

On the Cultural Anchorings of Knowledge Visualization

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This article concerns knowledge graphics from Chinese culture. These graphics are linked to specific designs based on concepts anchored in their own culture and time. The major question behind our research was: What visual means do knowledge graphics employ to represent their cultural framework?

The main object of the team's research was a body of images that visualizes knowledge, compiled chiefly from a Chinese encyclopedia, the 三才圖會 *Sāncái túhuì* [Collected Illustrations of the Three Realms]. At the heart of the research is the conception and creative development of *visual translations*. In producing our *visual translations*, we integrated missing information, or information that was merely alluded to, such as the four cardinal directions. By redesigning existing knowledge graphics, the research team was able to perceive the cultural implications of the Chinese graphics. Practice-based research primarily allowed us to better understand the original images through the process of tracing them—a practice that revealed for us their special characteristics. One of the most important observations was that, in traditional Chinese diagrams, both pictographs and written signs face different directions corresponding to the four cardinal points; the direction in which the signs are turned also provides information about particular spatial directions.

During the research process, practice-led research and scientific processes are closely connected. Reflecting on and creating *visual translations* are processes relevant to information design, to visual studies, and, in an expanded sense, to the disciplines of “intercultural design” and diversity research. In this interdisciplinary research project, our design team investigated the research topic in collaboration with Sinologists and cultural education scientists.

Introduction

Very little in-depth research on information design combines both practice and theory. One of the few exceptions is the work of Edward Tufte, who uses the redesign of existing informational graphics as a way to reflect on and critique actual visualizations.¹

1 See Edward Rolf Tufte, *The Visual Display of Quantitative Information* (Cheshire, UK: Graphics Press, 2013).

Viégas and Wattenberg also discuss lesser known redesigns, such as Alberto Cairo's redesign of a radial rendering of a timeline of the Arab Spring as a linear diagram.² Tufte's and Cairo's "redesign critique" is directed primarily at issues of form, such as legibility. Design methods are suggested for improving the renderings of certain types of information. Thus, information design, and more generally, design critique tends to refer to aesthetic, functional, or communicative aspects; rarely are socio-cultural contexts considered.

In contrast, "redesign" in our research is less about formally redesigning knowledge visualizations or improving their aesthetics; instead, we offer a method that allows for perceiving and visualizing the influence of culture and time on the methods and means used to create knowledge graphics. Capturing such influences was the main goal of our research.

Texts and specific visualizations were examined to answer the research question: What special characteristics related to their cultural frame of reference and their design do traditional Chinese knowledge graphics display?

To answer this question, we develop our main hypothesis: Because knowledge visualizations are always related to specific aspects of their cultural frame of reference, they cannot be regarded as "universal"; hence, they require a kind of visual translation that involves redesigning the original graphic. The dimensions of this translation are quite diverse; they range from comments, to explanations, to redesigns.

Why not simply translate the information in writing? As Gottfried Boehm writes, "images possess a logic that is entirely their own."³ We have expanded the investigation into this genuine visual characteristic, and in light of this expansion, we pose another central research question: How can redesign be used so that the cultural specifics behind the Chinese knowledge graphics can be seen and understood?

The cultural implications of images are an important issue. Becoming aware of and reflecting on the cultural influences behind various forms of depiction is relevant not only to visual studies and information design in the narrow sense, but also to the new discipline of "intercultural design." One practical field of application here is brand design for international firms. If a brand like Nestle wants to succeed in China, too, it has to make sure that the syllable, "Nest-" also has the same connotations in the Chinese context.

The experience and knowledge gained here also are relevant to diversity research, which examines the increasing diversity and differences in global societies. It aims to explore how the diversity of employees can benefit companies and other public institutions, such as hospitals.

2 Fernanda Viégas and Martin Wattenberg, "Design and Redesign in Data Visualization," Medium (March 27, 2015), https://medium.com/@hint_fm/design-and-redesign-4ab77206cf9#qy32j9l4u (accessed May 30, 2015).

3 Gottfried Boehm, "Die Wiederkehr der Bilder" [The Return of the Image] in *Was ist ein Bild? [What Is an Image?]*, ed. Gottfried Boehm (Paderborn, Germany: Wilhelm Fink, 2006), 28.

Information design can reinforce communications beyond the limitations of speech and, to an extent, beyond the limitations of knowledge. However, the universality often assumed to be conveyed by images must be critically examined; our research contributes to this critical assessment. Hence, the results of our research might also be seen as an example of a constructive way of dealing with cultural differences.

