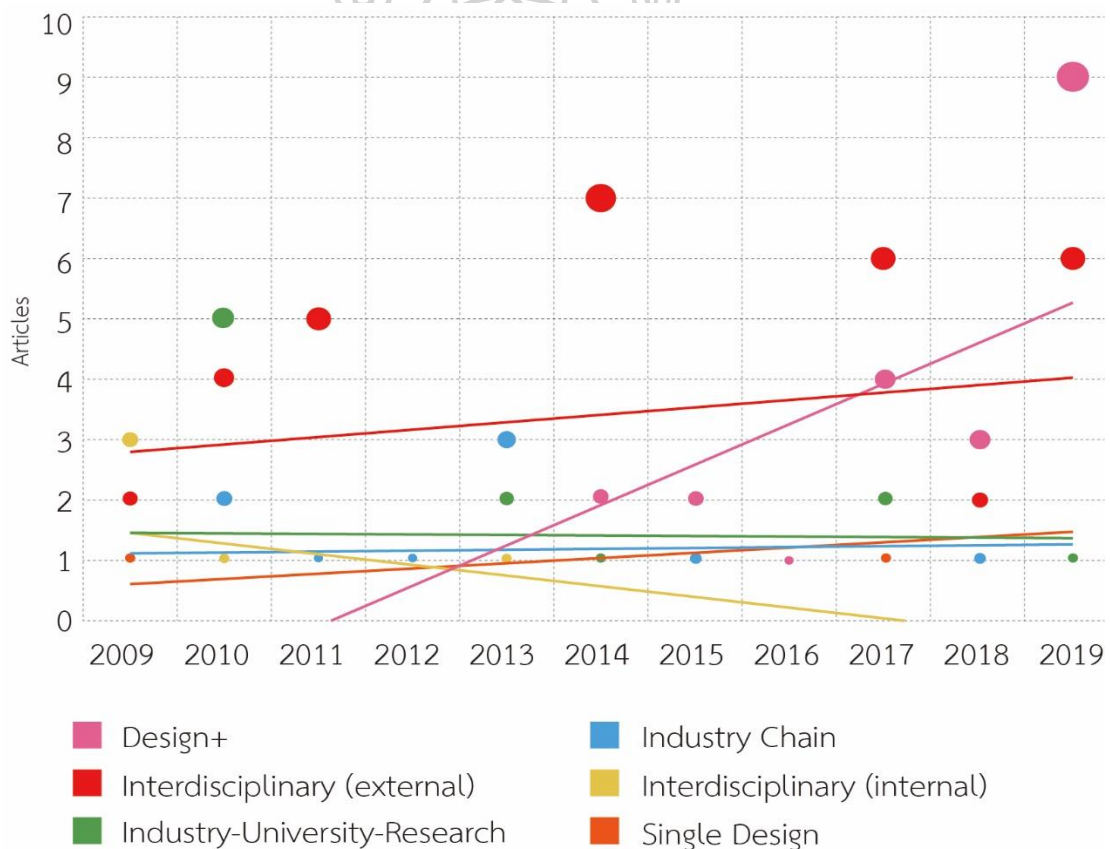
Figure 44. The Trend of Attention Statistics of Work Mode Groups

By Xing YANG

This study divided the work modes into another four groups according to different cooperative modes, named 'User Needs' 'User Participation' 'Co-creation Platform' and 'Dynamic Platform'.

User needs group means design starting from the needs of users, including user needs, and user-centered.

User participation group means letting users participate in the design process, including consumer participation, and user co-creation.

Co-creation platform group means establishing a cooperation platform to allow stakeholders to participate in the design, including project team, teamwork, collaborative design, linking design and users, studio, and cooperation platform.

Dynamic platform group means establishing a data-derived dynamic cooperation platform to allow stakeholders to design, including co-creation based on information, iterative update, dynamic system, innovation platform, open collaboration, break time and space limitations, and data-based.

From the frequency statistics of work mode groups above, designing through the platform is the primary way to achieve design cooperation, and the platform has gradually developed into a data-driven virtual platform. (Figure 45)
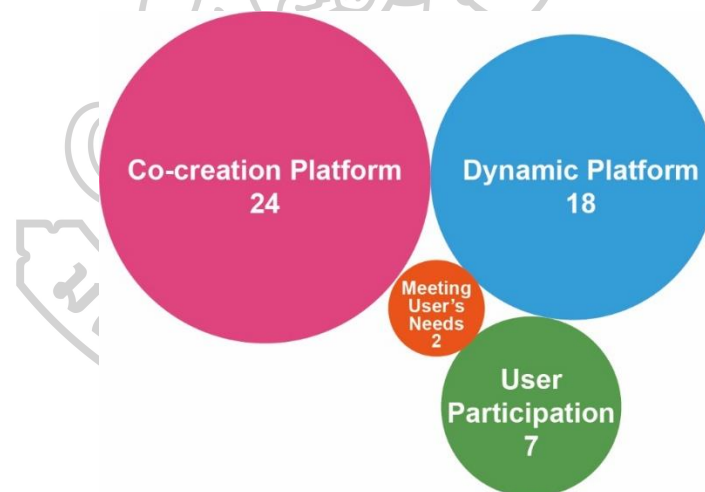
Figure 45. Frequency of Attention Statistics of Cooperative Modes

By Xing YANG

Chapter 5: Conclusions

5.1 Discussions

5.1.1 Restatement of the Study

This study comprehensively applied the methods of literature analysis, data analysis, historical comparative analysis and, questionnaire survey to define one hypothesis and three main problems.

Hypothesis:

China is forming its unique information design paradigm.

Problems:

There is currently no comprehensive information design concept generally recognized by academia;

The current theory that fully describes the design paradigm is not comprehensive;

The emerging information design paradigm in China has not been clearly decoded, but it has caused collective confusion among practitioners.

Accordingly, this research posed three research questions, each with its own set of sub-questions.

Question 1: What is information design?

(1) What is the identity of information design?

(2) What are the differences between information design and other designs or even other disciplines?

Question 2: How can a design paradigm be described?

(1) What is a paradigm, and how the relationship between multiple paradigms be understood?

(2) What is the design paradigm descriptive indicator system?

Question 3: What is the paradigm of information design in China (2009–2019)?

To answer the three questions, this study set three research objectives:

Objective 1: to identify information design

Objective 2: to create design paradigm models

(1) A design classification model

(2) A relationship model among paradigms

(3) A design paradigm descriptive indicator system

Objective 3: to decode the paradigm of information design in China (2009–2019).

For identifying information design, this study adopted the literature analysis method to define the origin, context, objective, object, elements, characteristics, and scope of information design.

As a result, the word 'information design' was coined in the 1970s by the graphic design and science communities. The academic status of information design was formally established in 1979 and gradually developed into a new discipline in the 1980s. The objective of information design is information communication, taking information as the design object and signs and symbols as design elements. Information design is an interdisciplinary field with a broad scope, but its focus is only on information communication.

This conclusion can effectively solve information design's cognition difficulties when the design becomes intangible and integrated, but it cannot fully answer what is information design. This study further answered the boundaries and relationships between information design and other designs and even other disciplines in the second research objective.

For creating design paradigm description models, this study comprehensively adopted the methods of case analysis, historical comparative analysis, and theoretical deduction as to create the design classification model, the relationship model among paradigms, and the design paradigm descriptive indicator system, which together form a design paradigm models.

This study followed design classification idea (Corbusier, 1985). According to the fourth round of China University Subject Rankings approved by the Ministry of Education of the People's Republic of China (CDGDC, 2017), the classification standard is no longer focused on objects but design functions, and the subjects offered by China's top 20% universities and colleges in design were categorized

according to design functions. Finally, three main layer of design classification and five categories of the design were identified as follows:

Design Thinking layer: design theory

Design Doing layer: design for communication, design for space, and design for use

Design Expanding layer: design+

Moreover, this study holds two characteristics of every kind of design according to Le Corbusier's idea, named universal characteristics and local characteristics.

Furthermore, by studying the history of modern design, this study discovered that the development of design for communication has consistently been ahead of other designs, granting design for communication status as a leading indicator of overall design development.

Accordingly, the design classification model was created. This model provides further researchers with a new perspective, design functions, which is different from the object-type classification perspective to classify designs. At the same time, this model answers the remaining questions in Objective 1, that is, the boundary and relationship between information design and other designs and even other disciplines.

Besides, this study referenced and analyzed Thomas S. Kuhn's paradigm theory and Paul K. Feyerabend's view on the paradigm shift to create the relationship model among paradigms. This model explains the existing relationship among different styles or schools that have long been neglected in design research. The integrated application of the design classification model and the relationship model among paradigms can help design researchers determine a study's scope and samples.

In addition, this study also referenced and analyzed Thomas S. Kuhn's paradigm theory and Margaret Masterman's view on the paradigm shift to create the initial paradigm descriptive indicator system and put it to design discipline to create the design paradigm descriptive indicator system. This model benefits the researchers comprehensively descript a design paradigm.

For decoding the paradigm of information design in China (2009–2019), this study used the Chinese comprehensive design academic journal ZHUANGSHI as the data source, adopted content analysis methods, used the design classification model and the relationship model among paradigms to screen research samples, and fully described the emerging paradigm of Chinese information design (2009–2019) based on the design paradigm descriptive indicator system.

The results show that China is forming an information design paradigm that focuses on long-term benefits and balancing relationships rather than creating artifacts, which is dually affected by global information technology and China's domestic economic, cultural, and design education development strategies. Design practitioners are highly dedicated to set design goals from the perspective of the supply-side and are carrying out extensive design cooperation on data-driven platforms.

5.1.2 Implications

5.1.2.1 The Emerging Philosophical Paradigm of China's Information Design

The analysis results of 4.3.1 and 4.3.2 sections show that China's domestic economic, cultural and educational policies influence the formation of emerging design values. After 2019, China's relevant policies are maintaining the same value orientation.

Strategies and policies worthy of attention include the new infrastructure construction strategy, interdisciplinary construction, and 'The Fourteenth Five-year Plan for National Economic and Social Development and the 2035 Long-term Goals' that advocates innovation leading development. These strategies and policies all reflect the value orientation of attaching importance to long-term benefits and building platforms to coordinate multiple relationships and provide infrastructure, policy guidance, and intellectual support to develop of innovative and creative industries.

(1) New Infrastructure Construction Strategy

The Standing Committee of the Political Bureau of the CPC Central Committee met in March 2020 and suggested hastening the development of new

infrastructure. The National Development and Reform Commission of China then issued a simple concept on April 20, 2020, which primarily includes three aspects:

One is information infrastructure, which refers to infrastructure that has evolved as a result of next generation information technology, such as 5G, Internet of Things, Industrial Internet, Satellite Internet, Artificial Intelligence, Cloud Computing, Blockchain, Data Center, and Intelligent Computing Center.

The second is integrated infrastructure, which refers to the extensive use of technology such as the Internet, big data, and artificial intelligence to enable the transformation and upgrade of conventional infrastructure, as well as the formation of integrated infrastructure, such as intelligent transportation and smart energy infrastructure.

The third type of infrastructure is innovation infrastructure, which is used to support technological research, technology growth, and product development. It mostly refers to infrastructure that has public-benefit characteristics, such as major technology infrastructure, science and education infrastructure, and industrial technology innovation infrastructure. The meaning and expansion of modern infrastructure are not stagnant and will continue to meet the technological revolution and industrial change.

(2) Interdisciplinary Construction

In August 2020, interdisciplinary subjects became the 14th subject category in China. On October 21, the Ministry of Science and Technology emphasized that basic research and applied basic research should be placed in a more critical position in the country's scientific and technological work and increase long-term stable support for unpopular subjects, basic subjects, and interdisciplinary subjects. In the same month, the National Natural Science Foundation of China established the Department of Interdisciplinary Science.

There are two reasons for establishing new interdisciplinary categories: one is based on the needs of knowledge production, where interdisciplinary subjects can provide more diverse theoretical foundations and perspectives and produce creative results. Moreover, with the development of modern science and technology, more cutting-edge research is required to break through the limitations of a single

discipline, and it is possible to succeed based on interdisciplinary thinking and joint efforts.

The second is based on the need for talent training. In universities, the establishment and adjustment of disciplines need to respond on time, according to the types of talents needed by the changing society. Therefore, the country's newly established interdisciplinary categories are also from a policy perspective to guide colleges and universities to adjust the discipline layout, and then through discipline education, cultivate professional talents urgently needed by society.

(3) The Fourteenth Five-year Plan for National Economic and Social Development and the 2035 Long-term Goals

The 'Proposals of the Central Committee of the Communist Party of China on Formulating the Fourteenth Five-Year Plan for National Economic and Social Development and 2035 Long-Term Goals', which were reviewed and approved by the Fifth Plenary Session of the 19th Central Committee of the Party, were allowed to be broadcast by Xinhua News Agency on November 3, 2020.

The 'Proposal' is a five-year and beyond action plan for China's economic and social growth. The 'Proposal' stresses the need to 'unwaveringly adopt the new growth principle of creativity, coordination, greenness, transparency, and sharing,' organically combine the expansion of domestic demand policy with supply-side structural changes, and push to generate innovation and high-quality supply new demand.

It is not easy to describe China's cultural characteristics without any details, but it is not challenging to locate the philosophical ideas that affect Chinese culture's formation. Most Chinese cultural scholars agree that the fusion of Confucianism, Chinese Buddhism, and Taoism forms Chinese culture's essence. Finding the most fundamental perspective on cooperation from Confucianism, Chinese Buddhism, and Taoism culture can check whether Chinese culture is inherently consistent with the new information design paradigm's work mode.

(1) Confucianism Advocates Harmony in Diversity

Confucianism is one of the Hundred Schools of the Pre-Qin Dynasty. For thousands of years, it has been respected by Confucianists of all ages. Confucianism was developed by Confucius and evolved into a full Confucianism system over time.

In the face of differences, Confucianism regards harmony as the principle. The Master quoted Confucius' Analects, saying that 'the superior man is affable, but not adulatory; the mean man is adulatory, but not affable.' It means that a superior man can maintain a harmonious and cooperative relationship with others while engaging with them, but does not agree with other people's points of view on specific issues. Instead, he can maintain critical thought while completely respecting other people's points of view and seek to reach a consensus. It should not surface approve of different views and reject them internally.

Harmony in diversity is a practical wisdom to deal with difficulties in cooperation.

(2) Chinese Buddhism Advocates Equal

Buddhism, which originated in India, passed the Indian cultural circle with its universality of religion, spread into the western region of China, and spread throughout China. As with Confucianism, Taoism, and other inherent ideas had deeply penetrated all aspects of society. After the foreign Buddhist doctrine spread to China, it took root in Chinese society and formed Chinese Buddhism.

One of the critical teachings of Chinese Buddhism is equality. This equality is not the concept of equality proposed in the European Enlightenment. The equality of Chinese Buddhism includes three basic meanings: the reincarnation of the present and the afterlife is equal; everyone can become a Buddha; all beings are equal.

Equality is the foundation of cooperation. Without equality, it is challenging to form practical cooperation.

(3) Taoism Advocates a Balance

Taoism is a culture born and raised in China. It is based on the Taoist doctrine and studies, believes, inherits, and promotes Laozi's doctrine. This culture is both elegant and popular, and part of it has evolved into the folk culture, which has become an essential part of Chinese spiritual life.

Taoism advocates a balance between yin and yang, and it is the world view of the Chinese culture as a dynamically balanced. Chinese people should put everything under specific time and space, analyze specific problems, consider the changing process of things, and continuously find a balanced relationship to achieve a coordinated state.

The balance is the basic working method in cooperation.

5.1.2.2 The Emerging Artificial Paradigm of China's Information Design

The analysis results of 4.3.3 and 4.3.4 sections show that Chinese information design practitioners pay more and more attention to balancing multiple relationships through design rather than creating artifacts. They pay more attention to innovation from the supply side rather than attracting users' attention. These are series of fundamental changes.

(1) Design is Always in an Unfinished State

From the results that the terminal and system should provide strong platform and system characteristics. The iteration speed of these design cases is rapidly achieved. It is not the designer who completes the design but the end-user. Moreover, changes with services application and machine can realize instant iteration and mass customization of terminal information products. This trend has been entirely different from the previous large-scale industrial production mode.

For example, Facebook will recommend news and information according to user preferences, YouTube will recommend videos according to content preferences, and even electronic maps will pop up instant information you may need at any time.

(2) From Focusing on User-side Needs to Focusing on Supply-side Innovation

The shift in design goals from meeting users' needs to supply-side innovation is a change in basic thinking. Due to the need not being created but only being met, the design is an improvement behavior under the thinking of meeting the user's needs, while the design is an innovation behavior.

User's needs could be identified from a survey or observation on the user-side, but the user's wants cannot, for the user does not know them before be created. It means a shift in design starting point from user-side to supply-side.

For example, before the Apple iPhone, Nokia phones just met people's needs and were therefore accepted. The newly created ideal were previously unknown to people. Therefore, Apple's founder Steve Jobs believed that users do not know what they need, and after Apple has come up with its products, users can discover what they want. Apple's innovation shifted from the user-side to the supply-side.

This thinking became one of China's basic development strategies already.

(3) Only Receive the Information You Like but Not the Information You Need

Data-driven information design can realize terminal diversification, but this diversification is based on the same operating logic. The seemingly prosperous design, in essence, is presenting some new challenges. The logic is not conducive to the creation of new things and harms the interests of long-term development.

In the new era of communication, social networks' development has brought about an explosion of information. At first glance, the channels, content, and quantity of people's access to information are vibrant, but with the help of technology and subjective choices, people often continue to accept and strengthen the views they already hold. The direction of information flow is very similar to that of the stratosphere atmosphere.

Regardless of Twitter, Facebook, Instagram, Weibo, and WeChat Moments, people often track information sources that are close to their positions and ideas and block their dissatisfied opponents. Big data is very smart, and according to users' past information habits and historical behaviors, the system uses algorithms to push the newest information to users. Over time, users think they have multiple channels of access to information, but in fact, what users see every day is information that they love to read, familiar with, and do not feel strange when reading. They are in the stratosphere of information as you are, constructing erected thick walls around

you, making it slightly different from the fields and values you are accustomed with your daily life.

Data-driven problems do not stop there. As data-driven becomes mainstream, more and more problems are emerging, but we cannot give up this development direction. Human beings need to solve development problems instead of shrinking. When the modern design was initiated, the low quality of products caused by large machinery production was also challenged by design theories. One of the Arts and Crafts Movement's advocacies is to return to the era of craftsmanship, but this anti-social development trend cannot prevent society development.

5.1.2.3 The Emerging Sociological Paradigm of China's Information Design

The analysis results of section 4.3.5 show that cooperation is the most important keyword for Chinese information design practitioners' working mode. Cooperation means the re-division of design labor. This division of labor is the re-division of labor between people and the re-division of labor with machines.

(1) Humans are Responsible for Creative Thinking and Machines are Responsible for the Execution and Repetitive Work

The democratization of design technology has led to designers' skills no longer a scarce resource. For example, you do not need to turn on Photoshop to modify a picture; it can be done easily with just a few swipes of the phone, and even make proper settings before taking the picture, and post-retouching work is entirely unnecessary.

Also, an endless stream of automatic design generation platforms, where designing a logo or a poster without hiring a designer at all, with just a few clicks on the Internet.

Could it be said that the machine replaced the designer's job? The answer is not pessimistic. It is a new division of labor between man and machine in the field of design. Humans are responsible for formulating design thinking, while machines are responsible for implementing design rules and complicated design labor.

For example, Alibaba's 'Luban' system is a design artificial intelligence application that focuses on the Alibaba e-commerce platform's design requirements. It can design 8,000 posters per second and increase the conversion rate of product

clicks; developed by Country Garden Group The 'Yuexing' system is a human-computer collaborative design system developed within the group, realizing the generation of large quantities of high-quality design creative materials.

(2) Design Stars Disappeared

People hear well-known designers' names less and less because the design work has become more and more complicated. It is difficult for a single designer and design team to complete a design project alone. Most design projects are a complex collaborative process that cannot be attributed to a specific person or team.

In the past, the requirements for designers were comprehensive and multi-skilled. However, as the design becomes complicated, a designer cannot master all the design skills. Therefore, the requirements for designers are from all-around talents to outstanding specialists. (Figure 46)
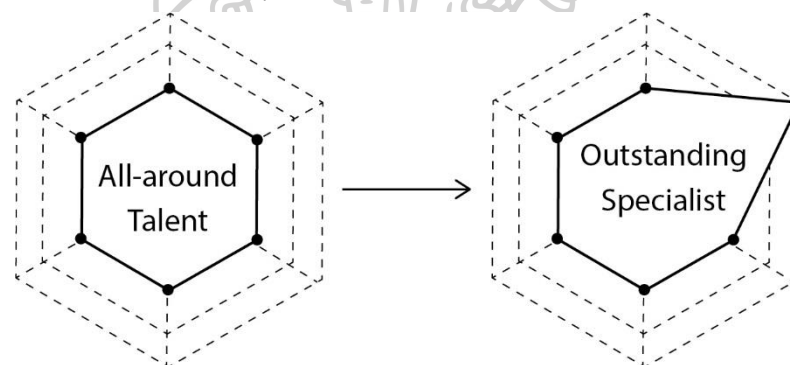
Figure 46. The Shift in Designer's Ability Requirements
By Xing YANG

5.2 Contributions

5.2.1 In Theory

5.2.1.1 On Information Design

The conclusion of this study on the identity of information design contradicts the views of scholars like Chen and O'Grady, who claim it is nearly impossible to come up with a single comprehensive meaning for the word 'information design' (Chen, 2011; O'Grady, 2008). At the same time, it provides strong support for scholars like Hembree, Mauricio Meja, Chu, Kathryn, and Andy, who claim that all visual communication and graphic designs are information design. Alternative

terms for graphic design have been suggested by educators and professionals, including information design, interface design, and visual communication design, with visual communication design referring to the evolution of graphic design (Hembree, 2008; Kathryn & Andy, 2014; Mauricio & Chu, 2014).

It can be seen from the design classification model that information design from this study is encompassed the design for communication sake thus can be called communication design.

Information design originated in the two fields of art and science and eventually formed an independent discipline. It is born with the attribute of linking art and science. It studies the relationship between people and objects and even between people rather than the subject's self-expression, nor the physical relationship between objects.

For information design, the design object is very simple, that is, information. The available elements are various signals and symbols. It is not easy to find a design case that involves only one design function. In other words, each design case is completed by different designs. Each design category focuses on realizing its function and interacting with other designs and even other disciplines. In this way, the interdisciplinary nature of design becomes more prominent, and so does information design.

Recognizing the interdisciplinary nature of design is conducive to breaking the previous perception of different design boundaries. The boundary between different designs no longer lies in object-type or shape but function.

5.2.1.2 On Design Paradigm Research

The design paradigm models created by this study include three sub-models: design classification model, relationship model among paradigms, and design paradigm descriptive indicator system. The design classification model and the relationship model among paradigms are beneficial for design researchers to scope research and screen samples; the design paradigm descriptive indicator system provides design researchers with a complete design paradigm descriptive perspective.

The whole set of models followed the attention to style and context in the research methods of art history and design history and made up for their lack of

understanding of the relationship between styles. Simultaneously, the whole set of models follows the cognition of the paradigm theory of the history of science on the relationship of different paradigms and puts the paradigm theory into the design research field, forming the indicator system for design research.

The design classification model filled up the gap in the absence of a design classification theory suitable for the current context. It offers new theoretical support for intangible design and clarifies the scope of the design. Furthermore, the model provides a new perspective of design classification, breaking Le Corbusier's object-type classification proposition (Corbusier, 1985). The new design classification model defines the design function as the classification standard and divides the design into three main horizontal layers: design thinking, design doing, design expanding, and two vertical layers with universal characteristics and local characteristics. Simultaneously, the five types of designs with different functions are classified into three main horizontal layers. Design theory is under design thinking; design for communication, design for space, and design for use under design doing; design+ under design expanding. Also, the design for communication is defined as the leading indicator of the overall design development.

The relationship model among paradigms filled up the gap in understanding the relationship between different paradigms (style/school) in the design research field. It is created by synthesizing of Thomas S. Kuhn's paradigm theory and Paul K. Feyerabend's view on the paradigm shift. This model has an explanatory function for the paradigm development of any discipline.

The design paradigm indicator system filled up the gap non completed theory to examine the relationship between the design objects and subjects and their context. In the past, some design researches focused on the design object, and some focused on the design subject. The design paradigm descriptive indicator system provides design researchers with a tool to fully understand the overall design within a specific research scope. This tool allows design researchers to interpret the value orientation of design, context, design cases, design goals, and design practitioners' work modes from three perspectives: philosophical paradigm, artificial paradigm, and sociological paradigm.

This study integrated the design paradigm models into a design paradigm research instruction to introduce the role and use methods of the models in design research. (Figure 47; Figure 48; Figure 49; Figure 50; Figure 51; Figure 52; Figure 53)
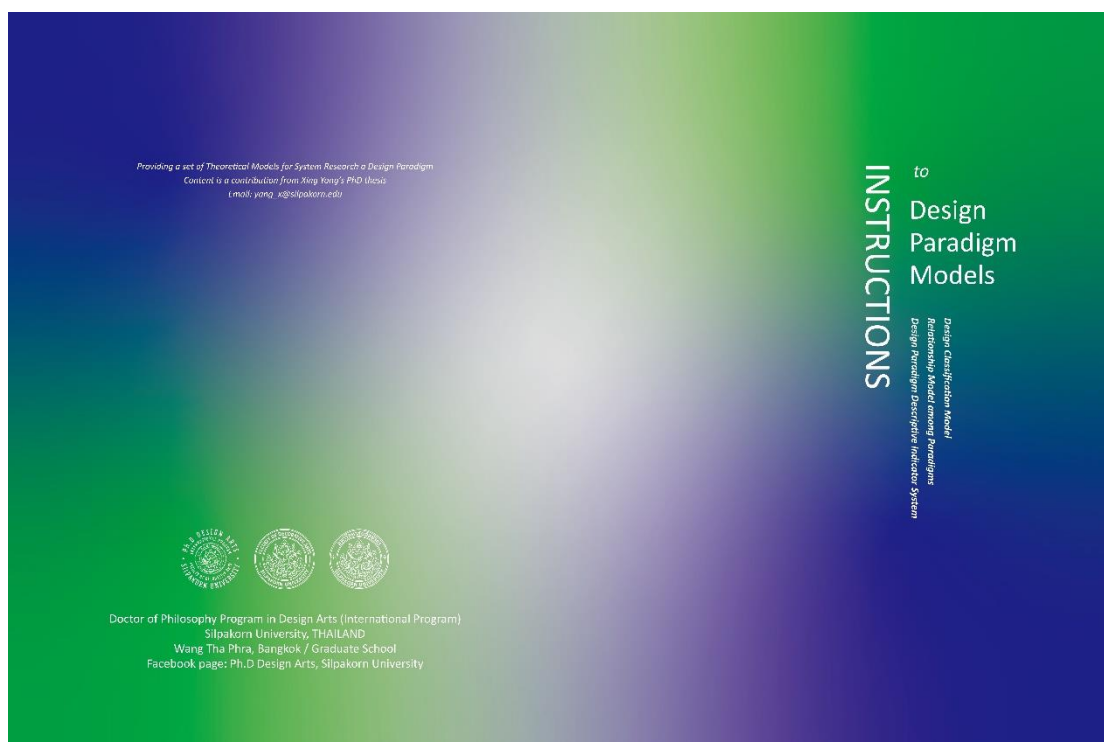
Figure 47. Covers of Instructions to Design Paradigm Models
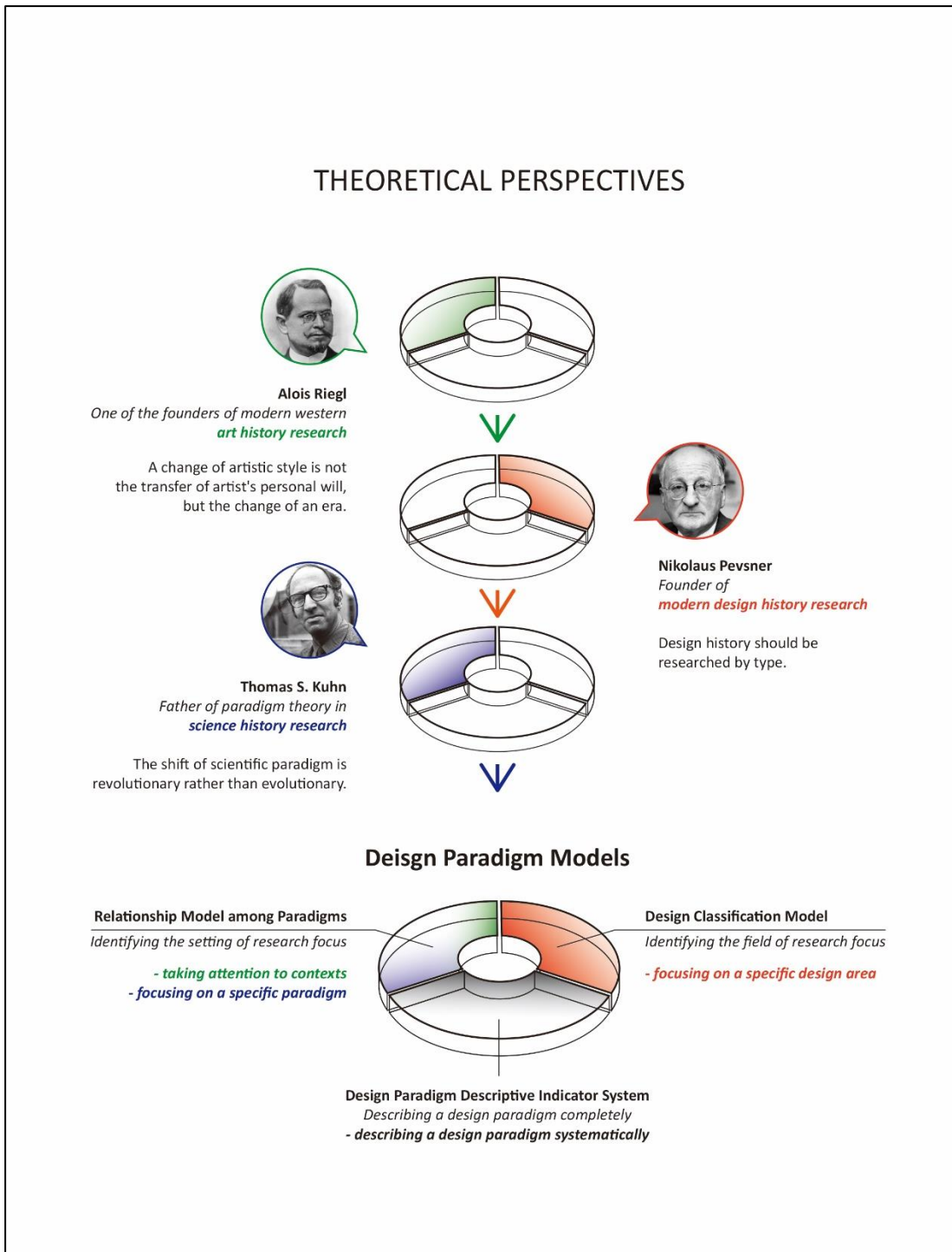
By Xing YANG

Figure 48. Theoretical Perspectives of Instructions to Design Paradigm Models
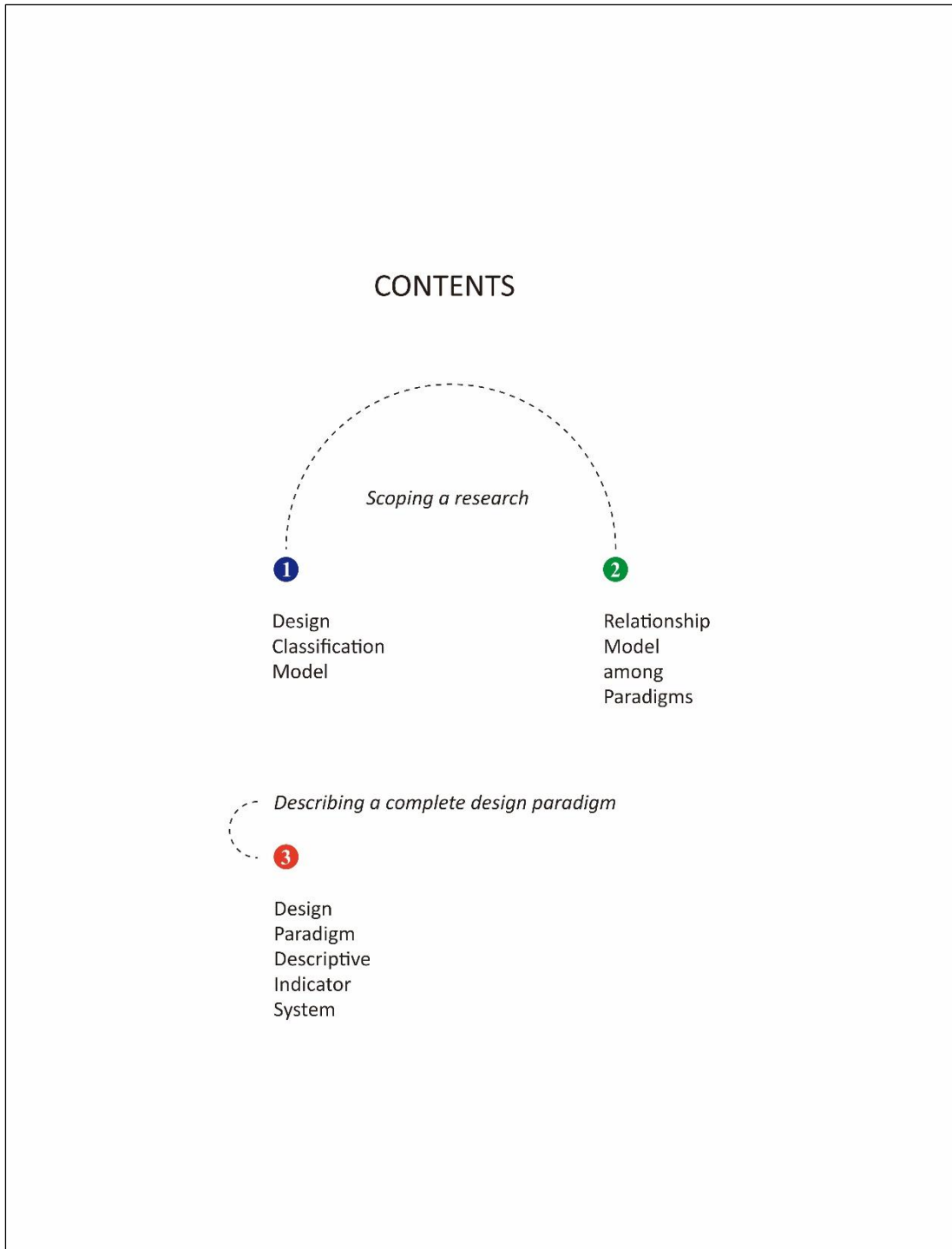
By Xing YANG

Figure 49. Contents of Instructions to Design Paradigm Models

By Xing YANG

❶ **Design Classification Model**

Basic View

Since Le Corbusier put forward the concept of 'object-types', the design has a method of classification research. However, the boundaries between current design objects have become blurred. Most of the time, designers from different design disciplines collaborate to realize the functions of different objects, and these objects eventually become complete designs.