How does our research fit into the context of earlier research projects on the theme? A two-year study that investigated the coexistence of Chinese and Latin characters inspired and initiated the current research. This preliminary study looked at how multilingual typography communicates through type specimens, visual text samples, annotations on books, and visual examples, based on a review of Chinese designers and texts.

Reflecting on the cultural influence of typographic and pictorial representation is significant to both the practical and the theoretical areas of information design. Through such reflection, information designers both learn a visual language and become aware of its “cultural grammar.”

Methodology and Methodological Steps: Posing the Problem

Should knowledge graphics be translated, and if so, why? The prevailing opinion that images are more immediately understandable than language applies particularly to highly simplified pictographs.⁴ The interpretation of a pictograph is derived from its similarity to the object depicted and is based on particular conventions. Furthermore, the interpretation depends on the context of a specific place. Pictographs are immediately legible because they build on learned and habitual forms of communication and familiar content, while also conveying easily digested, limited amounts of information.

However, in the process of conveying knowledge, this type of linear communication, which is oriented toward eliminating ambiguity, is insufficient. The more important goal here is to allow the viewer to engage with knowledge graphics in a process of exploration and thereby to enable a deeper understanding of the content.

In the design of a graphic or diagram, “design” refers foremost to the construction and arrangement of signs and symbols. These can be arranged linearly or radially, or in the shape of a tree, a network, a matrix, or a table. Diagrammatic or spatial layouts link isolated systems using “allocations,” assigning symbols each a position.⁵ These allocations, or assignments, not only visualize “real” spatial conditions but also elevate the spatial “to a representational principle that can be employed to visualize non-spatial matters.”⁶ A diagram shows content not only in a simultaneous

4 See Sigrid Schade and Silke Wenk, “Begegnungen mit Bildern: Vom Mythos ihrer unmittelbaren Verständlichkeit” [Encounters with Images: On the Myth of their Immediate Comprehensibility], in *Studien zur visuellen Kultur: Einführung in ein transdisziplinäres Forschungsfeld* [Studies of Visual Culture: Introduction to a Transdisciplinary Field of Research], ed. Sigrid Schade and Silke Wenk (Bielefeld, Germany: Transcript, 2011), 13.

5 Eva Cancik-Kirschbaum and Bernd Mahr, “Anordnung und ästhetisches Profil: Die Herausbildung einer universellen Kulturtechnik in der Frühgeschichte der Schrift” [Order and Aesthetic Profile: The Formation of a Universal Cultural Technique in the Early History of Writing] *Diagramme und bildtextile Ordnungen. Bildwelten des Wissens. Kunsthistorisches Jahrbuch für Bildkritik* [Diagrams and Image-Text Configurations: Visual Worlds of Knowledge, Art History Annual for Visual Critique] 3, no. 1 (2005): 97–114.

6 Sybille Krämer, “Operative Bildlichkeit. Von der ‘Grammatologie’ zu einer ‘Diagrammatologie’? Reflexionen über erkennendes ‘Sehen’” [Operative Imagery: From ‘Grammatology’ to ‘Diagramatology’? Reflections on Cognitive ‘Vision’] in *Logik des Bildlichen: zur Kritik der ikonischen Vernunfted.* Martina Hessler (Bielefeld, Germany: Transcript, 2009), 96.

manner, but also in succession. As such, many diagrams must be read in a specific direction: from left to right, clockwise, from top to bottom, or from the center outward to the periphery.

Theoretical Foundation

The following explains the theoretical foundation of the research, beginning first with the term “knowledge visualization.” Encyclopedia illustrations are generally called “utility pictures” or “scientific pictures.”⁷ Because of their functional purpose, they are distinguished from artistic images. In design, the term “infographics” generally has been adopted. However, the more appropriate term for encyclopedia illustrations and all the illustrations chosen for this article is “knowledge visualization.” How does information (e.g., news or reports) differ from knowledge? Information initially is unfiltered, uninterpreted, and unsorted. Only when the information is put into context and classified can knowledge emerge.⁸ Breidbach defines knowledge as interpreted information: Knowledge is substantially defined by the order in which it is presented. In this sense, “knowledge is the reference system in which information is interpreted and thus first made available at all.”⁹

A reference system for design is formed by all the factors that contribute to the interpretation of imagery, such as the structure and function of the graphics (e.g., cardinal points, reading directions, and context).