Therefore, the design classification model follows Le Corbusier's design classification idea, but the classification standard is no longer based on objects but design functions.

Aim

Helping identify the design research area and scope to ensure the data's validity in the research.

Thinking Layer
Design Theory

Expanding Practice Area

Doing Layer
Design for Communication
Design for Space
Design for Use

From Theory to Practice

To Theory + Practice

Expanding Layer
Design+

Leading Indicator

Note
Designs with the function for communication is a leading indicator of overall design development.

From Universality to Particularity

Universal Characteristics

Local Characteristics

Figure 50. Instructions to Design Classification Model

By Xing YANG

Examples

Design+

Art and Technology
Product Service System Design
Innovative Design and Entrepreneurship
Design Strategy and Management
Integrated Innovation Design

Design Functions

Design for Space

Environmental Design
Architecture Design
Public Design
Exhibition Design
Landscape Garden Design
Interior Design

Design for Communication

Visual Communication Design
Animation Design
Information Art & Deisgn
Media and Communication Design
Media and Image Design
Interactive Design
Digital Media
Digital Publishing and Display Design
Game Design
Advertising Design
Interactive Design
Artificial Intelligence and Data Design

Design for Use

Textile Design
Fashion Design
Dyeing Design
Jewelry Design
Product Design
Vehicle Design

Design Theory

Design History
Design Theory
Design Thinking

Figure 51. Examples of Design Classification

By Xing YANG

Figure 52. Instructions to Relationship Model among Paradigms

By Xing YANG

❸ Design Paradigm Descriptive Indicator System

Basic View

Based on Thomas S. Kuhn's paradigm theory and Margaret Masterman's view on paradigm, there are three meanings of paradigm: philosophical paradigm (philosophically, a paradigm is a way of seeing); artificial paradigm (cases); and sociological paradigm (scientific habits). Accordingly, the design paradigm indicator system is proposed, and the five indicators under the three sub-paradigms require a general discussion when examining a design paradigm.

Aim

Helping describe a complete design paradigm.

Philosophical Paradigm — Design Values, Context
Why is a design paradigm forming?

Artificial Paradigm — Design Case, Design Goal
What are cases reflecting a design paradigm?

Sociological Paradigm — Work Mode
How to do design research, education, and practice in a paradigm?
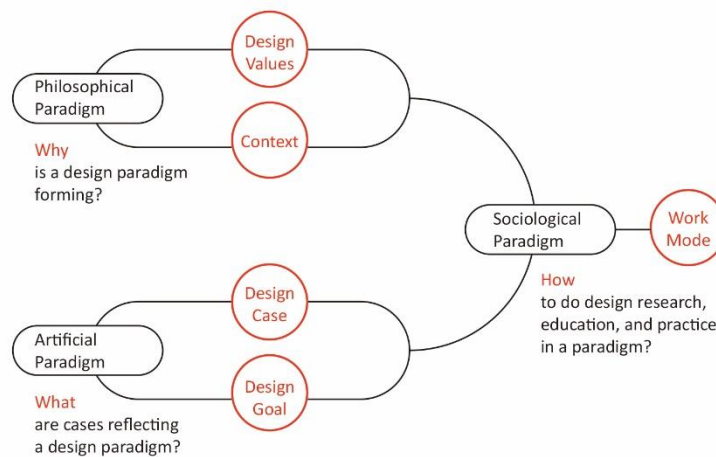
Note

'Design Values'   This indicator is used to answer how design practitioners understand design on a philosophical level;

'Context'   This indicator is used to answer what social, economic and technological background lead the design values;

'Design Case'   This indicator is used to answer what design cases the design practitioners focus on and reflecting a design paradigm;

'Design Goal'   This indicator is used to answer the design practitioners' goals to be achieved in specific design projects; and

'Work Mode'   This indicator is used to answer how the design practitioners organize design research, education and practice.

Figure 53. Instructions to Design Paradigm Descriptive Indicator System

By Xing YANG

5.2.2 In Practice

For information design practitioners, this study fully explained the current status and development trends of China's information design industry and provided them with reference for planning their studies and careers.

For design educators, the conclusions of this study answered many questions about the construction of design disciplines, such as how to define the boundary between different designs and the boundary between design and art and engineering. These conclusions provided references to China's design education reform.

For the design industry, the conclusions of this study revealed the shift in the working mode of Chinese information design practitioners, where the working mode of Chinese information design practitioners has changed from a fixed working mode such as a single designer, design profession, or design work team to a dynamic cooperation mode. This dynamic cooperative working mode is to cooperate within the design discipline and extends to the outside of the design discipline; this working mode is also connected by a data-driven platform instead of the previous tangible platform; the cooperative working mode extends horizontally to both ends of the industrial chain and extends vertically to industry, university, and research. This new design work model has announced the end of the star designer era and has also put forward new requirements for the designer's ability.

This study produced an online data story from the decoding results of the emerging paradigm of Chinese information design, providing design practitioners and researchers with a clear and concise reference. (Figure 54)
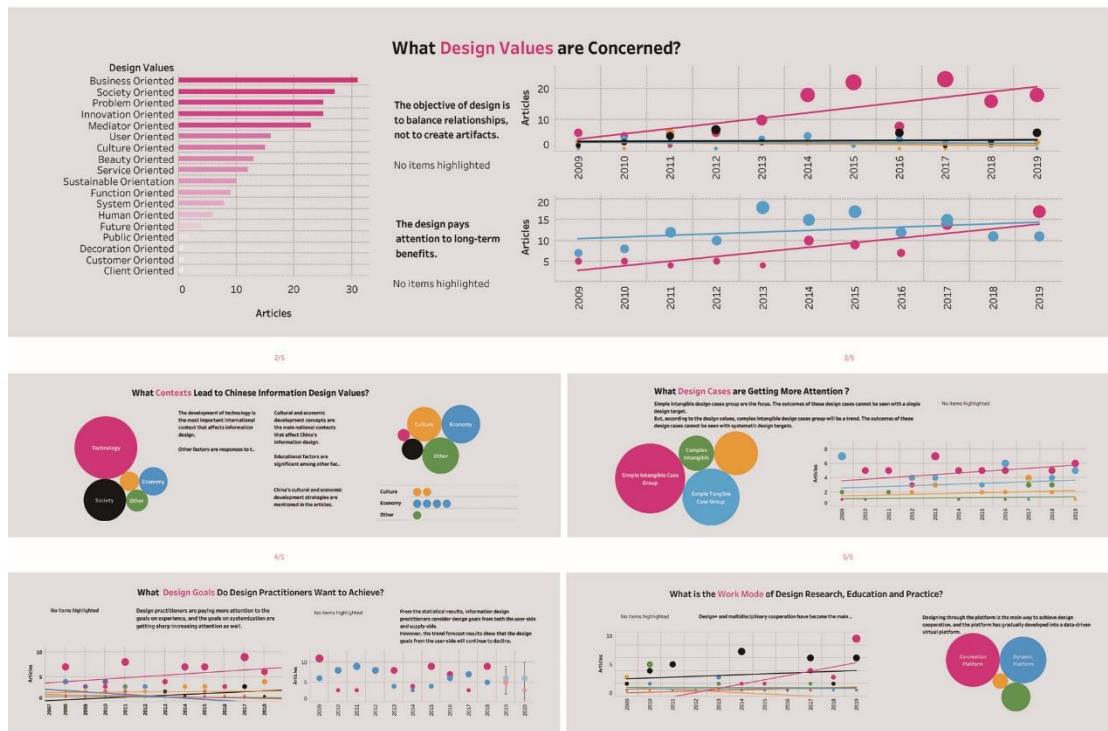
Figure 54. Online Data Story Screenshot

By Xing YANG, Available at:

https://public.tableau.com/views/2_16028771026180/INFORMATIONDESIGNINCHINA?:language=en&:display_count=y&:origin=viz_share_link

5.2.3 Feedback

As of 17:00 on January 24, 2021, the 'Online Data Story on Chinese Information Design (2009–2019)' has been read by 100 audiences. To obtain more accurate feedback, five peers who contributed to the reliability and validity of this study were invited to read the 'Instructions of Design Paradigm Models' and the 'Online Data Story on Chinese Information Design (2009–2019)', and to reinterview them. The five peers are:

(1) Prof. Dongping Zhu, Faculty of Design, School of Arts, Renmin University of China;

(2) Dr. Zhengyi Zhao, Art and Design Studies, Kyoto University of the Arts, Japan;

(3) Mrs. Wei Liang, Design Director of China Art Daily;

(4) Mrs. Chen Du, Design Director of Mozilla Firefox Ltd. (Beijing);

(5) Mrs. Lei Qiao, Design Director of Hangzhou TreeFintech, Lecturer of Guangzhou Huashang College.

Since the other two peers who contributed to this study's validity test are not Chinese information design practitioners, this study did not invite them for reinterview.

The reinterview revolves around the following three questions:

(1) Do design paradigm models provide new design research perspectives and tools?

(2) Do you agree with the findings of this study's decoding of Chinese information design?

(3) Does the broad awareness assist designers in comprehending the current state and prospects of Chinese information design?

Based on the results of the reinterview, peers agreed with the results and contributions of this study.

Prof. Dongping Zhu's feedback. As a design educator, professor Dongping Zhu expressed his views from design education based on decades of professional experience.

First of all, he believes that China's design discipline is at a critical juncture in its growth. One of the biggest problems encountered at present is the rapid expansion of design field and the continuous deepening of the interdisciplinary characteristics of design, which has gradually blurred the boundaries of design. At the same time, there is confusion in classification within the design discipline. This phenomenon has caused primary obstacles to the reform of design education and the construction of design disciplines.

The design classification model in the conclusion of this study provides a new perspective and classification framework for the design discipline to identify the

boundary and directions. Although more detailed subcategories are needed under each category, the new perspective and new framework are of great significance.

Secondly, modern Chinese design has received far-reaching influence from the Western paradigm both in education and practice, but it is now developing a suitable design development model for China. The theoretical construction of this model is the focus of current Chinese design studies, and the relevant conclusions of this study are the contribution to this field.

Dr. Zhengyi Zhao's feedback. Dr. Zhengyi Zhao has a dual design education background in China and Japan and an academic background in space design and communication design. She interpreted the significance of the conclusions of this study from the perspective of Eastern and Western design paradigms.

She believes that the early development of Chinese design was affected by multiple influences from European, American, and Japanese designs. Among them, Japanese design has both the shadow of European and American design and has its uniqueness. Japanese design is a successful case of mutual learning between East and West in East Asia. China has completed the basic construction of design and is gradually forming its contemporary design paradigm. This paradigm is taking shape quietly, but in order to be stable and far-reaching, it needs precise interpretation by design theoretical researchers. The design paradigm descriptive indicator system proposed by this study is conducive to constructing the overall structure of design paradigm research.

Mrs. Wei Liang's feedback. Mrs. Wei Liang has nearly 30 years of experience in traditional print media design. She interpreted the conclusions of this study from the perspective of traditional print media practitioners facing the crisis of the new era.

In recent years, the changes brought by new media technology to communication design have made her more and more aware of the times' radical change. In the past, she only needed to study print media, but now she has to shuttle back and forth between the design work of newspapers, magazines, websites, applications, and social media.

She believes that practitioners can only face changes in communication design and cannot avoid them. However, how to face it is a difficult problem. Is the software used by designers updated constantly? Is the designer constantly expanding other skills besides design? Perhaps these are all solutions that cannot be sustained. Rethinking the essence and core of communication design is the foundation for the continued development of the industry. The interpretation of the paradigm of Chinese information design in this study answers such questions for practitioners or future practitioners. It can alleviate their anxiety and see their development direction and career choices.

Mrs. Chen Du's feedback. Mrs. Chen Du has 15 years of experience in Internet platform design. She uses her experience to interpret the conclusions of this study.

When recalling her learning and working experience, she said that most of the skills and knowledge she learned at university were about traditional printing graphic design. Nevertheless, she encountered a career bottleneck when she graduated. At that time, mainstream employment was turning to Internet-based design. Today, the design of Internet platforms is being replaced by many concepts such as mobile design, service design, experience design, and natural interaction. Change has become a daily topic that must be faced in today's communication design. Perhaps the only way to deal with change is to define what is changed and what is unchanged. Only by grasping the unchanged things can we calmly deal with the ever-changing.

She believes that this study's interpretation of China's emerging information design paradigm can help her understand what has changed and what has not changed in communication design. It is a fundamental contribution to the industry.

Mrs. Lei Qiao's feedback. Mrs. Lei Qiao has the dual roles of communication design educator and practitioner. She interpreted the results of this study from the perspective of mutual referencing between industry development and design education.

She believes that the current design education in Chinese universities is undergoing fundamental adjustments to respond to the new talent market demand. These adjustments have begun to bear fruit. At the same time, the adjustment of design education strategy is also moving towards the deep-water area, and the difficulty faced is the obsolescence and lack of basic theory of design discipline. In the past, any problems encountered in Chinese design would seek answers from the experience of developed countries and regions, but now the world experience has been exhausted. Various design development problems require active exploration by Chinese design researchers. This research is a kind of active exploration, and its conclusions will be a reference for Chinese design education and industry and provide new knowledge for design study in the world.

5.3 Limitations

First, the data of this study came from academic journals. The advantage is that the data is systematic and accurate and has been reviewed by peers. However, the disadvantage is that the publication period of the data is long, and there is a lag of about half a year.

Second, this study is partial qualitative research done by a single researcher. Its advantage is that it can interpret the analysis results more deeply, but the subjective factors of a single researcher will more or less affect the research conclusions.

5.4 Recommendations

First, this study only reveals the emerging paradigm of Chinese information design. Although this study defines communication design as a leading indicator of overall design development, to fully reveal the overall paradigm of Chinese design, supplementary research is still needed from other design categories.

Second, a study on the coexistence and influencing factors between Chinese design paradigms and different international design paradigms remain to be carried out.

Last, how to formulate China's design discipline's development strategy based on the conclusions of this study may needs refined research.

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Appendix 1: Sample List

1/132

Fei Hongyu, pp118-120, 2009 (1)

Multi-dimension in Visual Expression of Graphic Design Element

In the context of the information age, graphic design expression language has intense penetration in different dimensions. The graphic design emphasizes the extensive use of multiple media, pays attention to the combination of design and visual environment systems, and cross-integrates with other design fields. The inherent traditional visual thinking mode of flat space expands to three-dimensional space media and virtual space media and forms the multi-dimensional expression method of graphic design visual elements.

Keywords: Visual Elements, Multi-dimension, Space, Media, Interactive

2/132

Chai Wenjuan, pp129-130, 2009 (4)

The Design Perspective of Electronic Books

E-book design should emphasize the importance of users and consumers. What designers are doing now is no more extended sampling in the real world to reflect their design ideas but constructing a framework of the network, allowing the audience to create their world, allowing individuals to make full use of cyberspace's freedom to construct reality. These are the importance of e-book design and the true meaning of the digital revolution.

Keywords: Digitalization, E-books, Design Thinking

3/132

Zeng Yundong, Zhong Sishi, pp103-105, 2009 (5)

New Views on the Advertisement of Guangzhou Subway Station

With the Guangzhou Metro's continuous development, subway station advertising has become an essential part of subway culture. This paper explores the new perspectives of Guangzhou subway station advertisements by investigating new media forms, creative ideas, and the regional characteristics of advertising in subway stations.

Keywords: Guangzhou Subway Station, Advertising, New Media, New Perspectives, Creativity

4/132

Zhang Yali, pp129-130, 2009 (7)

Probe into the Talent Cultivation Mode of the New Media Art Subject

As a new interdisciplinary discipline, the new media art discipline's talent training model has become the focus and difficulty of current art education. Based on the teaching practice of new media professional training in the School of Fine Arts, Capital Normal University, this article attempts to construct and demonstrate a talent training system suitable for the characteristics of new media art disciplines in specific types of universities based on the particularity and focus of talent training. The organic connection of essential factors thus improving the effectiveness and competitiveness of talent training.

Keywords: New Media, Talent Structure Factor, Talent Training Model

5/132

Liu Qing, Xue Chengqi, Falk Hoehn, pp100-101, 2009 (9)

The Client-based Interactive Interface Design of Light Rail Transit in Hamburg, Germany

Based on the research on the importance of humanized interface to light rail transit, this paper proposes a new design strategy of user-centered interaction method that runs through each element of the interactive interface of light rail transit and takes the interactive interface designed by Hamburg city light rail in Germany as an example. From the inside and outside of the cabin, the entire interactive interface design process using this design method is detailed.

Keywords: Interaction Design, Light Rail Interface, User-friendly Design, Subdivision Design, Cab Design

6/132

Sun Wei, pp135-136, 2009 (10)

Analysis on Performance Characteristic and Development Trend in Network Visual Symbols

Network culture is infiltrating into every corner of our lives. Network culture and its unique visual symbols emerged at the historic moment in such a communication method, which spread faster and more widely and played a significant role in cross-cultural communication and information dissemination. Digital reading methods will gradually

replace the traditional reading methods and become the mainstream. Personalized and customized services will become a new trend of network services. As the most critical communication language in network communication, visual symbols adapt to the visual age's communication needs and become an important research direction in design in the network age.