Knowledge visualization is always linked to a reference system, as Breidbach has defined it. Each reference system is, in turn, linked to a particular culture and is valid within a specific time period. The reference system is a significant factor in the reception of images and their production. Along with cultural issues, the reference system comprises other influencing factors, such as social, ethical, and historical matters. Even when images have a natural appearance, they are connected to a reference system—but because the system of reference is so familiar to all inside that particular culture, the system no longer needs to be defined more precisely.¹⁰

Data Analysis and Description of Chinese Knowledge Diagrams

For our investigation, we chose a collection of images consisting chiefly of knowledge visualizations from the Chinese encyclopedia 三才圖會 *Sāncāitúhuì* [Collected Illustrations of the Three Realms]. This extraordinary store of knowledge from the Ming dynasty (1368–1644) consists of around twelve thousand pages, one-third of which are knowledge visualizations. No other work contains a comparable wealth of images and diversity of themes. Other sources, such as the 圖書編 *Tushu Bian* [Compendium of Diagrams], are less comprehensive and diverse. We selected about 100

7 For the former, see, e.g., Stefan Majetschak, “Sichtvermerke. Über Unterschiede zwischen Kunst- und Gebrauchsbildern” [Visual Notations: On the Differences between Artist and Commercial Images] in *Bild-Zeichen: Perspektiven einer Wissenschaft vom Bild* [Image-Sign: Perceiving a Science through the Image], ed. Stefan Majetschak (Munich: W. Fink, 2005), 97. For the latter, see Gottfried Boehm, “Zwischen Auge und Hand: Bilder als Instrumente der Erkenntnis” [Between Eye and Hand: Images as Instruments of Knowledge] in *Konstruktionen Sichtbarkeiten* [Constructing Visuals OR Constructions of Images] ed. Jörg Huber and Martin Heller (Zurich: Hochschule für Gestaltung und Kunst, 1999), 227.

8 See Olaf Breidbach, *Neue Wissensordnungen. Wie aus Informationen und Nachrichten kulturelles Wissen entsteht* [New Configurations of Knowledge. How Information and News Gives Rise to Cultural Knowledge], (Frankfurt: Suhrkamp, 2008), 11.

9 Ibid.

10 Nelson Goodman, *Languages of Art: An Approach to a Theory of Symbols* (Indianapolis, IN: Bobbs-Merrill, 1968), 37.

diagrams depicting conceptual knowledge of time and space (architecture) from the encyclopedia and systematically described them; a Sinologist translated the accompanying entries.

Our study revealed that the strongest particulars in the diagrams refer to the method used for depiction and the cultural frame of reference. Of special interest in our research were the various knowledge diagrams dealing with the fundamentals of the Chinese system of correspondences—its depictions of relationships between different times, directions, transformational phases, and polar opposites. In traditional China, nearly all areas of knowledge and life are connected by this system of correspondences. It embraces a synopsis of qualities and assigns the most diverse categories, such as seasons, cardinal directions, bodily organs, sensations, flavors, and colors, to an established canon of equivalents. The knowledge visualizations selected for this article express this system of correspondences, and they come from the chapters 宮室 *Gongshi* [architecture] and 儀 *Liyi* [rituals]. (Pictorial representations of objects, animals, and plants were not selected for this research.)

The design researchers discussed the selected diagrams extensively with the Sinologist, and recorded the resulting observations. Both researchers also carried out the visual analysis of the diagrams. The research group also included an information designer, who used Illustrator to draw the redesigns on the computer.

In analyzing the diagrams, the most important aspects of the frame of reference were compiled from the encyclopedia's diagrammatic depictions. Sybille Krämer's assembly of the main characteristics of diagrammatic images served as our theoretical foundation. For the examples described, two features of Krämer's theory are particularly relevant: Chinese diagrams are directional and syntactic.

Developing Redesigns, or Visual Translations

This phase of the research involved the conception and creative redevelopment of *visual translations*. Through the study of literature and in close cooperation with a cultural mediator, we worked out a body of theoretical knowledge based on culturally anchored concepts of time, space, and symbolism. Certain aspects of these concepts that were not immediately visible but that are part of the knowledge diagrams' cultural reference system were identified and then visualized in newly created graphics.

Our methodological approach combined scientific processes and research through (re)design, resulting in practice-led research. The theoretical reflection, based on the hypothesis that knowledge graphics must translate another culture, entails ethnographic and visual studies expertise. An interdisciplinary team of researchers investigate the levels of the traditional Chinese system of references that is the foundation of the knowledge graphics. In this process of research through design, the results were *translated* into iconic representations and knowledge visualizations. This practice-based research enabled us to better understand the originals through the process of drawing them, which then allowed us to reflect on the process of comprehension: When people look at knowledge graphics, what information is lacking and must therefore be added to the redesigns or emphasized in them?