Keywords: Network Age, Network Visual Symbols, Communication, Development Trends

7/132

Zhang Lie, pp84-85, 2009 (11)

Analysis on Structure of Virtual Experience Design

This article builds a virtual experience design model consisting of a conceptual layer, an element layer, an interaction layer, and a presentation layer to express appeals and design methods' internal motivations.

Keywords: Virtual Experience Design, Design Method, Structure

8/132

Liu Jihong, Wan Xuan, pp116-117, 2009 (11)

Crossover Design in Graphic Advertising

Cross-border design refers to combining traditional design and other industries in form, technology, and materials under new technical conditions to obtain a new design vocabulary and achieve better and updated design ideas. Based on the basic meaning of design and the successful examples of cross-border design in different fields, this paper discusses cross-border design's rationality and its importance as a design method. This article also makes a specific exploration of the method of cross-border design of print advertising.

Keywords: Print Advertising, Cross-border Design, Creativity

9/132

Feng Gaohua, pp87-89, 2009 (12)

Design of the New Generation Information-based Newspaper Kiosk Based on Industrial Design Syntax

This article proves that the product feature of informalized newspaper kiosk is more than an architectural feature. It points out the necessity and advantages of using the industrial

design method to design newspaper kiosks.

Keywords: Newspaper Kiosk, Industrial Design, Semiotics

10/132

Tang Min, pp90-91, 2009 (12)

Research on User Experience of Immersive Web Navigation Design

Immersive web navigation design is the current development trend of web design. This article mainly analyzes the user interaction process and user experience of immersive web navigation design in detail from aesthetic psychology, taking a website of a design group in Boston as the main case, and summarizes the advantages and disadvantages of immersive web pages.

Keywords: Immersive Navigation, Web Design, Aesthetic Psychology, Visual Perception

11/132

Ji Tie, Hu Ying, pp92-95, 2009 (12)

Service Design for Social Networking

Community network service is the current hot market and topic, but China's corresponding service design is relatively low. This article starts with the basic concepts and analysis of communities, community networks, and community network services. The three essential elements of platform, organization, and activity in community network services are explained separately based on the user-service framework. Finally, from community network services based on this framework, the design analysis ideas from user clusters to service clusters are proposed.

Keywords: Community Network Service, Community Network, Service Design

12/132

Chen Xiaonan, pp126-127, 2009 (12)

The New Space of Book Design

The beauty of bookbinding comes mainly from human vision, but it is not just from vision. The beauty of bookbinding is also near and subtly related to other senses, such as human touch. Therefore, bookbinding's beauty is mainly based on human vision and the result of comprehensive aesthetic judgments of feelings. In the era of the rapid development of digital multimedia, new materials, new technologies, new concepts, new markets, and

people's new lifestyles have brought new changes to the development of book formats in the future and new bookbinding designs.

Keywords: Book Binding Design, Electronic Media, Interactive Design

13/132

Li Yun, pp13-23, 2010 (1)

Interaction and Experience: Summary of Beijing 2009 International Conference on Interaction Design

In mid-October 2009, the Tsinghua University School of Fine Arts, the Carnegie Mellon University School of Design, and the Hong Kong Polytechnic University School of Design jointly sponsored the 2009 Beijing International Conference on Interaction Design. This journal has compiled reports from five speakers: Xin Xiangyang, Jan Kubasevich, Lorra Justis, Tang Xuan, and Paul Nerfurt.

Keywords: Interaction Design, Multiple Perspectives Problem, Processing Methods, Planning Activities, Design Ideas

14/132

Wu Qiong, Li Yun, pp24-29, 2010 (1)

Interaction Design or Industrial Design: Interview with Freddy Anzures, Designer of Apple Computer Inc.

Freddy Anzures is now the designer of Apple's human-machine interface group. He has participated in the design of the iPhone and has been interviewed by many media. In mid-October 2009, Freddy was invited to participate in the 2009 Beijing International Conference on Interaction Design held by the Academy of Fine Arts of Tsinghua University, and this magazine took the opportunity to interview him. Freddy graduated from Carnegie Mellon University, had an internship at Converse, and worked at the frog design company after graduation, and now he is at Apple. He is very active and continuously exploring new areas. From the witty answer, we can also see his understanding of interaction design and the design itself.

Keywords: Interaction Design, Interview

15/132

Lu Xiaobo, pp30-33, 2010 (1)

Review and Prospect: Disciplinary Development of Information Design

The thesis mainly explains the necessary process of the emergence and development of the information art design profession in the information society, including professional research fields, research directions, results, professional characteristics, professional development concepts, models, etc. It aims to look forward to the future by reviewing the professional development process issues that should be addressed.

Keywords: Information Society, Information Art Design, Development Model

16/132

Wu Qiong, pp34-37, 2010 (1)

The Field and Boundary of Interaction Design

This article mainly discusses the research fields of interaction design and interdisciplinarity characteristics with domains and unbound. Interaction design refers to the creation of events. Its design object is a process that changes and uses over time. Therefore, behavior, content, and form become the three elements of interaction design. Interaction design is developed with the development of information technology. It is a highly interdisciplinary discipline that requires the cooperation of multiple disciplines to complete interaction design. Simultaneously, in the face of market and technology development needs, interaction design began to move towards a system integration model to provide a complete solution.

Keywords: Field, Boundary, Interaction Design

17/132

Max Bruinsma, Translator: Du Qin, pp37-40, 2010 (6)

The World Must Change: Graphic Design and Idealism

After accepting the possibility of open design results, if the designer does not terminate the design at a specific node, he not only leaves room for the audience to interpret with its liberating aspect but also creates an individual stand for space. Its design reveals the possibility of things-a conversation about its function is initiated in the process of communication. On the other hand, on the computer-who else is not working on the computer now? -Nothing is finalized.

Keywords: Change, Graphic Design, Idealism

18/132

Huang Liyan, pp143-144, 2010 (6)

Cultural and Creative Industries in the Visual Communication Design Teaching Reform

Visual communication education is the most valuable way to nurture creative cultural talents, and they are mutually reinforcing. The industrialization of cultural innovation offers a broad space for the future of visual communication design, and visual communication education is the most important way to cultivate creative cultural talents. From the establishment of technical courses to the reform of teaching techniques, the building of internship bases, and the deployment of students, all must break the teaching mode of conventional visual communication design and explore the path of visual arts teaching reform in order to meet the current requirements for talents in the new age. As a result, the current teaching standard is being improved.

Keywords: Cultural Creative Industry, Visual Communication Design, Teaching Reform

19/132

Ma Quan, pp13-18, 2010 (8)

Graduation Design from Department of Visual Communication, Academy of Arts & Design, Tsinghua University

In 2007, all teachers in the Department of Visual Communication discussed the current status of graduation design and exhibition. The teachers expressed their opinions on the graduation design: graduation design has become a form, the direction is not clear, the teacher is very hard, the students are not very engaged, the exhibition effect is not right, the audience is not exact. These problems are also common in various professional colleges in China.

Keywords: Visual Communication, Graduation Design

20/132

Han Xu, pp19-24, 2010 (8)

Graduation Design from Department of Visual Communication Design, School of Design, China Academy of Art

No matter how new the graduation exhibition is, thinking about the graduation exhibition, graduation design, and reform of the talent training model has always been the norm for

design educators. First of all, thinking about the evaluation criteria for undergraduate graduation design and graduates' evaluation criteria. Second, the rapid development of society has led to the rapid differentiation of social groups. The time concept of the generation gap has also been rapidly reduced from the original ten to fifteen years to two to three years, and the understanding caused by faults has been lacking. Thirdly, we must think deeply about the training direction of design talents and hope to reach a consensus in education.

Keywords: Graphic Design, Graduation Design, Evaluation Criteria, Lack of Understanding, Training Plan

21/132

Song Xiewei, pp25-30, 2010 (8)

Graduation Design from the 6th Studio, Department of Visual Communication, China Central Academy of Fine Arts

The marginal characteristics of design disciplines coincide with the trend of interdisciplinary integration between disciplines in this era. Visual communication design, while consolidating traditional advantages, tends to combine current sensitivity and trends. Words such as mixing, diversification, cross-border, and integration are no longer the shelving cabinet's slogans, but the requirements of visual communication design made by reality, which has become the real problems that designers must face.

Keywords: Design, Boundary, Cross Fusion, Visual Communication Design

22/132

no author information, pp31-36, 2010 (8)

Graduation Design from Department of Graphic Design, College of Design, Guangzhou Academy of Fine Arts

The Guangzhou Academy of Fine Arts's design education tradition has been emphasizing the practical value of design since Mr. Yin Dingbang pioneered the development path of industry-study-combination. Taking practice as a benchmark and driving academic research, design can serve the industry's actual needs and the market. Students have a faster start time after leaving school.

Keywords: Visual Communication Design, Industry-university-research, Practical Value, Market Demand

23/132

Wang Anxia, pp37-42, 2010 (8)

Graduation Design from Department of Visual Communication, School of Design, Jiangnan University

The popularity of digital media in the information age has had a profound impact on visual communication design. It is mainly manifested in three transformations: first, the conversion of visual language from traditional paper media to digital media; second, the image changes from static to dynamic; The one-way change to interactive, which makes the visual communication design have a more profound expansion in humanization.

Keywords: Visual Communication Design, Digital, Dynamic, Humanization, Interaction

24/132

Sun Wei, pp141-142, 2010 (11)

Think about the Ethical Questions of Art & Design under the Network Cultures

Design ethics, as a new direction for design art in the context of network culture, explores the harmonious relationship between people and the network-facing design art, discusses the design way in line with the development of human civilization, and calls on the humanistic spirit of design art to realize harmonious development of humanity.

Keywords: Network Culture, Design Art, Design Ethics

25/132

Guo Xinwei, pp94-95, 2011 (1)

Analysis of Navigation at User Interface

This article analyzes the system navigation methods and results based on the existing problems in the human-computer interaction interface, follow user-centered design guidelines, and summarizes three design methods to improve user efficiency and brand experience.

Keywords: System Navigation, Interaction Design, User Interface, Brand Experience

26/132

Pan Feng, pp112-113, 2011 (2)

Importing the Concept of Culture Heritage into Digital Animation Teaching: A Case

Study of Chu Culture Heritage

The protection of cultural heritage should stop at the stage of archeological restoration and integrate its rich cultural resources into college digital animation teaching. Encouraging students in this major to pay attention to cultural heritage is the need for cultural protection and inheritance and a positive way to cultivate creative talents in animation.

Keywords: Universities, Digital Animation, Cultural Heritage Protection

27/132

Xia Yingchong, pp129-130, 2011 (2)

A Study on Development and Education of Application Animation

Functional animation has a wide range of applications, and its primary purpose is to display and convey information. It is a superior means of visual communication in product interaction, product promotion, scientific research, archeological discoveries, television packaging, architectural browsing, design instructions, and many other fields. With the current difficulties in developing the entertainment animation market, it is imperative to develop functional animation education and personnel training. Creating value through the creation of functional animation can take advantage of its powerful application and market demand.

Keywords: Entertainment Animation, Functional Animation

28/132

Zhao Zhan, pp88-89, 2011 (4)

Embodied Vision: The New Media Revolution in Graphic Design

After the Internet and interactive media technologies were widely used, digital technology began to appear in visual design as an independent visual medium. The images presented on digital visual media are no longer just static or moving images, but action images that directly correspond to actions. The viewer's viewing of action images is no longer purely visual but is a view that incorporates body movements—embodied view.

Keywords: Visual Design, New Media, Action Graphics, Embodied View

29/132

Li Sida, pp143-144, 2011 (4)

An Exploration to Discipline System of Digital Media Art

Digital media art is a new interdisciplinary and artistic innovation field formed with digital technology and art in the 20th century. Based on the related disciplines and professional settings of foreign universities, this paper proposes a digital media art discipline system based on the media art framework. It combines information visualization methods to summarize and summarize the subject framework and application areas of digital media art as a media product model. The author believes that the construction of the digital media art discipline system is conducive to clarifying the position of the discipline in the scientific knowledge system and undoubtedly has tremendous significance for the specialty's talent training.

Keywords: Digital Media art, Subject System, Media Art, Information Visualization

30/132

Zhao Xiumin, pp114-115, 2011 (5)

Landscape Design Methods of Urban Soundscape based on the Integration of Vision and Sound: A Case Study of Hangzhou Five-Water Landscape System

This article explains the concept of acoustic landscape and the origin and development of the concept. It emphasizes the importance of acoustic landscape in landscape planning. It requires that the overall harmony of sight and hearing be considered in landscape design. The latest research then puts forward the Five Waters Co-Guiding scenic belt concept in Hangzhou and analyzes in detail the constituent elements of the five waters scenic soundscape and how to design it positively and negatively. This article clarifies the advantages and disadvantages of the Five Waters acoustic landscape planning and explains the Five Waters Co-Guiding landscape belt's acoustic landscape design methods in Hangzhou.

Keywords: Acoustic Landscape, Audio-visual, Five-water Co-guidance, Landscape zone

31/132

Liu Wenpei, pp76-77, 2011 (6)

Four Propositions on the Interactive Design in the Context of Network Environment

This article discusses several topics about interaction design in the network environment. Taking the user's demand psychology as the research object and the interaction behavior occurring in the human-machine interface as the starting point, this paper proposes the beneficial principles of interaction design. It uses cognition, ease of use, experience,

attention as the supporting concept of the beneficial principles and the connotation of interactive design.

Keywords: Interaction Design, Beneficial Principles, Experience, Empathy

32/132

Liu Yi, pp135-136, 2011 (7)

Product Design of Mobile Internet Platform

This article attempts to analyze mobile products' design characteristics and conduct in-depth research on product design of mobile platforms from the perspectives of information design, user behavior research, visual process design, etc., to summarize and organize product design methods applicable to 3G mobile platforms.

Keywords: Mobile Products, 3G Mobile Platforms, Product Design

33/132

Wu Qiong, pp68-70, 2011 (8)

From Representation to Interpretation: The Design of Infographics

In the information age, infographics design has gradually become one of the hot research directions in graphic design. This article proposes that the design of infographics is to plan and visualize the content of complex information to effectively communicate information and meet people's needs to understand and use information. This article also discusses the advantages and disadvantages of applying graphics for information presentation. It focuses on the characteristics of the content, principles, and infographics design methods and emphasizes that infographics design should help people better obtain the content of information, explain the characteristics of information, and reveal the laws.

Keywords: Infographics, Information Communication, Graphic Design

34/132

Sun Haiyin, Ding Sha, Deng Yanan, Ma Huifang, pp86-88, 2011 (9)

Research on the Experience Communication of Social Networking Services

Recently SNS social networking sites have seen a surge in user traffic. How to promote the optimization of SNS social network platform experience communication is a topic that is urgently needed for contemporary SNS social network experience communication.

Note: SNS (Social Networking Sites)

Keywords: SNS Social Network, Experience Communication, Interactivity

35/132

Qin Jingyan, Li Yan, pp82-83, 2011 (10)

Information Design Methods Research in Dating Sites

This article analyzes the change of marriage and love patterns in the information age and combines the characteristics of users of love and marriage websites to explore the process of user information acquisition and mining. This paper explores the information design methods of each stage of the love and marriage website to have a specific reference value for the future marriage website design through the cross-research on the theory of mate selection stage in psychology.

Keywords: Marriage Website, Information Mining, Information Design, Mate Selection Stage Theory

36/132

Cao Wenbo, Yu Wenrong, pp129-130, 2011 (10)

Analysis on Cognitive Load of Interaction Art Design on Web-Based

studying the interface, navigation, and other related design issues in the design of network interactive art from the perspective of visual cognitive theory, aiming to improve network information dissemination efficiency from science and art processing and shorten the target audience's time spent.

Keywords: Web Interactive Art Design, Cognitive Load, Information Dissemination, Dynamic Presentation

37/132

Wan Changlin, pp84-85, 2012 (1)

Learn and Format the Time: Brief Analysis of Time Expression in Infographic Design

Time is an essential factor in chart design. Many charts directly set up the structure of the entire chart, and other graphic designs need to be systematically based on it. This article starts with the expression of time in chart design and attempts to analyze the ordering and visualization of time in the chart.

Keywords: Infographics, Time Expression, Information Visualization

38/132

Zhu Liang, p8, 2012 (2)

The Summary of Design Education Forum

On December 29, 2011, the 2011 Design Discipline Construction Symposium was held at the Tsinghua Science Park Conference Center. Nearly 70 experts and scholars attended the meeting. They were the heads of 35 institutions and the heads of various School of Fine Arts departments of Tsinghua University.

Keywords: Design, Discipline Construction

39/132

Chai Qiuxia, pp73-75, 2012 (2)

On Immersive Experience of Digital Media Interactive Art

Interactive art changed traditional media's linear narrative mode, emphasized the enthusiasm and proactive of the audience, and deconstructed the cognitive and aesthetic methods of traditional art. The interaction aims to use virtual reality technology to create an immersive environment for the audience experience, guide the audience to understand better and explore virtual space-time, construct a new aesthetic experience, and achieve a natural and harmonious way of communicating between people and virtual objects.

Keywords: Interactive Art, Immersion, Experience, Non-linear Narrative

40/132

John Wood, pp17-19, 2012 (3)

Time and the Shortening of Design Futures

This article points out that design was initially developed to transform science and technology into productivity quickly. Under such a consumption system centered on economic benefits, the design emphasizes instrumentalism and ignores the long-term benefits of the entire society, which ultimately worsens the damage to the ecological balance. Therefore, designers must start thinking about the longer-term future. In the era of the handicraft industry, the future of design is defined as the birth of a product, but with the rapid development of technology and the rapid increase in productivity, the previously defined future is getting closer to the present and cannot benefit everyone. Designers are only concerned about the short-term benefits of the product. It is not enough to meet society's needs, and it will even be harmful to society. Therefore, we must rethink the

concept of time and learn to face the shortening of designing the future.

Keywords: Designing the Future, time, Design Education, Ecology

41/132

Anthony Dunne, pp30-34, 2012 (3)

When Technology is Taken for Granted...

Anthony Dunne found that in addition to daily teaching, architecture students also participated in constructing large public buildings and private residences, product design, and other activities and had positive performances in both academic and professional fields. In contrast, design students are more conservative and are only involved in commercial product design. Therefore, he advocated for designers to work as architects, combining theory with practice, giving equal emphasis to teaching and studios, and intersecting conceptual and practical projects. Also, he believes that design should take full advantage of the development of electronic technology.

Keywords: Theory and Practice, Electronic Technology

42/132

Zhao Hua, pp30-34, 2012 (6)

The Harmonious Coexistence of Human and Technology: Interview with Corporate Vice President, Microsoft, Mr. Ya-Qin Zhang

Since the Industrial Revolution, the earth's distance has been gradually shrinking, and the concepts of time and dimensions have been much different from before. Intelligence and freedom are the development trends of human lifestyles that are becoming increasingly apparent. The boundaries between virtual and reality, human and machine, art and science, are also blurring. To this end, Mr. Zhang Yaqin, the global vice president of Microsoft Corporation, discussed the harmonious coexistence relationship between humans and technology in the future from an information technology scientist's perspective.

Keywords: Relationship, Human, Technology

43/132

Ge Dongmin, pp137-138, 2012 (8)

The Current Situation of Graphic Design with the Application of Digital Technology

This article mainly discusses computer technology's influence on graphic design, digital technology to promote graphic design application technology, the problems of film and television works in the digital background, and the countermeasures. From the perspective of historical development, the problems at different stages always have a typical pattern. The contradictions and interactions between technology and ideas are the driving force for developing the graphic design industry and will eventually become the key to solving current problems.

Keywords: Digital Technology, Graphic Design, Concept

44/132

Song Fangyuan, pp95-96, 2012 (9)

The Visual Decoration of the Sound: The Exploration of Sound Visualization in the Teaching of Graphic Animation

This article takes the relationship between pictures and sound in graphic animation as the research object, combines specific teaching cases and innovative sound visualization applications, and discusses the visual imagination and unique narrative structure that dynamic graphic elements may produce in sound. Explain the inspiration of creative thinking in the flexible use of sound visualization in graphic animation teaching.

Keywords: Sound Visualization, Graphic Animation, Audition Conversion, Creative Thinking

45/132

Wu Qiong, pp32-36, 2012 (10)

Design Ethics in Information Age

The development of information technology has brought unprecedented opportunities and challenges to design. This article analyzes the content and methods of interaction design, experience design, service design, and social network service design, discusses the evolution of design goals, content, and ethical value in the information age, and proposes the rational use of information technology for human development service, and the goal of building harmonious human-machine and interpersonal relationships.

Keywords: Interaction Design, Experience Design, Service Design, Social Network, Design Ethics

46/132

Sheng Feifei, pp131-132, 2012 (11)

From Static to Dynamic: The New Extension of Typography Design Course Teaching

With the rapid development of new media technology, text design has moved from static text design in traditional media to dynamic text design. Therefore, the teaching of text design courses should be adjusted accordingly to adapt to the times' development. This article discusses the reform of the text design course from dynamic characters' aspects, the repositioning of the text design course teaching in the digital age, and new topic design.

Keywords: Static Text, Dynamic Text, Digital Age, Curriculum Teaching

47/132

Li Yu, pp139-140, 2012 (11)

Study on Chinese Style in UI & UX

In recent years, there has been a Chinese style design trend in Chinese icon design. This article analyzes the definition of this type of design and its positive significance in terms of expression methods, metaphor sources, user experience, and cultural heritage in response to this phenomenon. This article points out that iconic Chinese style design still needs to return to functional needs while developing visual performance.

Note: UI (User Interface), UX (User Experience)

Keywords: Computer Icon, Chinese Style, Design

48/132

Jiang Junchen, pp118-120, 2012 (12)

The Significance of Space and Composition of New Image Language in Visual Design

Visual communication design has transformed a graphic language into a new graphic language. Understanding and constructing space by art theory contributes to the development and enrichment of the new image language. The spatial form created by the new image language should be the fusion of form space, meaning space, and intelligent space.

Keywords: Visual Communication, New Image Language, Spatial Form, Spatial Meaning

49/132

Wu Qiong, Liu Jun, pp16-21, 2013 (1)

The Revolution of Mobile Phone: Mobile Design Turned from Function to Service

The mobile phone has changed from a simple communication device to a smart service terminal. This article divides the mobile phone development process into four stages and discusses the technical and design characteristics of each stage. This article points out that mobile phone design has shifted from hardware design with modeling and function as the core to the overall design, including equipment, content, and services with service as the core. On this basis, this article analyzes the content, characteristics, and platform of the mobile phone interactive interface design and summarizes the opportunities and challenges faced by mobile phone design.

Keywords: Mobile Phones, Application Services, Interface Design

50/132

Huang Ruiling, pp28-32, 2013 (1)

Rethinking the Relationship between the Mobile Media and Individualization of Society in the Internet Era

In the ubiquitous network era, mobile phones have evolved into the first terminal of the network, and their powerful, comprehensive functions have made people's cognition of their attributes also diverse. Based on this situation, the author tried to strip the mobile phone from various functional features of the appearance and abstracted it into a symbol, explaining how the mobile phone promotes the upgrading of social individualization and achieving the fragmentation grouping of social individuals. The process emphasizes that the fundamental value of mobile phones is to build a social relationship network centered on the user. No matter how the external appearance and additional functions of a smartphone evolve, its essential attributes will not change fundamentally.

Keywords: Mobile Phone, Ubiquitous Network, Social Individualization, Social Relationship

51/132

Li Jiang, pp41-44, 2013 (1)

Identity Emotion Service: Huawei's Mobile Internet Design Philosophy

Global smartphone sales reached 680 million units in 2012, and global smartphone sales are expected to reach 1.6 billion units in 2016. At present, Apple iPhone and Samsung smartphones occupy the majority of the market. Striving for the initiative in the era of fiercely competitive smartphones has become an unavoidable problem for every mobile phone design and production enterprise. As a leading global information and

communication solution provider, Huawei has its understanding and positioning of smartphones and future mobile internet platform design, that is, to match terminal devices with application services through personalized inspirational design, thereby manufacturing mobile internet platform for users.

Keywords: Mobile Internet, Emotion, Service

52/132

Liu Shuqing, Liu Guanmin, Zheng Xianjun, Peng Kaiping, pp78-79, 2013 (2)

Exploring the Aesthetic Experience of Chinese Users

Based on the AttracDiff2 questionnaire, this study compiles a questionnaire suitable for measuring Chinese users' aesthetic experience and studies the user experience of Chinese users on specific products. The questionnaire adds new dimensions and new items of the aesthetic experience based on interviews with Chinese users and uses the aesthetic experience questionnaire to study Chinese users' aesthetic experience on three commonly used Nokia, BlackBerry, and Apple phones.

Keywords: Interactive Products, Aesthetic Experience, AttracDiff2 Questionnaire

53/132

A Shanghai, pp118-119, 2013 (2)

Research of The Intelligent Voice Packaging Design

Intelligent voice packaging refers to a type of intelligent packaging with a voice recording or playback functions. It is divided into intelligent voice-oriented packaging and impressive digital music packaging. This article takes the fully intelligent multi-sensor recordable speech packaging and pressure-sensitive speech packaging as specific cases to analyze the technical route and design methods required for the development and design of intelligent speech packaging and the issues needing attention in design.

Keywords: Packaging Design, Intelligent Packaging, Intelligent Voice Packaging

54/132

Liu Yi, pp143-144, 2013 (3)

Interaction Design Education in Studio System: Take Interaction Design Studio of GAFA for Example

Interaction design has become a hot topic in China. However, there are specific errors and

distances in understanding interaction design's talent standards in industry and universities. Therefore, this article provides a sample and case for interactive design education research by analyzing the problems and resolutions encountered in the teaching and work of the interactive design studio of Guangzhou Academy of Fine Arts.

Note: GAFA (Guangzhou Academy of Fine Arts)

Keywords: Interaction Design Education, Project Education, Industry-university-research Cooperation

55/132

Yan Ping, Li Leilei, Xie Dan, pp121-123, 2013 (4)

The Crossover Transition of Shenzhen Graphic Design Industry: From Uni-Design to Networked System

In recent years, the cross-border transformation of graphic design has occurred. This article describes the cross-border transformation of the Shenzhen graphic design industry in terms of customer types, geographical expansion, design business, etc., through interviews and social network analysis methods, combining typical cases of design companies and industry data. At the same time, this article analyzes the factors that affect the transformation of the graphic design industry from a single design to a network system.

Keywords: Graphic Design Industry, Cross-border Transformation, Social Network Analysis

56/132

Liyun, pp12-18, 2013 (5)

Seminar on Chinese Typeface Design

Right fonts can make people recognize clearly and read quickly and smoothly. Chinese character font design is getting more and more attention now. Chinese character font design is still exploring more suitable forms for digital platforms. At the same time, Chinese fonts are also the cultural positions we should stick to.

Keywords: Font Design

57/132

He Qinyang, pp82-83, 2013 (5)

Discussion on Aesthetics in the Context of Information Visualization

Artistic expression combined with visualization technology can enhance user

understanding. However, from the existing visual design practice, the effect is not satisfactory. This article proposes to pay attention to aesthetics as an independent medium. By evaluating what beauty information is, this article summarizes three critical points of information aesthetics in the context of information visualization in order to explore the potential of linking science and art.

Keywords: Information Visualization, Aesthetics, Content, and Form, Information Aesthetics

58/132

Fu Zhiyong, pp26-30, 2013 (6)

The Ecological Cycle and Social Regeneration of Stuff in the Vision of Information Technology

This article explores how the public can participate in the recycling and regeneration of items with information technology support. People and things in the city have formed an interdependent ecosystem. The current garbage and environmental problems are the externalizations of people's life concepts and values, the information media flattens the society, and the public's group wisdom shapes the waste disposal and recycling new ideas. This article combines a series of practical cases to explore the social problems caused by garbage and to make the overall ecosystem more active, open, healthy, and transparent through information technology and public power.

Keywords: Information Technology, Social Media, Garbage, Recycling, Ecosystem

59/132

Zhou Zhi, pp62-67, 2013 (6)

Design, Beyond the Cloud: Interview of FengXu, Designer of iMadeFace

This magazine interviewed a designer who used original Chinese design to get rid of the sham infamous internationally and asked him some views on software design and development.

Keywords: Application, Chinese Design, Innovation

60/132

Wu Weihe, Wan Qiaohui, pp104-105, 2013 (6)

Interactive Behavior Design in the Context of Posture-Sensing

The development of posture-sensing technology will change the way of interaction

between people and products. This article uses the posture-sensing device's perception and understanding of user behavior as the starting point. Based on the analysis of posture-sensing contextual characteristics, it uses cognitive psychology guided by theories of behavioral psychology and behavioral psychology; the interactive behavior design in the context of somatosensory research is studied from the aspects of usability of motion, the feasibility of technical realization of motion, the semantic definition of motion, frequency of motion implementation and fatigue.

Keywords: Posture-sensing Context, Interaction Design, Behavior Design

61/132

Wu Qiong, pp12-15, 2014 (2)

The Tipping Point of Interaction Design, Challenges and Opportunities in the Background of New Technology: Review of the 3rd International Conference on Interaction Design

In November 2013, the Third International Conference on Interaction Design was held at Tsinghua University. The conference focused on the tipping point theme and worked hard to create a global platform for design education and industrial interaction. Speakers shared their views on interaction design education and industry. This article summarizes and summarizes the content of the conference's keynote speech.

Keywords: Interaction Design, Experience Design, Media Design

62/132

Zheng Yangshuo, Zhang Xincheng, pp20-23, 2014 (2)

Information Interaction Design in Smart City Construction

Smart cities are a new type of city supported by a new generation of information technology. This article analyzes the development process of smart cities and the dilemmas they face during construction and points out the necessity of information interaction design based on urban residents' needs in building a smart city. This paper explores the typical cases of information interaction architecture and information interaction design in smart cities and emphasizes the critical impact of information interaction design in smart cities' construction.

Keywords: Smart City, Information Interaction Design, Information Application

63/132

Zhang Mangmang, Fu Jiang, pp24-27, 2014 (2)

Design of Vehicle-based Urban Public Intelligent Information Services

This article explains how to consider and respond to smart cars and smart cities' development needs from the perspective of interaction design in the context of urban transportation big data information technology.

Keywords: Urban Public Information, Smart Cars, Interaction Design

64/132

Hao Ninghui, Lu Xiaobo, pp34-37, 2014 (2)

Critical Thinking on Tangible User Interface Design

Under the influence of information communication and materials science and technology, physical products are deeply integrated with traditional industries, promoting the innovative development of physical interaction interfaces in terms of human-computer interaction expressions, behavior models, and design philosophy metaphors. This article compares and analyzes the correlation and differences between interactive graphical interfaces and physical interactive interfaces and reflects interactive technologies and design methods applicable to physical interactive interfaces. It points out that physical interactive interfaces have changed from quasi-physical visual metaphors to flat and natural interfaces. This paper obtains the four characteristics of physical interaction interface and five key design elements through the analysis of case studies and cutting-edge research results. Finally, this article rethinks the challenges and opportunities facing physical interface design.

Keywords: Entity Interaction Interface, Behavioral Mapping, Indicator

65/132

Zhao Junjie, pp141-142, 2014 (4)

Look at the Emotional Factors in Interaction Design from WeChat

From the traditional internet to the mobile internet, user behavior changes and migration are faster than many people imagine. Times are changing, but human nature has not changed. Good user experience is the key to the survival and development of interactive design products. This article analyzes WeChat's research on emotional experience design, discusses the combination of emotional and interaction design, and discusses interaction

design's emotional trend.

Keywords: Emotional, Interaction Design, WeChat, User Experience, Mobile Internet

66/132

Li Yun, pp16-23, 2014 (6)

Summary of Meet the Big Data Age Seminar

Big data is a hot topic in society, and it is worth discussing in the design field. Big data is like a mysterious future. No one can fully see through it, but they all feel its power. Experts are invited in this issue, hoping to precipitate big data and its response in the design field at the scientific level.

Keywords: Design, Big Data

67/132

Wang Yun, pp28-30, 2014 (6)

Humanized Space Beyond the Big Data: An Interview with Viktor Mayer-Schönberger

This journal invites a scholar from the China Academy of Art Wang Yun to conduct an email interview with Viktor Mayer-Schönberger, the head of the information supervision research project at Harvard Kennedy College. In the interview, Viktor Mayer-Schönberger also specifically talked about the responsibility that design should bear in the era of big data.

Keywords: Big Data, Design Responsibility

68/132

Wang Wei, pp31-35, 2014 (6)

The Evolution of Data-driven Design Paradigm

The penetration of data into human society is changing a wide range of fields, including design. This article first analyzes the characteristics of data-driven design and its changes to the design environment and then explores the changing trend of data-supported design paradigms in the future.

Keywords: Big Data, Design Paradigm, Information Interaction Design

69/132

Zhuang Bian, pp54-61, 2014 (7)

Summary of Subject Construction and Promotion: Design Subject Development Symposium

This seminar invited more than 350 design professionals from more than 160 colleges and universities to discuss design disciplines' development and released the book Design Courses for Chinese Universities.

Keywords: Design, Discipline Construction

70/132

Chen Xinghai, He Renke, Yang Huan, pp80-82, 2014 (8)

Research on Business Model Innovation Systems under the Design Thinking: A Case Study of MIUI

This paper finds that using design thinking as a strategic innovation strategy will help businesses gain sustainable competitive advantages in today's dynamic economic environment in the information economy. Through the analysis of the MIUI business model, this article further draws a design-oriented business model innovation method.

Note: MIUI (Mobile application system developed by Xiaomi)

Keywords: MIUI, Design Thinking, Business Model Innovation, Organizational Ecosystem

71/132

Fu Zhiyong, pp12-15, 2014 (12)

From Cross-disciplinary to Open Innovation Talents Cultivation: For Celebrating the 10th Anniversary of Information Art and Design Department at Tsinghua University

This article starts from the experience of interdisciplinary talent training in the Department of Information Arts and Design and combines the current emerging innovation and entrepreneurial trends to explore talent training ideas. At present, design-driven open innovation education has become an important driving force for interdisciplinarity. Related activities and teaching practices will also provide valuable references for the cultivation of innovative talents.

Keywords: Interdisciplinary, Information Design, Design-driven, Maker

72/132

Wu Qiong, pp16-17, 2014 (12)

Information and Interaction Design in the Perspective of Interdisciplinary Research

Information design and interaction design are two design areas that are developing rapidly in the information age. They have many things in common in goals, content, and methods. With the development of information technology, their cross research is a need for design practice and research and a microcosm of the cross-development of various fields of design.

Keywords: Interaction Design, Information Design, Cross Research

73/132

Xin Xiangyang, pp58-62, 2015 (1)

Interaction Design: From Logic of Things to Logic of Behaviors

Interaction design departs from the traditional practice of treating objects as design objects and instead considers human activity as a design object. Objects (including hardware and software) are simply the medium, mechanism, or means by which interactive activity is realized. Interaction designers are more concerned with the built and functional user interface than with the physical attributes of the product.