To translate knowledge graphics into visuals and, in doing so, to perceive aspects of the traditional Chinese system of references, we developed visual correspondences. In terms of methodology, this process is comparable to the development of pictograms or of a visual language (e.g., Otto Neurath and Gerd Arntz's ISO-TYPE¹¹). For example, in some cases, the degree of abstraction used in the redesigns differed from the originals: the new images were made somewhat more specific. For instance, a rectangle, representing a house, was replaced with a two-dimensional image of a house. Both the contents of the knowledge graphics and the concepts connected to them (time and space) were translated in this way—they were made perceptible and comprehensible. We developed about 120 graphics in total, which allowed us to discover and understand the constitutive aspects of the traditional Chinese system of cultural references and to perceive the special features of traditional Chinese knowledge visualizations.

Results

We explain here the three most important results of this research:

- The method of visual translation developed;
- The main aspects of the traditional Chinese system of reference; and
- The major special features of the designs for the knowledge graphics from the 三才圖會 *Sāncái túhuì*.

Visual Translation

The Chinese graphics were redesigned. The redesign was a necessary step in visualizing the cultural aspects of the frame of reference in images, and to explain the knowledge graphics in visual ways. Visual translation involves making visual “comments” about the original graphics and highlighting or supplementing aspects of

11 Otto Neurath, *International Picture Language: The First Rules of Isotype* (London: K. Paul, Trench, Trubner & Co., Ltd., 1936).

the system of reference. Aspects of concepts that are not directly visible—in our case, time, space, and symbolism—can thus be made accessible through visual and linguistic “explanations.”

As a method of research, *redesign* fostered the recognition of these aspects in the graphics. As a result, the redesigned translations show evidence of the research. As visual documents, they provide contemporary Western and Chinese eyes with access to the original, ancient Chinese graphics. During this phase of research, intuition and creativity played significant roles, as did intellectual activity and reflection.

Major Aspects of the Traditional Chinese Frame of Reference

Among the most important aspects of the frame of reference found in traditional Chinese diagrams is the connection between the square (地 *dì*, [earth]: space, material) and the circle (天 *tiān* [sky]: time, mind). In traditional Chinese diagrams, “space” and “time” do not describe qualitative relationships but measurable dimensions. Circle and square are understood to be different forms of the effects of the same causative force, 道 *dào* (or “tao,” literally, “the way”); hence, they work together and complement each other, rather than being two sides of an irreconcilable, opposing relationship. The concept of space is characterized by dividing the square into nine fields (九宮 *jiǔ gōng*, or [nine palaces]) and arranging the four cardinal points around the center. In diagrammatic images south is at the top, while on some maps or architectural plans north is at the top.

Fundamental to the visual connection between circle and square is the notion of the principal forces of polarity, identified as 陰 *yīn* (dark, cold, contracting) and 陽 *yáng* (bright, warm, expanding). The idea that a cyclically fluctuating balance exists between these opposing forces is essential to the entire traditional Chinese view of the world.

*Most Important Specifics for Designing Diagrams from the 三才圖會 *Sāncái túhuì**

We explain the major aspects involved in designing diagrammatic images from the encyclopedia 三才圖會 *Sāncái túhuì* here and visualize them in the example shown in Figure 1. The image depicts a ceremony honoring ancestors, held in the Ming dynasty’s Imperial Palace.¹² The building itself represents the hall of ancestors, before which each emperor was required to carry out his ritual bows. The written characters in the rectangle and in the lower section of the image indicate where each participant—such as the minister of sacrifices, the minister of rituals, the musicians, or the dancers—were supposed to stand.

12 王圻 Wang Qi and 黃晟 Huang Sheng, 三才圖會 *Sāncái túhuì* [Collected Illustrations of the Three Realms], published by 槐陰草堂 Huaiyin caotang [1609 print plates, revision, and reproduction Qianlong], 儀制 Yizhi [Rituals], vol. 7, 46. <http://daten.digital-sammlungen.de/~db/0006/bsb00060348/images/index.html?seite=269&fip=193.174.98.30> (accessed September 28, 2017).