Keywords: Interaction Design, Interaction Behavior, Behavior Logic, Physical Logic

74/132

Chen Ju, Liang Yuerong, pp126-127, 2015 (1)

On the Distance between the Product and People in Product Design in the Context of Internet

With the development of Internet technology, product design has inevitably need to consider the relationship between the product and the Internet and people. The product is no longer an item with only independent functions in the traditional sense but has become an information exchange between the Internet and people. One of the company's information terminals, the digitalization, informatization, and networking of products, has become irreversible. Thus, in the context of the Internet, product design and development need to reconsider the (distance) relationship between people and products. This article is to discuss and think about this problem.

Keywords: Product Design, Internet, Distance

75/132

Liu Zaixing, pp136-137, 2015 (1)

Study and Practice on UI Interaction Design Teaching

Explore the UI design process centered on interaction design and user experience. This article starts with the analysis and research of the interactive design process of the user interface. After the accumulation of actual teaching practice, a UI interactive design process suitable for classroom teaching is summarized. Moreover, taking the relevant student work as an example, the specific teaching content design is explained.

Note: UI (User Interactive)

Keywords: User Interface, Design Education, UI Design, Interaction Design, User Experience

76/132

Zheng Ziyun, Sheng Cheng, pp106-107, 2015 (2)

Research on Intelligent Urban Subway Service Based on Wearable Technology

The innovation of wearable technology has fundamentally changed the shape of urban residents' lives and changed how people travel. From mobile phone applications to wearable products, urban public transportation is no longer just a manifestation of transportation functions but will gradually become a mobile interactive space for urban residents' lives. Wearable technology transforms people to people, people to cars; people and the environment are closely linked by natural logic and social logic, and new urban public transport travel experiences of 'smart travel' and 'information sharing' are innovated. This article explains the service trend of urban subway transportation under mobile internet background, using wearable devices for data collection and analysis, introducing user management information management thinking, and providing a more comprehensive new strategy for intelligent services.

Keywords: Wearable Technology, Urban Subway Transportation, Intelligent Services

77/132

Dong Shibin, pp92-93, 2015 (3)

The predicament of Advertisement Design in New Media Environment and the Reflection about It

With the development of technology, new media has penetrated everyone's life, and it has the overall characteristics of digitization, timeliness, and interactivity. In the new media environment, the creative operation mode of advertising needs urgent reform. Therefore, creative advertising designers need more attempts to enhance creative interaction, create

a creative cultural atmosphere, and improve creative quality; through these efforts to turn difficulties into opportunities and open up a new path to develop creative advertising design.

Keywords: New Media, Advertising Creativity, Survival Dilemma

78/132

Zhou Ren, pp136-137, 2015 (4)

Interactive Multimedia in the Pavilion Design of Universities: Take Fengxian History Museum of Shanghai Normal University for Example

With the rapid advancement of computer and communication network technology, multimedia information display technology reduces display space limitations, encourages audience engagement, and displays content more efficiently. This article takes the History Museum of Shanghai Normal University to analyze the necessity of introducing interactive media technology in university pavilions, the application characteristics, and design ideas of specific technologies.

Keywords: Interactive Media, Display Design, Interactive Design

79/132

Wang Renfei, Ji Tie, pp100-101, 2015 (5)

Narrative Design Research of Mobile Shop Information Architecture

This article takes WeChat stores and mobile Taobao online stores as examples, analyzes the design strategies of the existing mobile online store information architecture, discusses the narrative needs of the mobile online store information architecture, and proposes the mobile online store information architecture with the help of narratology-related theories narrative design framework. According to specific narrative logic, the framework organizes information content, transforms the browsing process of commodities into a process of interpretation of stories, and thus shapes the shopping experience with brand characteristics. The article takes the renovation design of a WeChat store as an example to verify the feasibility of the information architecture's narrative design framework and discusses the deficiencies of the framework.

Keywords: Narrative Design, Information Architecture, Mobile Online Store

80/132

Gan Wei, Zhao Jianghong, pp114-116, 2015 (5)

Making Things Integrated: Symbiotic Social Interaction Design Research in Cars

This article explains the car social design paradigm based on the old Chinese philosophy of 'corresponding with the same voice and seeking the same voice'. According to the social schema theory, a social design method of visual form-social behavior-psychological experience is constructed, which expands the four social design factors of participation, communication, interpersonal and activities, and proposes location sharing co-construction and relationship in combination with the type of group interaction. Empathize with the design of three types of car social interactions, and verify the study's feasibility through typical cases. The research expands the innovative design methods of social experience and provides good support for enhancing social groups' interactive experience and socialized information services.

Keywords: Car Socialization, Group Interaction Type, Social Schema, Interaction Design

81/132

Gong Jiangtao, Tan Sirui, Xu Yingqing, pp21-27, 2015 (6)

Design Research for Children on Interactive Creation Tool PaperJeemo

This article introduces PaperJeemo, an interactive origami creation system for children. The system explores how to design user-oriented user interfaces and their universal usability. PaperJeemo, as an origami creation tool mainly for children, can provide origami creation assistance for children and adults of all ages. It provides easy-to-use parent-child education and interactive methods for families with children and supports adults with no professional skills to make complex origami models or make rapid prototypes in group collaboration. Experiments show that both children and adults can easily use PaperJeemo for origami creation.

Keywords: Children's Design, Creative Tools, Interaction Design, Origami Design

82/132

Zhang Lie, Wang Wei, Jia Meng, pp43-45, 2015 (6)

Rehabilitation Service System Design for Children with Autism on the New Internet Platform

Autism is a subtype of generalized developmental disorder, so far, the cause is unknown, and there are no complete recovery cases, but scientific rehabilitation training can be

treated and improved to a certain extent during the optimal intervention period. Most autistic children's therapy needs, however, cannot be met due to a shortage of teachers, intermittent business, and inadequate radiation coverage of rehabilitation facilities. The rise of a new generation of the Internet, as well as the idea and technology of online and offline convergence, has aided in the growth and creativity of people from all walks of life, as well as providing new opportunities for the autistic child therapy industry. With the concept of service system design, this article introduces the design concept and design practice of rehabilitation service system for autistic children on the new generation Internet platform.

Keywords: Autism, Rehabilitation Training, New Generation Internet, Service System Design

83/132

Mo Xiao, pp12-17, 2015 (8)

Seminar on Visual Communication Design Education, 2015

Five design experts were invited to a small seminar to discuss the subject development, teaching principles, and the importance of graduation design in visual communication design. On June 27, 2015, the seminar was held in Everyone's Cafe, hosted by Fang Xiaofeng, editor-in-chief of *ZHUANGSHI*.

Keywords: Design Education, Visual Communication

84/132

Gan Wei, Zhao Jianghong, pp78-79, 2015 (12)

Based on Social Behavior of Interface Design: Analysis on Social Design in Social Media

Based on the social interaction theory of sociology, this article expounds on social design research ideas with social behavior organizations as the object, proposing four social interaction design elements of participation design, communication design, interpersonal design, and activity design, and draws different social media products. The strategy is the conclusion of the outstanding combination of these four design elements. This study provides a new design idea and design method for social media social design.

Keywords: Social Media, Social Design, Social Behavior Organization, Interface Design

85/132

Exchange Experience: Method for the Design of Empathy in the Interactive Interface of Information Service Facilities

In the information age, the user group for information service facilities is becoming larger and larger. From the mainstream user group used to using interactive interfaces to the non-mainstream user group not used to using interactive interfaces, how to reflect the usability and ease of design better? The research starts from the perspective of design psychology, through systematic research on the establishment of conceptual models such as empathy observation, role models, scenario models, and proof-of-concept methods, etc., to explore the empathy design method of the interactive interface of information service facilities in the conceptual design stage, to improve the experience of the non-mainstream user group when using the information service facility interface.

Keywords: Empathy Design, Character Collection, Emotional Matching, Obstacle Situation

86/132

Research on the Interface Icon Design Method Based on Sound Visualization

This paper presents a new design method of interface icons based on sound visualization. This method uses the sound of the interface as an auditory stimulus, the visualization of the sound as a creative tool, and invites different users to participate in the creation of the icon of the interface so that the created icon has the auditory beauty of the sound, in order to increase the aesthetic experience of user interface interaction.

Keywords: Sound Visualization, Interface Icons, Creative Design

87/132

A Review on In-vehicle Information System Design Based on Gesture Interaction

This article summarizes the current status of in-vehicle infotainment system design and the latest research progress of gesture interaction technology in the system, focusing on the key technologies and specific applications of gesture interaction in the design of in-vehicle infotainment systems aimed at the sharing of occupant infotainment, And the development trend of in-vehicle infotainment system applications. Finally, it summarizes the information content, personal preference, gesture design, and other factors that affect

the design of in-vehicle infotainment system and needs further research, and points out the future research focus of in-vehicle infotainment system design.

Keywords: In-vehicle Infotainment System, Gesture Interaction, Infotainment Sharing

88/132

Zhu Xiaojie, pp103-105, 2016 (5)

The Role and Design Principle of Animation in User Interface

Animation effects are an essential part of the user interface and an indispensable tool in user experience design. This article combs animation's role in interaction, analyzes the design principles of animation in the interface, and discusses the research direction of interface animation.

Keywords: User Interface, Animation Effects, Design Principles

89/132

Li Haiping, pp106-107, 2016 (5)

The Spring of Chinese Character Design: Review on the Controversy of FZYouHei Font

Chinese screen display fonts have changed from passive adaptation to functional design. Culture has become a design norm, which also means that Chinese font design begins to challenge Western font design's mighty design power. The era of constructing the own Chinese font design method is coming quietly, and it is of great significance.

Keywords: Founder Youhei, On-screen Font, Design, Right to Speak

90/132

Tian Jun, pp50-55, 2016 (6)

Fusion and Transcendence: Xu Yingqing's View on Information Art Design Education

Xu Yingqing, Ph.D., Director of the Department of Information Art Design, Tsinghua University School of Fine Arts. His research directions: user experience design research, immersive cognition and interaction, tactile cognition and interaction, digitization of cultural heritage. Professor Xu Yingqing has devoted himself to scientific research and teaching in this field for many years and has achieved fruitful research results. On May 25, 2016, our reporter interviewed him. Mr. Xu's experience on the integration and innovation of art and science and the development of disciplines and talent cultivation have profound inspiration for us further to understand the new discipline of information art

design.

Keywords: Information Art Design, Education, Art and Science, Interdisciplinary, Talent Training

91/132

Wang Li, Lü Ping, pp132-133, 2016 (6)

Visual Promotion of Minority Nationality Special Brand in New Media Perspective: Taking Jiuzhou Silk Ball Brand Visual Promotion for Example

The development of new media is an important way of visual language communication. Guangxi minority areas are rich in national characteristic brands. This article relies on the typical representative brand promotion case of the Zhuang nationality old state hydrangea to reconstruct the vision of national brands from the perspective of new media form, to explore how to realize the visual development of national characteristic brands.

Keywords: Jiuzhou Hydrangea, Online Media, Mobile Media, Social Media

92/132

Guo Honglei, Wang Anxia, pp136-137, 2016 (7)

The Orientation of Visual Communication Design and the Construction of Curriculum System

With the rapid transformation of lifestyles and cognitive models under the influence of informatization, big data, and the Internet, the connotation of visual communication design has also undergone significant changes: New logic is generated at the information interaction level. Visual communication professional construction needs to actively respond to these changes and promote teaching reform from the aspects of professional relocation and curriculum system reconstruction.

Keywords: Visual Communication Design, Professional Positioning, Curriculum System

93/132

Zhou Pengcheng, pp142-143, 2016 (8)

Research on Source Design Expression of Motion Graphic in Outdoor Digital Media

The dynamic graphics in the outdoor digital media display are multi-dimensional products of flat, static graphics. When the propagation characteristics of adding space (outdoor space) and time dimension are evident, the general methodology of dynamic graphic

design expression is: it is different from the creation method of short-term images; Intervention, intervention in the time dimension, instruction, process, interaction, and digital design methods are used to form a design methodology for the dissemination of dynamic graphics.

Keywords: Outdoor Interactive Media, Dynamic Graphics, Source Data, Design Expression

94/132

Wu Zhendong, Guo Weimin, Ai Xiaoqun, pp109-112, 2016 (10)

Research on the Teaching Mode of MG Design Based on Problem-Oriented

Dynamic graphic design is a popular direction in the media. However, students do not have a deep understanding of their characteristics, and their guidance is ambiguous. This article proposes its design thinking process based on the 'problem-oriented' scientific method and the content structure centered on the problem. Based on the practical project, the design creativity, target needs, information organization, and other related factors are integrated to establish a dynamic graphic design teaching system: problem situation design is to express the problem with a text storyboard and solve the problem through information visualization.

Keywords: Problem-oriented, Dynamic Graphic Design, Instructional Design, Practical Process

95/132

Liu Bing, Yang Jian, pp33-36, 2016 (11)

Some Philosophical Considerations on Intelligent and Design

Intelligent is a widely and frequently used word at present, but its meaning is not exact at present. This article discriminates this concept, discusses the relationship between its use and the original, intelligent concept, uses two typical cases of intelligent design objects in the design field, analyzes the ethical issues therein, and makes some thoughts on this basis.

Keywords: Intelligence, Design, Ethics

96/132

Zhang Li, pp80-81, 2016 (12)

Experience Design and Consumer Engagement: Study on the Commercial Application

of Augmented Reality

Augmented reality is one of the three major technologies that will change shopping in the future. This article discusses the four modes of augmented reality in commercial applications, analyzes its constituent elements, proposes to consider the design process based on user experience, and finally analyzes the relationship between the three groups of user-brand, user-user, user-bystander to enhance consumer participation in augmented reality.

Keywords: Augmented Reality, Experience Design, Consumer Participation, Commercial Applications

97/132

Zhao Yiping, pp12-19, 2017 (1)

Summary of Innovation and Entrepreneurship Symposium

On the afternoon of November 17, 2016, the 'Innovation · Entrepreneurship' seminar of *ZHUANGSHI* magazine was held at Everyone's Coffee. Nine experts attended the meeting. Based on their own experience, they discussed issues related to innovation and entrepreneurship. The distinguished experts expressed their views on how industrial design continues to innovate in the current general environment, the transformation problems faced by traditional enterprises, how to transform innovation and generate value, how the mobile Internet of Things can assist entrepreneurship, and how to build a platform to help entrepreneurs.

Keywords: Entrepreneurship, Innovation, Internet of Things

98/132

Li Yun, Chen Hongyu, pp20-25, 2017 (1)

Artop's Path in the Era of Innovation: Industry Design Moving Towards Complete Industrial Chain Innovation Service

Nowadays, industrial design is highly comprehensive among horizontal industries and extends vertically to the industrial chain's upstream and downstream. Heroic individual designers cannot afford such complex design tasks. The collaborative design community is the main body of design innovation, among which industrial design companies are the main force of doing their part. Langjian Design Co., Ltd. is rooted in Shenzhen in the process of reform and opening up. Since its establishment in 1999, it has developed

rapidly and has become the leading industrial design company in China. We were fortunate to interview Mr. Chen Hanliang, co-founder, general manager, and design director of Langjian, who told us about Langjian's entrepreneurial process, understanding of design functions and voice, and his insights on design management.

Keywords: Design Innovation, Design Management, Whole Industry Chain Innovation, Designer

99/132

Lou Yongqi, pp66-70, 2017 (1)

Human-computer Interaction, Sustainability, and Design in the View of NHS

This article points out from the perspective of NHCAS that to better cope with the challenges of the human-land crisis and achieves sustainable development, new development models need to be developed. This development model's core task is to find a balance between the operation of the 'artificial world' and the self-healing function of the earth's environment, which often means a collective change in human life and production methods. Interaction design starts from people's feelings and deals with the interactions and interactions between people, people and things, and environment, which may play a vital role in future human life or production methods, that is, the NHS's future relationship. Simultaneously, the development of intelligent information network systems has resulted in a social-scale interaction design based on 'social and environmental feedback'. This includes how to use data, algorithms, networks, and other new technologies to make the system more transparent and induce social behavior changes towards sustainable development. Such intervention can come from both action and system levels. In this process, there are both social interaction issues and contractual issues between actors. The development of artificial intelligence has made the political issues between people and machines on the agenda. The system mechanism's design is the necessary environment for the operation and interaction of the NHCA system. Finally, this paper proposes to change the relationship between people and the outside world through functional design and then choose the next action based on these feedbacks and target states. This is an 'action-feedback-action' based dynamic design method based on evidence.

Note: NHS (Nature, Human Beings, Cyber World, and the Artificial)

Keywords: NHS, Human-computer Interaction, Sustainable Design, DesignX, Social

Interaction

100/132

Xian Feng, pp90-92, 2017 (3)

Construction of Interactive Technology Course System: Taking Academy of Arts & Design, Tsinghua University as an Example

Since the 21st century, interaction design has thrived as an emerging field of design disciplines, and majors and departments related to interaction design in universities have been established. The professional education of interaction design requires balanced construction and coordinated development in both knowledge (art and science) and skills (method and practice), which poses challenges to constructing the curriculum system. Especially in scientific knowledge and technical practice, high requirements are placed on the interaction design profession. The typical performance is that science and technology, technical knowledge, and skills are deeply introduced into the teaching and practice process. The system construction has had a profound impact.

Keywords: Interactive Design, Interactive Technology, Interactive Technology Courses

101/132

Zhang Chenggang, pp12-15, 2017 (4)

Information Visualization in the Image Era: Context, Progress, and Limitation

As a technological practice in historical evolution, design activity is the unification of entity theory and social construction theory. In the early handicraft activities, the design objects are unique, and design and production are inseparable; in large-scale production organizations in industrial society, design activities are planned to a large extent at the symbol level. Information visualization is the realistic representation of design activities in the age of images, which opens a new dimension of representation, cognition, and transformation. 'Image' and 'image interpretation' are the core issues of information visualization; information visualization should distinguish between 'image' and 'image awareness' and pay attention to 'image meaning'; to get out of the information dilemma requires effective social governance.

Keywords: Information Visualization, Image, Image Interpretation, Information Dilemma

102/132

Fu Xinyi, Liu Shixia, Xu Yingqing, pp16-19, 2017 (4)

The Development and Reflection of Information Visualization

Data visualization is facing both opportunities and threats as a result of the exponential growth of information technology and new technologies such as big data processing, artificial intelligence, and virtual reality. This article examines the historical context as well as the frontiers of science and technology, as well as the definitions, classifications, and principles of information visualization, and proposes some major information visualization growth trends; at the same time, it combines application practice from text visualization, social media visualization, big data visualization, and science. Several classic information visualization practice cases are analyzed from the perspectives of computational visualization and cultural heritage visualization. Finally, combined with the interactive design theory, it reflects and looks forward to the difficulties and prospects facing the current information visualization.

Keywords: Information Visualization, Interaction Design, Big Data Analysis, Artificial Intelligence

103/132

Wu Qiong, pp20-23, 2017 (4)

Location-based Information Visualization

Geographical location-based information service is one of the most important mobile phone application models. It brings convenience in information acquisition and use and has a significant meaning and value for the innovation of content and model of information services. Information visualization based on geographic location should clearly and effectively present geographic information characteristics, which can solve the practical problems when people are in a specific geographic location.

Keywords: Information, Services, Location-based

104/132

Yang Xuan, pp114-117, 2017 (5)

The Forming Factors and Reducing Means for the Cognitive Load of Dynamic Visual Representation of Information Visualization

The dynamic visualization of information visualization includes dynamic graphics, text, speech, and interactive means. More cognitive load factors are generated in the

information recognition process due to the non-checkable, non-repeatable, and dynamic interference characteristics of dynamic graphics. The cognitive effect of dynamic graphics is sometimes not as good as static images. Text, clues, speech, interaction, and segmentation are useful visual or technical means to reduce the cognitive load of dynamic graphics and cause other cognitive load problems due to their characteristics or improper design. As a double-edged sword to reduce or generate the cognitive load of information visualization, the analysis of these visual or technical means must be reflected in its application value and application conditions.

Keywords: Dynamic Visual Representation, Dynamic Graphics, Cognitive Load, Information Visualization

105/132

Chen Xinghai, pp108-111, 2017 (11)

Projects-based Classroom Teaching Reform and Practice of Interface Design Course in Design Workflow

This paper analyzes and summarizes the case of the interface design course jointly carried out by the Zhejiang University of Technology and Xiami Music and proposes introducing the actual project of the enterprise into the interface design classroom teaching in the teaching content. Instruct the students in teaching methods according to the interface design workflow of user research, interaction design, and visual design, in the form of small component cooperation, simulate the actual project development environment to conduct project training; invite internal designers and marketing on the evaluation mechanism the results of the personnel participation price. It is beneficial to enhance students' project practical ability, form systematic interface design thinking, and promote their growth to PMD-style design talents.

Keywords: Design Workflow, Project-style Teaching, Interface Design, Xiami Music

106/132

Fan Rongqiang, pp28-31, 2017 (12)

The Process from UCD to UXD

The user-centered design concept of UCD (User-Centered Design) has been proposed for more than ten years, and the designer's functions (interaction, vision, user research) have not changed much. With the constant emergence of new businesses and technology in

this age, it's worth considering how to enable designers to adapt to the era's changes and turn into UXD (User Experience Design) in order to better solve user experience problems.

Keywords: User Experience, Experience Design, Service Design, Alibaba, UXD

107/132

Chen Yan, pp32-35, 2017 (12)

Tencent Charity: Constructing Innovative Model for Online Charity Through Service Design

With the development of the times, the traditional public welfare model is becoming more challenging to meet the public's expectations in the rapidly changing information society, resulting in increasing public trust in public welfare. With the development of the mobile Internet and the gradual lowering of the threshold of smart devices, under the strategy of 'connecting everything', the positioning of Tencent Philanthropy as a 'connector of public welfare for everyone' has become increasingly apparent, and it has gradually become a charity organization and a large number of loving netizens and the enterprise. Under this positioning, Tencent Charity attempts to tap the potential needs existing in different charity roles and seek the possibility of providing services through the Internet. In the past ten years of public welfare, Tencent Public Welfare adhered to the exploration of becoming a 'connector of public welfare for everyone' and used innovative design thinking and service design to build a new model of Internet public welfare.

Keywords: Tencent, Charity, Internet Charity, Service Design

108/132

Zhao Tianxiang, pp36-37, 2017 (12)

Didi Chuxing: Service Design Reaching the Ground

Didi Chuxing has always insisted on letting service design reach the ground, emphasizing the arrival of service design thinking and the importance of value. As an O2O product, online and offline parts in many details based on empathy considerations and implementation of services. This article discusses the multi-touch of the re-creation and problem-solving of the travel car experience in the mobile Internet era and analyzes the 'three people' that are important in the design of Didi travel services the chief, the development team, and the passengers. They can establish a stable and positive operation cycle to empower the overall user experience.

Keywords: Service Design, User Experience, Empathy

109/132

Li Jian, Cai Dongna, pp108-110, 2018 (1)

Study on the Interaction Design Strategy and Application for Pro-environmental Behavior

The current environmental behavior design method based on environmental psychology only considers some of the behavior change factors. It is difficult to effectively transform the user's environmental will into actual environmental action, and it is difficult to ensure long-term environmental behavior. Starting from the context in which environmental behavior occurs and emphasizing the dynamic behavior process can macroscopically grasp the complexity and long-term characteristics of environmental behavior. This paper proposes a contextualized-processed design model and shows through research cases that technological context, social context, phased action. Future-oriented design routes can more effectively mobilize environmental action will, improve environmental behavior capabilities, and build a systematic environmental behavior design model that brings new ideas.

Keywords: Interactive Design, Environmental Behavior, Sustainable Design

110/132

Yang Xuan, pp114-117, 2018 (1)

The Essential Factors of Affecting the Effect of Animation Representation of Information Visualization

Analyzing the relationship between the three aspects of information representation object (information), animation representation constituents, and the subject of the cognizant and their relationship and function are the necessary steps to realize the cognitive effect of information visualization animation representation. The factors affecting the cognitive effect of animation representation organization and information construction include the organization structure of animation representation, the dimensions of animation representation, the combination of representation, the rate of animation playback, the speed of commentary, the complexity of graphics, visual cues, and information design of irrelevant dynamically changing elements, fixed cognitive schema, and visual order. The analysis of the cognitive person's characteristics includes the cognitive person is a priori

knowledge, dynamic cognitive spatial comprehension ability, age, and cognitive willingness, and accepted cognitive tasks. The research on the above three aspects of content impact factors can promote the completion of information visualization's cognitive task in visual communication goals.

Keywords: Animation Representation, Information Visualization, Visual Representation, Cognitive Load, Cognitive Effect

111/132

Zhang Yali, pp118-119, 2018 (1)

Concurrence and Integration of Infographic and Audio-visual Language: Study on Teaching Practice of Multimedia Arts

Multimedia art contains the content of information design and involves a large number of imaging elements. The related course instruction should focus on the logical expression of the learner's knowledge graph, as well as the learner's understanding and integration of the work's audiovisual language. However, the cross-system analysis and teaching practice for these two disciplines are relatively rare. This article will combine the author's multimedia art courses to analyze and explore the coexistence and blending promotion mode of the above two subject directions. The linear teaching procedures and practices explore the best combination of the two disciplines and the learning and training model to build a more scientific, reasonable, and applicable multimedia art curriculum system.

Keywords: Multimedia Art, Information Atlas, Information Design, Imaging

112/132

Yang Huan, pp120-123, 2018 (1)

Exploration and Practice of Advanced Digital Media Design Series Curriculum: Taking Fine Arts School of Hangzhou Normal University as an Example

The 'Skills · Cognition · Emotion · Experience' advanced digital media design series courses are based on the concept of Bloom's educational target system and are derived from stimulating learning interest, promote disciplinary development, adapt to the needs of industrial talents, and meet the territorial industry of universities with structural features as the goal, build an advanced digital media design consisting of a curriculum chain (1. skill module curriculum + 2. cognitive module curriculum + 3. emotion module curriculum) and a school-enterprise cooperation platform (4. experience module platform) Series of

courses. Through the Fine Arts College of Hangzhou Normal University's teaching practice, the series of curriculum models are verified in the four dimensions of design education (students, disciplines, industry, regional industrial structure) to achieve coordinated development of industry, education, and research.

Keywords: Bloom Education Target System, Advanced, Digital Media Design Teaching

113/132

Xue Yanmin, Dai Yu, pp124-125, 2018 (2)

Study on the Influence of Webpage Design Elements on PAD Emotion Experience

The user's emotional experience has a direct relationship with the webpage usability evaluation and webpage design. In this paper, we studied the effect of PAD emotion in user experience on web design through eye movement experiments, designed eye movement experiments on web interface colors, layout, text, pictures, etc., and summarized the joy of design elements such as layout, colors, pictures, etc. Pleasure Degree (P), arousal degree (A), dominance degree (D).

Keywords: Web Design, User Experience, Eye Tracker, PAD Emotional Experience

114/132

Qian Xiaosong, Yang Xin, Zhang Fan, pp82-85, 2018 (3)

An Exploratory Design Research on Touchscreen Interaction System in Special Vehicles

The aim of this article is to develop a collection of design methods for touch screen interaction systems that are appropriate for select vehicles in order to enhance the performance and user experience of those systems. Because special vehicles differ significantly from traditional vehicles in terms of tasks, users, and environment, the existing touch screen interactive system design method is not suitable for select vehicles. The research focuses on tasks, users, and environment and analyzes and explores the differences between unique vehicle interaction scenarios and common scenarios. It is proposed that the design process of the touch screen interactive system of select vehicles should follow the TLM design method of task priority, larger interaction area, and diverse interaction. This method introduces the touch screen interactive system into select vehicles and has specific practical guidance significance.

Keywords: Special Vehicles, Touch Screen Interactive System, TLM Design Method

115/132

Kang Lijuan, pp97-99, 2018 (3)

Study on the Application of Augmented Reality in the Display of Cultural Heritage

Augmented reality technology has huge application prospects in the display of cultural sites. This article reviews the related applications of augmented reality in recent years, examines the advantages and disadvantages of the augmented reality technology path in the display of cultural sites, combs the use of augmented reality in the restoration, reconstruction, scene restoration, and off-site display of cultural sites, and briefly state and interact with information organization.

Keywords: Augmented Reality, Cultural Sites, Information Design

116/132

Tan Jiajia, Lu Xiaobo, pp104-106, 2018 (6)

Study on Blockchain-based Multimodal Digital Identity Creation and Management System Design of Material Cultural Heritage

Material cultural heritage in China is abundant, diverse, and of high quality, and it is an important part of human cultural heritage. As a result, an effective digital identification framework for physical and cultural heritage is needed. This system is based on protecting and disseminating material cultural heritage and using new technology concepts to build a digital identity system platform for material cultural heritage. The platform mainly includes multimodal information entry and network unique identity verification. The first part uses multi-source heterogeneous data fusion, high-precision 3D reconstruction, hyperspectral color texture analysis, and other technologies to collect and record data such as morphology, material, and texture more comprehensive digital information archive for the material cultural heritage. Through the blockchain technology, the second part binds the collected multi-dimensional information to the blockchain to determine that the digital material cultural heritage has unique and compelling identity information on the Internet.

Keywords: Digitalization, Material Cultural Heritage, BlockChain, Digital Identity, Intellectual Property

117/132

Lin Shuang, pp110-113, 2018 (7)

Research on Product Sound Design Based on Semiotics Theory

Sound is the medium of communication between people and products. Appropriate sound can improve the user's work efficiency and enhance the experience. This article analyzes the classification of sounds in product design and the relationship between the sound source corresponding to each type of sound and the listener (user) from the symbols' perspective. It proposes a method for establishing a classified sound database. Given the problems existing in the design of air conditioners on the market, it is proposed that the sound design can be improved to match the four modes of the air conditioner and the critical functions of the remote control to the sound according to the theory of semiotics.

Keywords: Sound, Product, Interactive Design, Symbol

118/132

Paul Chapman, pp23-29, 2018 (10)

Immersive Environments: Real Problems, Virtual Solutions

In this article, I will review computer graphics development and the evolution of the 'mature age' of virtual reality that human beings are looking forward to. I will focus on the multidisciplinary team's strength and introduce various projects that use the immersive environment carried out by the Glasgow School of Art's Simulation and Visualization Institute (SimVis). Specifically, there are medical visualization, pharmaceutical visualization, dangerous sports, and dangerous working environment. Finally, explain how scientific tools generate beautiful 3D immersive point cloud images.

Keywords: Immersive Environment, Virtual Reality, Medical Visualization, Dangerous Environment, Simulator, Point Cloud

119/132

Wu Qiong, Zhao Yiping, pp40-43, 2018 (10)

Frontier Exploration on Natural Human-Computer Interaction: An interview with Paul Fu, Sr. Director of User Experience, Alibaba Group

Fu Limin is a worker and manager who has worked in the field of user experience for many years and a professional researcher. Purdue University awarded him a Ph.D. in industrial engineering in 1999. He contributed to one of the classic bibliographies in the field of human-computer interaction, titled 'Human-Computer Interaction: User-Centered Design

and Evaluation.' He is currently in charge of the human-machine natural interaction laboratory, which is studying the electronification of the five senses and its combination with artificial intelligence in collaboration with Tsinghua University and Zhejiang University. As a senior expert and manager who has been working for many years and taking into account research and practice, how does Fu Limin lead the team to design, evaluate and research user experience? How do you view the development and prospects of the user experience industry at home and abroad? How to define and apply the natural interaction between man and machine advocated by him? With such questions, we conducted an exclusive interview with Fu Limin.

Keywords: User Experience, Natural Human-computer Interaction, Alibaba

120/132

Guo Ting, Ai Xiaoqun, pp94-97, 2018 (10)

The Research on User's Sensory Quality and Behavior Model of AR Museum Guided Application from the Perspective of Cognitive Load

In order to solve the problem of refinement of the information and function design of museum augmented reality (AR) navigation applications, the introduction of human-machine-environment system engineering theory to determine the overall goal of 'high experience, high cognition, high-cost performance' for the design, It is analyzed that the rationality of the cognitive load within the museum's information transmission is its crucial issue.

Keywords: Cognitive Load, Museum, Augmented Reality, Sensory Quality, Behavioral Model

121/132

Wu Qiong, pp12-15, 2019 (1)

Digital Experience Design for Cultural Heritage

The value of digital technology in the protection and utilization of cultural heritage lies in the preservation of digitization and the reproduction of history, the spread of culture, and the impact of the present. To protect, display, and disseminate cultural heritage, this article mainly discusses how to design digital experiences based on digital technology. This article focuses on the ontology and presentation of cultural heritage. At the same time, this article discusses how to promote the resonant interaction between culture and audience and the sustainable development of digital cultural heritage.

Keywords: Cultural Heritage, Digitization, Experience Design

122/132

Li Zhe, Huang Si, Zhang Mengdi, Li Yan, pp16-20, 2019 (1)

The Method of Rapid Acquisition of Facade Image and Intelligent Retrieval of the Decoration Category of Traditional Chinese Rural Dwellings: A Case Study on the Decorative Style of the Residential Entrance of Liukeng Village

Image recognition technology based on machine learning algorithms has developed rapidly and has demonstrated sure accuracy in biometric recognition, but its application in the analysis of village architectural styles is still very immature. It automatically sorts out and retrieves many research photos, and quantitative analysis of decorative features comparison is still a problem. Aiming at the experiment of image collection and type recognition of the house gate in Liukeng Village, Jiangxi, we can analyze the bottleneck of image acquisition and find a way to break through, construct a full operation chain from image acquisition to quantization of style features, and significantly improve the accuracy and feasibility of classification. Based on this, an open and shared network can be established to realize cross-regional search and comparison of traditional village building decoration styles and features.

Keywords: Traditional Villages, Traditional Houses, Style Maps, Machine Learning, Intelligent Retrieval, Image Recognition

123/132

Fu Xinyi, Ma Xiaojuan, Sun Zhijun, pp21-27, 2019 (1)

Digital Restoration of Damaged Murals: Based on Dunhuang Murals

Dunhuang Mogao Grottoes is a treasure trove of world cultural heritage and Buddhist culture, with a long history and high artistic value. However, after years of baptism, the wall paintings of Mogao Grottoes are facing the erosion of various diseases. The restoration methods of physical means have challenges such as difficulty, long period, and high cost. The restoration of murals by digital means has been a hot spot for protecting cultural heritage at home and abroad in recent years. This article focuses on typically broken murals, from the perspective of the interdisciplinary information art design, comprehensive design knowledge, fine arts, computer science, and other subject domain knowledge, using literature research method, demand analysis method, design research method, user

experience method and other research methods, the design paradigm of the interactive mural digital restoration system is proposed, which realizes the restoration of the damaged Dunhuang murals by using the line drawing information of the murals. The recovery results of this article have been recognized by experts in the Dunhuang Academy's relevant fields and can be applied to the protection of cultural heritage.