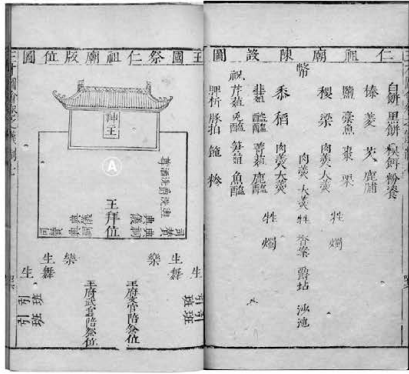
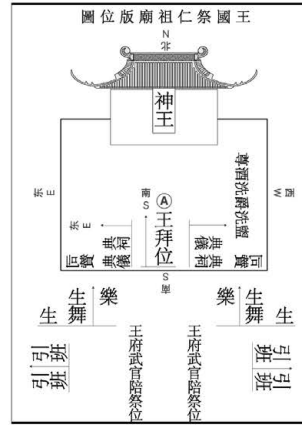


Figure 1
Ceremony honoring ancestors, in the Ming
dynasty's Imperial Palace.



Traditional Chinese diagrams are characterized by the multidirectionality of Chinese script, which includes the ability to turn Chinese written characters in different directions. Because they are compact and are conceptualized as squares, the written characters in the diagrams can be turned more easily to show different spatial relations. The direction the Chinese written characters face therefore serves as a directional indicator—a very different approach from today's Western method of indicating directions in diagrams, which almost always involves the use of arrows.

The orientation of the Chinese written characters in diagrams can be compared to a physical turn toward each of the cardinal directions and thus also to the references in the system of correspondences. One of the essential traits of traditional Chinese diagrams is the direction the pictographs and the written characters face. The specific direction displayed not only conveys the cardinal direction associated with it, but also implies all of the other aspects of the traditional system of correspondences (e.g., seasons, colors, bodily organs). As a result, this directional trait takes on a qualitatively unique position in relation to the entire research project.

In Figure 1, arrows indicate the “direction” a character faces; the cardinal points, which are not shown in the original, have also been added. Individual details (e.g., the ancestral temple here) refer to certain cardinal points, as do the written characters. At the center of the temple, representing the figure of the emperor, is the character 王 *wáng* [king]. It is depicted “standing up,” which corresponds to its direction, facing north.

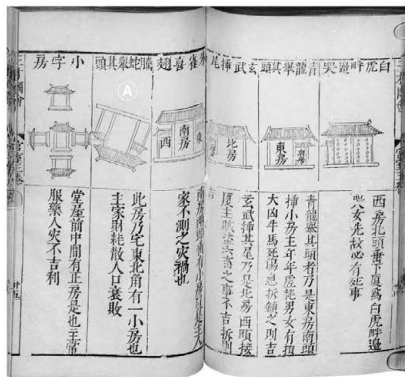
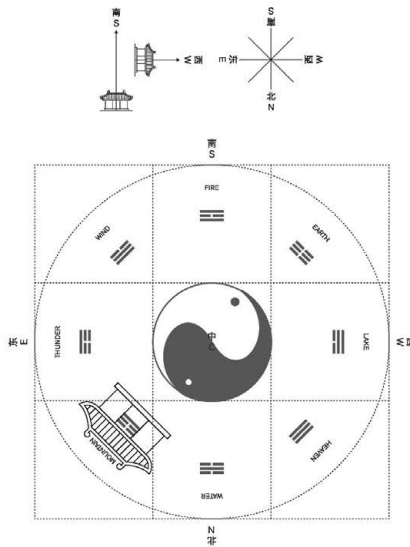


Figure 2
 騰蛇舉其頭 *téng shé jǔ qí tóu* [the very fast snake lifts its head].



Among the requirements for selecting a direction is that the boundaries of the planes upon which the elements appear must be clear. A framing line marks these boundaries in the 三才圖會 *Sāncái túhuì*; in addition, planes are bounded by the actual physical body of the encyclopedia itself. This combination of frames dictates directions, such as “above,” “below,” “right,” and “left,” which in turn makes it possible to interpret the cardinal directions of any given diagram.

The most important piece of knowledge gained through the analysis of the diagrams in the 三才圖會 *Sāncái túhuì* is that the diagrammatic depictions are characterized by a form of “syntacticity”—the relationship of the elements to each other—that is specific to each image. Diagrams are hybrids made up of visual and textual information. The written characters are read in relation to their position on the plane, the direction they face, and to the pictorial elements—in this case in Figure 1, the ancestral temple. Thus, we do not perceive each component individually, but simultaneously and relationally, and at the same time, we understand them discursively, reading them as if they were text.

To further highlight the essential aspects of the reference system, small-format schemata were developed and inserted above each of the individual illustrations.

Examples

The following examples visualize the interaction among the central aspects of the traditional Chinese system of references and the specific design of the diagrams studied.