Keywords: Cultural Heritage, Dunhuang Frescoes, Digital Restoration, Interactive Design

124/132

Tu La, Ma Xiaona, Du Juan, Xu Yingqing, pp28-35, 2019 (1)

Research on Digital Acquisition of Dunhuang Murals Color

As an integral part of the digital research of cultural heritage, the digital restoration of mural colors mainly involves collecting and processing mural images, the collection and analysis of paint components, and the analysis and restoration of mural colors based on this. This article combines the research on the restoration of cultural relic color in the national '973' project 'Theories and Methods of Digital Protection of Cultural Heritage', taking the digital restoration research project of the mural color of the Mogao Grottoes in Dunhuang as an example to analyze the critical points involved in the collection of digital images of cultural heritage and Difficulties. At the same time, the corresponding solutions are proposed to lay the foundation for subsequent related research.

Keywords: Cultural Heritage, Dunhuang Frescoes, Mogao Grottoes, Digital Collection, Color Restoration

125/132

Wang Zhigang, Wang Ye, pp36-43, 2019 (1)

Sidelights of Renascence of Traditional Culture: Tsinghua University Cultural Heritage Protection and Innovation Research Achievements Exhibition

'Everything is Soul' Tsinghua University's Cultural Heritage Protection and Innovation Research Achievement Exhibition, through the use of video, interactive experience, virtual reality, holographic projection, and other new media technologies, reproduce and innovate the charm of cultural heritage. Through the subject research, the theoretical value is used to explore the important value of cultural heritage protection deeply through planning exhibitions and using actual results to spread the mission of cultural heritage protection. New media art is also used to express the creative exploration process of cultural heritage,

and 'information' is the core concept of the spirit of all things to show the diversified and systematic research results of digital protection of cultural heritage and sustainable innovation.

Keywords: Cultural Heritage, Protection and Innovation, Exhibition, New Media Art, Immersive Experience

126/132

He Yan, Yang Si, Pei Weiyi, pp44-49, 2019 (1)

Digital Interpretation and Public Communication of Cultural Heritage: Taking the E-MAX Immersion Interactive Exhibition as an Example

This article takes the immersive interactive show of 'Return to the Western House' as an example by analyzing and summarizing its specific content planning, experience design, and space design to explore new ideas and digital interpretation models of cultural heritage and public communication.

Keywords: Digital Cultural Heritage, Public Communication, Connection, Immersion, Personal Experience

127/132

Song Wu, Xiong Hailin, Li Yan, pp71-73, 2019 (2)

Application of Human Factors Technology in Human-Computer Intelligent Interaction from the Perspective of Industrial Design

As the term 'intelligence' is widely popularized in life, intelligence is also quietly changing the industrial design. The ergonomic method of integrating intelligent manufacturing technology has become mature in helping industrial design and design evaluation. In the context of cross-disciplinary integration, an industrial design must also break through the bottleneck and seek innovation in the current information era. Therefore, the 'intelligent human factors engineering' of the intelligent information terminal service-oriented learning created by combining the human factors engineering to obtain human factors data and the current intelligent technology will be one of the new industrial design methods in the future.

Keywords: Intelligence, Ergonomics, Industrial Design, Human-agent Interaction

128/132

Zhang Yali, Xu Yingqing, Han Zhengang, pp72-75, 2019 (3)

Study on the Cultural Heritage Color Digitalization of Fahai Temple Frescoes

The 'Outline of Chinese Mural History' mentioned the Ming Dynasty's temple murals; the first is the murals of Fahai Temple painted by the court painter. The painting method and color style of its turquoise and rich colors and the 'little powder and gold' have pronounced artistic characteristics and color research value, and it is also the best period to intervene in the research of color digitalization. This article takes the color of the Fahai Temple mural as the research object, through the interdisciplinary research of aesthetics, fine arts, information design, chronology, etc., strives to build a theoretical model and practical basis for the cultural heritage color digitization, and explores the digital display of traditional colors interdisciplinary research path experience in communication and reapplication.

Keywords: Cultural Heritage, Mural Paintings of Fahai Temple, Digitization of Colors, Leaching Gold

129/132

Zheng Yangshuo, Zhu Yiwen, pp81-83, 2019 (4)

Thinking and Practice of Teaching Mode for the Interaction Design Specialized Course Based on Four Perspectives: An Example Course of User Research and Usability Design

User research and usability design are one of the hot topics in interactive design research and practice. On the one hand, the new information technology and design tools make the completion and high quality of information and interaction design possible. On the other hand, the related interactive design courses' teaching and practice are disconnected, and the teaching direction is relatively vague. This article takes the 'User Research and Usability Design' course of design colleges as an example to systematically discuss the teaching model and subject design process of interactive design courses based on a four-dimensional perspective, verifying that the innovative curriculum system and teaching methods can effectively guide students' creative thinking.

Keywords: Four-dimensional Perspective, Design Thinking, Information Interaction Design

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Zhang Lie, Pan Husheng, pp96-99, 2019 (5)

Research Progress and Trend of Interactive Design Abroad: Quantitative Analysis of Literature Maps Based on Indexes Such as SSCI

In this study, the scientometrics method was used to select the relevant literature of five commonly used citation index databases such as SSCI from 1985 to 2018 as the data foundation. With the aid of the information visualization Citespace software, the atlas analysis of foreign interactive design research papers was conducted. The results show that: (1) The volume of published articles has generally increased year by year, especially after 2007, and has experienced significant growth after three early research stages, steady growth, and rapid growth. (2) Researchers have a strong sense of cooperation, and interdisciplinary, inter-university, and cross-country collaborations dominated by scientific research are frequent. (3) The topic selection and research perspectives of the thesis are extensive, with a total of 1,224 keywords generated, which are all involved in politics, economy, culture, technology, education, art, sports, health, etc. (4) Research hotspots are mainly three clusters, reflecting the development process of interactive design interface-behavior-experience. (5) Primary research is relatively stable, and several classic works have been produced.

Note: SSCI (Social Sciences Citation Index)

Keywords: Interactive Design, Design Science, Knowledge Atlas, Citespace

131/132

Yang Huan, pp100-103, 2019 (5)

The Integration of Data and Design: The Innovation Path Research of User Requirement Insight Through Big Data Analysis

This article starts with the study of the fusion relationship between data and design thinking, explains the principles and innovative methods of user research under big data analysis, emphasizes the use of quantitative and qualitative user research methods, and builds 'from creating user portraits to analyzing user experience big data analysis in the field of Internet design in the context of Journey and Scenario Analysis leads to an innovative path for insights into user needs. Finally, the innovative insight path was applied to the case of churn users. The case study's conclusion further verified its effectiveness, promoted the innovative development of the data-driven design model, and showed the specific path of the integration of data and design.

Keywords: Big Data Analysis, User Research, User Needs, Insight Path

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Exploration on Project Introduction & School-enterprise Linkage Practical Teaching Mode of Visual Communication Design Major

This article introduces the 'project + school-enterprise linkage' practice teaching reform mode. It uses course case analysis to clarify that the 'project' is used as the guiding purpose of practical teaching and the 'school-enterprise linkage as a practical teaching method, through a series of diversified live detection design results methods to improve student teamwork and practical innovation ability.

Appendix 2: Feedback of Peer Validity Evaluation

Feedback of Validity Evaluation from peer 1

(Assoc. Prof. Sone Simatrang, Silpakorn University)

Expert's Feedback on the Validity of the Research Design

Topic PARADIGM SHIFT OF CHINA'S INFORMATION DESIGN:
A Content Analysis of *ZHUANGSHI* (2009-2019)

1. Is the journal *ZHUANGSHI* valid as the sample population of this research?

    ☑ yes   ☐ no

2. Is the time period of this research valid?

    ☑ yes   ☐ no

3. Is *Paradigm Shift* theory as the theoretical basis valid?

    ☑ yes   ☐ no

4. Is *Grounded* theory as the theoretical basis valid?

    ☑ yes   ☐ no

5. Whether the background of the researcher is suitable for this research?

    ☑ yes   ☐ no

6. Is the *Content Analysis* method valid?

    ☑ yes   ☐ no

7. Is the framework of the first round research valid?

    ☑ yes   ☐ no

8. Is the framework of the second round research valid?

    ☑ yes   ☐ no

9. Is the framework of the third round research valid?

    ☑ yes   ☐ no

Signature _Simatrang_

Date _23_ Month _Sept._ Year _2019_

Feedback of Validity Evaluation from peer 2

(Asst. Prof. Ph.D. Jirawat Vongphantuset, Silpakorn University)

Expert's Feedback on the Validity of the Research Design

Topic PARADIGM SHIFT OF CHINA'S INFORMATION DESIGN:
A Content Analysis of *ZHUANGSHI* (2009-2019)

1. Is the journal *ZHUANGSHI* valid as the sample population of this research?

   ☑ yes   ☐ no

2. Is the time period of this research valid?

   ☑ yes   ☐ no

3. Is *Paradigm Shift* theory as the theoretical basis valid?

   ☑ yes   ☐ no

4. Is *Grounded* theory as the theoretical basis valid?

   ☑ yes   ☐ no

5. Whether the background of the researcher is suitable for this research?

   ☑ yes   ☐ no

6. Is the *Content Analysis* method valid?

   ☑ yes   ☐ no

7. Is the framework of the first round research valid?

   ☑ yes   ☐ no

8. Is the framework of the second round research valid?

   ☐ yes   ☐ no   NOT KNOW

9. Is the framework of the third round research valid?

   ☐ yes   ☐ no   NOT KNOW

Signature ___JIRAWAT V.___

Date __5__ Month _OCT._ Year _2019_

Feedback of Validity Evaluation from peer 3

(Mrs. Liang Wei, Design Director of China Art Daily)

Expert's Feedback on the Validity of the Research Design

Topic PARADIGM SHIFT OF CHINA'S INFORMATION DESIGN:
A Content Analysis of *ZHUANGSHI* (2009-2019)

1. Is the journal *ZHUANGSHI* valid as the sample population of this research?

   ☑ yes   ☐ no

2. Is the time period of this research valid?

   ☑ yes   ☐ no

3. Is *Paradigm Shift* theory as the theoretical basis valid?

   ☑ yes   ☐ no

4. Is *Grounded* theory as the theoretical basis valid?

   ☑ yes   ☐ no

5. Whether the background of the researcher is suitable for this research?

   ☑ yes   ☐ no

6. Is the *Content Analysis* method valid?

   ☑ yes   ☐ no

7. Is the framework of the first round research valid?

   ☑ yes   ☐ no

8. Is the framework of the second round research valid?

   ☑ yes   ☐ no

9. Is the framework of the third round research valid?

   ☑ yes   ☐ no

Signature _____

Date _25_ Month _9_ Year _2019_

Feedback of Validity Evaluation from peer 4

(Mrs. Du Chen, Design Director of Mozilla Firefox Ltd.)

Expert's Feedback on the Validity of the Research Design

Topic PARADIGM SHIFT OF CHINA'S INFORMATION DESIGN:
A Content Analysis of *ZHUANGSHI* (2009-2019)

1. Is the journal *ZHUANGSHI* valid as the sample population of this research?

   ☑yes ☐no

2. Is the time period of this research valid?

   ☑yes ☐no

3. Is *Paradigm Shift* theory as the theoretical basis valid?

   ☑yes ☐no

4. Is *Grounded* theory as the theoretical basis valid?

   ☑yes ☐no

5. Whether the background of the researcher is suitable for this research?

   ☑yes ☐no

6. Is the *Content Analysis* method valid?

   ☑yes ☐no

7. Is the framework of the first round research valid?

   ☑yes ☐no

8. Is the framework of the second round research valid?

   ☑yes ☐no

9. Is the framework of the third round research valid?

   ☑yes ☐no

Signature _____

Date _25_ Month _9_ Year _2019_

Feedback of Validity Evaluation from peer 5

(Mrs. Qiao Lei, Design Director of Hangzhou TreeFintech)

Expert's Feedback on the Validity of the Research Design

Topic PARADIGM SHIFT OF CHINA'S INFORMATION DESIGN:
A Content Analysis of *ZHUANGSHI* (2009-2019)

1. Is the journal *ZHUANGSHI* valid as the sample population of this research?

   ☑ yes ☐ no

2. Is the time period of this research valid?

   ☑ yes ☐ no

3. Is *Paradigm Shift* theory as the theoretical basis valid?

   ☑ yes ☐ no

4. Is *Grounded* theory as the theoretical basis valid?

   ☑ yes ☐ no

5. Whether the background of the researcher is suitable for this research?

   ☑ yes ☐ no

6. Is the *Content Analysis* method valid?

   ☑ yes ☐ no

7. Is the framework of the first round research valid?

   ☑ yes ☐ no

8. Is the framework of the second round research valid?

   ☑ yes ☐ no

9. Is the framework of the third round research valid?

   ☑ yes ☐ no

Signature _____

Date _2⁵_ Month _8_ Year _2019_

Appendix 3: Feedbacks Forms of Peer Reliability Evaluation

Feedback of Reliability Evaluation from peer 1

Professor Dongping Zhu

Institution:

Faculty of Design, School of Arts, Renmin University of China

Submission Date: August 1, 2020

Notes: Sampling Accuracy (SA); Coding Accuracy (CA); Chinese-English Consistency (CEC)

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
7	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
9	SA	√									
	CA	√									
	CEC		√								

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
13	SA		√								
	CA	√									
	CEC	√									

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
19	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
25	SA	√									
	CA	√									

	CEC	√									

Samples	Agreement Percentage										
		100	90	80	70	60	50	40	30	20	10
26	SA	√									
	CA	√									
	CEC		√								

Samples	Agreement Percentage										
		100	90	80	70	60	50	40	30	20	10
38	SA	√									
	CA			√							
	CEC	√									

Samples	Agreement Percentage										
		100	90	80	70	60	50	40	30	20	10
45	SA	√									
	CA	√									
	CEC	√									

Samples	Agreement Percentage										
		100	90	80	70	60	50	40	30	20	10
49	SA	√									
	CA	√									
	CEC			√							

Samples	Agreement Percentage										
		100	90	80	70	60	50	40	30	20	10
57	SA		√								
	CA	√									
	CEC	√									

Samples	Agreement Percentage										
		100	90	80	70	60	50	40	30	20	10
63	SA	√									
	CA	√									
	CEC		√								

Samples	Agreement Percentage

Samples		100	90	80	70	60	50	40	30	20	10
69	SA			√							
	CA	√									
	CEC	√									

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
73	SA			√							
	CA	√									
	CEC	√									

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
78	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
89	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
95	SA	√									
	CA	√									
	CEC		√								

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
97	SA		√								
	CA		√								
	CEC			√							

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
106	SA		√								

		√									
	CA	√									
	CEC		√								

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
113	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
117	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
122	SA		√								
	CA	√									
	CEC			√							

Samples		Agreement Percentage									
		100	90	80	70	60	50	40	30	20	10
127	SA			√							
	CA	√									
	CEC	√									

Other Comments

I suggest to unify the expressions of similar meanings between samples for later analysis.

Signature

Date 13-08-2020

Feedback of Reliability Evaluation from Peer 2

Dr. Zhengyi Zhao

Institution:

Art and Design Studies, Kyoto University of the Arts

Submission Date: August 1, 2020

Notes: Sampling Accuracy **(SA)**; Coding Accuracy **(CA)**; Chinese-English Consistency **(CEC)**

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
7	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
9	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
13	SA		√								
	CA	√									
	CEC			√							

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
19	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
25	SA		√								
	CA			√							
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
26	SA	√									
	CA		√								
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
38	SA			√							
	CA	√									
	CEC		√								

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
45	SA	√									
	CA			√							
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
49	SA		√								
	CA	√									
	CEC			√							

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
57	SA	√									
	CA		√								
	CEC		√								

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
63	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10

69		100	90	80	70	60	50	40	30	20	10
	SA		√								
	CA	√									
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
73	SA			√							
	CA	√									
	CEC		√								

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
78	SA		√								
	CA	√									
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
89	SA	√									
	CA		√								
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
95	SA	√									
	CA			√							
	CEC		√								

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
97	SA			√							
	CA			√							
	CEC		√								

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
106	SA	√									
	CA	√									

	CEC	√								

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
113	SA			√							
	CA		√								
	CEC		√								

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
117	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
122	SA	√									
	CA	√									
	CEC	√									

Samples		Agreement Percentage (%)									
		100	90	80	70	60	50	40	30	20	10
127	SA			√							
	CA	√									
	CEC	√									

Other Comments

The extracted qualitative data can be as short as possible while maintaining the core meaning to reduce data noise.

Signature _____

Date _____15-08-2020_____

VITA

NAME	Xing YANG
DATE OF BIRTH	18 April 1983
PLACE OF BIRTH	Heilongjiang of China
INSTITUTIONS ATTENDED	EDUCATIONAL BACKGROUND

2006, Bachelor of Arts (Graphic Design), Beijing Forestry University, CHINA

2011, Master of Arts (Visual Communication Design), Renmin University of China, CHINA

2018, Entered the Doctor of Philosophy Programme in Design Arts (International Programme), Graduate School, Silpakorn University, THAILAND

CAREER BACKGROUND

2017-2018, Lecturer in the Faculty of Art and Design, Dhurakij Pundit University, THAILAND

2011-2017, Designer, Editor, and Reporter in China Art Daily Newspaper Office, CHINA

2006-2008, Designer in China Textile & Apparel Press, CHINA

HOME ADDRESS	3-603, Building 7, Longhua Community, Tiefeng District, Qiqihar City, Heilongjiang Province, CHINA
PUBLICATION	Yang, X. (2019). The Color Scheme Applied to the Existing Third-party Mobile Payment Applications. In Proceedings of the 2019 5th International Conference on E-Business and Applications (pp. 25–28). Bangkok.

Xing Yang (2021) Paradigm Shift in Chinese Information Design (2009–2019), The Design Journal, 24:2, 325-334, DOI: 10.1080/14606925.2020.1835233