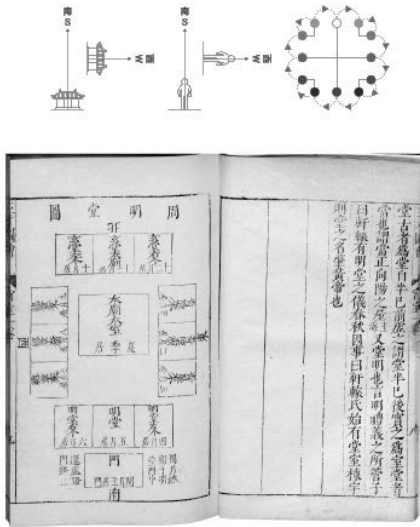
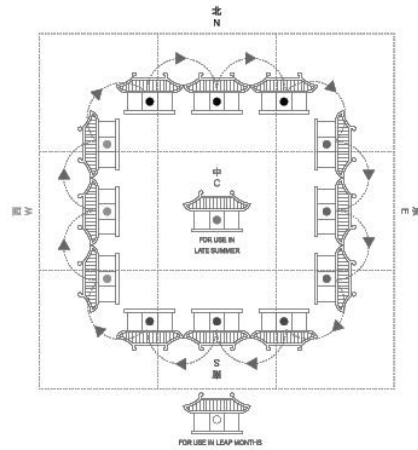


Figure 3
周明堂圖 *Zhōu míng táng tú* [Zhou Dynasty Hall of Clarity].

13 王圻 Wang Qi and 黃晟 Huang Sheng, 三才圖會 *Sāncái túhuì*, 槐陰草堂 *Huāiyīn caotang*, 宮室 *Gongshi* [Architecture], vol. 3, 35. <http://daten.digitale-sammlungen.de/~db/0006/bsb00060337/images/index.html?seite=243&fip=193.174.98.30> (accessed September 29, 2017).

14 王圻 Wang Qi and 黃晟 Huang Sheng, 三才圖會 *Sāncái túhuì*, 槐陰草堂 *Huāiyīn caotang*, 宮室 *Gongshi* [Architecture], vol. 1: 9. <http://daten.digitale-sammlungen.de/0006/bsb00060337/images/index.html?fip=193.174.98.30&id=00060337&seite=29> (accessed September 9, 2015).



The first example is 騰蛇舉其頭 *téng shé jǔ qí tóu* [the leap snake lifts its head]; it was taken from the 宮室 *Gongshi* [architecture] section of the 三才圖會 *Sāncái túhuì*.¹³ The original version of the diagram (see Figure 2(A)) features a house that has been turned upside down, something that must seem mysterious to any observer outside of the cultural frame of reference. From a Western viewpoint, an upside-down house could be seen as a mistake, if the turn in direction is not explained. The redesign visualizes certain aspects of the frame of reference—the ideas and concepts that underlie the diagram, which reveals the notions of space to which the diagram refers. The redesigned image shows a building facing northeast. These kinds of images help in the interpretation of the buildings, their positions, and the directions they face, which indicate whether the effects on the building’s residents are good or bad.

Figure 3 shows the image 周明堂圖 *Zhōu míng táng tú* [Zhou Dynasty Hall of Clarity], was also taken from the 宮室 *Gongshi* [architecture] section.¹⁴ It shows the 明堂 *míng táng* [Hall of Clarity], where the emperor received princes from satellite states or envoys from distant lands, and made official gifts of lands and titles. The 明堂 *míng táng* was considered the central architectural structure in the ritualistic system at the imperial court during the Zhou dynasty (1100–256 BCE). The depiction was chosen for its strong representational characteristics and because the relationship between time and space is especially clear. By arranging the rooms according to units of cyclical time, this piece of architecture functions as a kind of “house of the calendar” and depicts an abstract

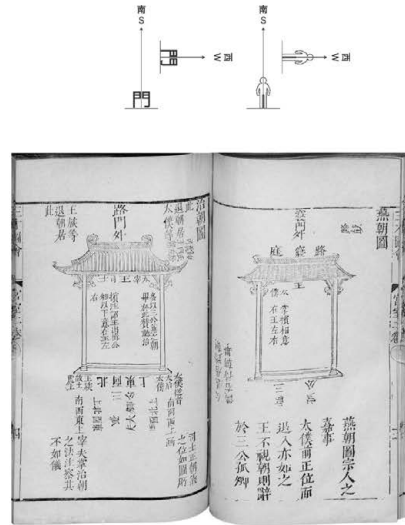


Figure 4
燕朝圖 *yàn cháo tú* [Swallow Audience].

concept of the universe. Because the objects are positioned to correspond to the months of the year, it establishes which hall the emperor is supposed to occupy from month to month. Here, the main subject is the correlation between spatial and temporal qualities that are seen in cyclical change. As such, the fact that the emperor in the 明堂 *míng táng* resides in a different palace in the summer than in winter takes on significance. His stay begins in the spring in the east and moves month by month across the south, west, and north, back to his starting point. This movement is not directly visible in the original graphic, but in the redesign, it is visualized by arrows, which illustrate the cyclical motion. The buildings, indicated in the original by abstract rectangles, are rendered in the new drawings in a more concrete form—as palatial halls. Moreover, the colors linked to the cardinal points, which are not included in the original graphic but would have had to have been supplied by the viewer’s imagination, are explicitly indicated in the new drawing.

The image 燕朝圖 *yàn cháo tú* [Swallow Audience] (see Figure 4) is again taken from 宮室 *Gongshiiin* [Architecture] volume two.¹⁵ On the right, the original image shows an audience with the king in front of the palace’s living quarters: an intimate, private, peaceful audience in the circle of the imperial family and its closest courtiers. The only visual element is a simplified gate that marks the transition point from the governmental palace to the residence. Most of the written characters represent the position and direction of the participants. Representing the figure of the king is the written character 王 *wáng* [king]. Across from him, at a 180-degree angle, are the characters 三公 *sān gong* [three highest ministers]. The specific positions of the characters clarify the direction of the lines of sight. This combination of characters clarifies

15 王圻 Wang Qi and 黃晟 Huang Sheng, 三才圖會 *Sāncái túhuì*, 槐陰草堂 *Huaiyin caotang*, 宮室 *Gongshi* [Architecture], vol. 2: 3. <http://daten.digital-sammlungen.de/0006/bsb00060337/images/index.html?fip=193.174.98.30&id=00060337&seite=98> (accessed September 9, 2015).

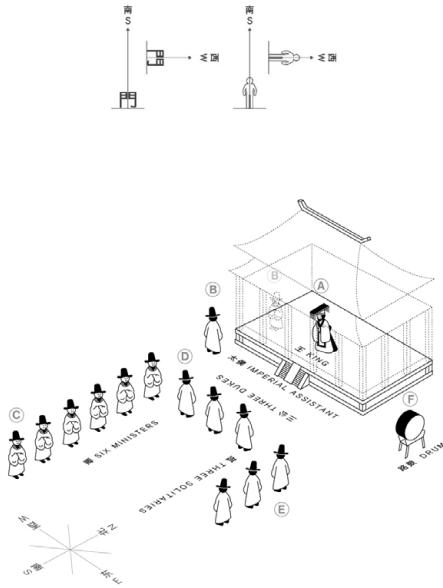


Figure 5
Redrawing of the 燕朝圖 *yàn cháo tú*
[Swallow Audience].



Beneath the arches of the gate is the character 王 *wáng* (A), representing the figure of the king; he is depicted "standing upright," which corresponds to his stance facing south. 太僕 *tài pǔ* (B), or the imperial assistant, is looking north. The character 卿 *qīng* (C) refers to the "six ministers.". The characters 三公 *sān gōng* (D) represent the "three dukes.". The character 孤 *gū* (E) represents the "three solitaires". One character stands for an object, the 路鼓 *lù gǔ* (F), or the "drum for ceremonies at the ancestral altar" (facing west).

the direction of the image: The king stands, gazing south; the ministers look northward. Other written characters, such as 卿 *qīng* [minister] and 孤 *gū* [three highest junior ministers] are turned either to the right or the left at a 90-degree angle, so that they are facing either east or west. The figure of the 太僕 *tài pǔ* [valet to the king] appears twice: during the ceremony, looking south, and when the king withdraws to his residence, turned 180 degrees and facing north.

These redesigns (see Figure 5) try in different ways to visually translate traditional Chinese conventions: On the right, a tracing of the current design is faithful to the original but has been explained. On the left, a visual translation includes pictorial figures and objects to show the positions and directions of the participants.

A particularly important feature of this diagram is the "directionality" of the visual and written characters, which face certain compass points. To allow for a better understanding of the diagram, we have shown this directionality in the redrawing in perspective. The spatial rendering was given precedence because it allows the various positions and viewing directions of the participants and objects to be shown much more easily. For example, the king gazes (王 *wáng*, A) toward the south. In the original, positions and viewpoints are expressed by turning the characters to face particular directions.

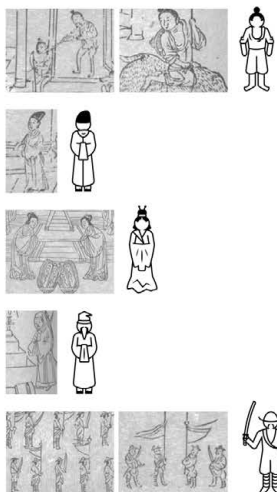
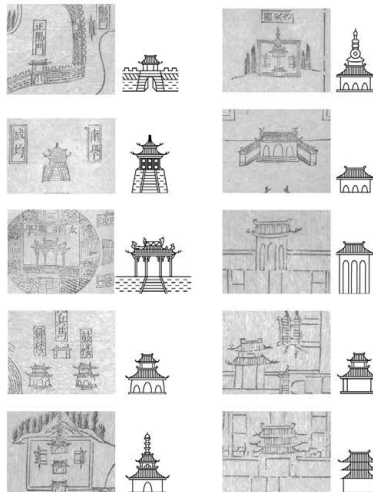


Figure 6
Examples of redrawings of the 三才圖會
Sāncái túhuì.



The clothing, figures, and architecture shown were drawn with particular care, to include the specific details of their historical style (see Figure 6). This task proved to be very difficult, not just because of the significant differences between the various images referenced, but also because pictures of buildings from the Ming dynasty are extremely rare.

Discussion

This research was concerned with the major details of traditional Chinese knowledge diagrams, with a view to their design and their cultural frame of reference. Based on Krämer's five traits of diagrammatic visuals, one of the most important pieces of knowledge gained from our study is the observation that in traditional Chinese diagrams, visual and written characters are turned in certain directions, and the direction of the drawing therefore provides information about a particular position in space. Because the compass points are part of the system of correspondences, the direction the written and visual characters face also indicates other relationships involving the seasons, colors, bodily organs, and sensations.

As the examples show, the redesigns primarily visualize the connection between time (season) and space (position, direction). These aspects are fundamental for knowledge visualization. They were made visible through the redesign so that viewers outside the cultural frame of reference understand the fullness of what is being communicated. The goal of the research was to visualize these aspects as much as possible in the images themselves, and not just to communicate them through text. The original illustrations in the 三才圖會 *Sāncái túhuì* encyclopedia are very complex, and the redesigns offer interpretive support on the visual level, without which the diagrams are barely comprehensible.

How could *visual translations* become a fixed part of future design research, and what benefits do they confer upon the discipline? How can the knowledge gained be applied? The knowledge graphics examined during this research could be used in Sinology, anthropology, and the cultural sciences. Images primarily are used to illustrate verbal statements. However, if the originals are redesigned and visually translated, then scientific debate can occur on both visual and verbal levels. Although images have drawn more interest since the 1990s following the “iconic turn,” they often are used in scientific works only to visualize or ornament the text.¹⁶ But images, as Boehm tirelessly demonstrates, “possess a logic that is entirely their own,” which he understands as “the consistent creation of meaning out of genuinely visual means.”¹⁷ Knowledge graphics create unique access to knowledge.

The methods of *visual translation* can be applied to images from all cultures. However, the research here also shows that specific design tasks always have to be repeatedly revised in exchange with the target culture. The visual forms and themes represented are too diverse. Nonetheless, the methods developed during this research can be used because they can be modeled. Each and every solution (i.e., redesign) must be revised with regard to the specific local and contextual issues, and the design methods here provide a basis for this kind of translation and revision.

Future Research

Swiss society is—like many other countries—distinguished by a multiplicity of languages and cultures. Moreover, about one quarter of the people living in Switzerland come from other places and have migrant backgrounds. This diversity affects all areas of communication but most particularly the healthcare system, where communication is especially important. Although the national program promotes equality in the healthcare system, only a few investigations to date have considered the potential of visually supported communication. The information design currently in use is often very standardized and does not meet the requirements for dealing inclusively with differences.

In future research we intend to develop distinct design principles for communications design for the healthcare field, in modules and smaller units, which address and satisfy the diversity requirements for patients. The new graphics are intended to help patients to more easily access complex information. They also are expected to promote individual treatment, patient empowerment, and an inclusive way of dealing with differences, as well as to reduce (mental) barriers to effective healthcare delivery. The ultimate goal is to develop applicable knowledge and methods—a repertoire of adaptable signs and pictograms—for communications design, diversity research, and visual communications in the healthcare system.

16 For discussion of the iconic turn, see, e.g., Boehm, “Die Wiederkehr der Bilder.”

17 *Ibid.*, 28.

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