

Visual Communication in Art Design of City Maps

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Abstract. Creation of a map is not only a technical process, but involves many subjective factors of its designers. Thus, to the designers, realizing and answering the question, how to design a map to satisfy the cognitive characteristics of its readers, is the key of guiding a map creation. Additionally, to map's readers, they are best entitled to judge the quality of a map and gives feedbacks as to making changes of a map so to make it better meet the requirements of its readers, such as easier reading and understanding and more availability of information, etc.

The article, based on theories of visual communication design of map, from the perspectives of Theory of Communication and Aesthetics, studies systematically the patterns of cognition and visual perception of maps by their designers and readers.

Key words: Visual communication , Aesthetics , Visual transmission

1. Introduction

City mapping develops rapidly and good maps are constantly emerging. There are the city's comprehensive atlas, city image atlas ,city thematic atlas ,as shown in the list. The recent 10 years have seen that city map design and mapping technology in China have made significant progress. Especially those city atlases of Beijing, Shenzhen, Shanghai and Zhuhai have abundant information, novel forms, vivid expression, advanced technology, exquisite printing. Their quality can compete with those made in developed countries of the world. We found that the artistic designs of these atlases are more accord with readers' visual cognitive characteristics than ever before.

Map design is not just a technical process but also affected by the designer's subjective factors. Therefore, a map designer has to know how a map can accord with readers' cognitive characteristics perfectly.

2. Definition of the Design for Vision Communication

Design for vision communication is a subject which is deeply impacted by western culture and the study of communication, a subject on the study of vision and its application. It emphasizes the behavior of the sender and the receiver during the process of information transfer, the role of information to the user, and the effect of information transfer.

The reason that we introduced the concept is: Under the traditional mapping conditions, map users just passively accept the objective world mapped according to map designer's own understanding. Under digital mapping condition, map users can use various mapping software to extract data from the database and interactively produce maps according to their own needs. In another words, the way of map usage has changed from visual transmission to visual thinking, from public to private, from low-level interaction to high-level interaction between cartographic workers and the map users. In addition, with the new technology penetrated into the traditional cartography, map design and map production are no longer a patent of professional educated map scholar's. It is of vital significance to integrate the mapping with map usage.

3. Theory of Map Visual Communication Design

To analyze person's vision, we should study from the visual physiology, visual psychology, visual process and visual thinking:

1) Visual physiology

The human vision has the following main features: eye adaptability, contrast sensitivity, certain resolution limit, Mach ability, visual inertia

2) Visual psychology

People's vision is affected by psychological impact. Vision is not a simple passive copy of the immediate physical object but also a kind of positive activities

3) Visual process

In the design for vision communication field, the visual process is the process of accepting visual symbols and interpreting the information from within.

4) Visual thinking

Researches show that all kinds of psychological process in thinking process also exist in the vision: abstracting, reasoning, analyzing, synthesizing, etc. How does our vision feel the form of map and what kind of form can make us joyful? In order to create a pleasant map works, we need to use visual thinking through the map design from the beginning to the end.

4. Meaning Deformation in the Communication of Map Vision

The ideal map information communication is a kind of mechanical convey in essence. In fact, the map information will be damaged in the mobile process (fig.1) because of cartographic generalization and human or machine conversion:

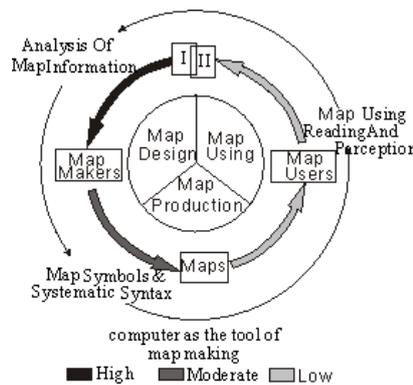


fig.1 mobile process of map information communication

1) derivative phenomena in meaning transmission:

Information derived mainly from three aspects: Direct, that is concluded from symbolic meaning and position; Indirect: that is concluded from comparing the recipient's knowledge with information included in a map; Derived, using the map analysis method to derive results from the map.

2) shortage of meaning understand:

There are three major causes. First of all, audience's domain is less than designer's. Secondly, the deficiency in understanding map information is also related to communication features of the map information. Moreover, possibilities of map representation are limited by volume capacity of the map and the quality of reader's psychology and physiology. Map designer must adopt classification and merging methods to tell the intention to the readers. But the information of tiny features of objects or phenomena has to be omitted.

5. Effective Information Communication by Design of Maps Visual transmission

5.1 The preparation of effective information communication in design for map visual communication

1) The acquisition and holding of the map information by the map maker

Map designer's collection and grasp of information is the first step of effective communication of a map. In the design and determine the optimal form of a map, we have to study what kind of meaningful information should appear on the map to achieve the best transmission effect.

2) The common experience domain of the map designers and of the map audiences

In 1954, the U.S. scientist in communication Wilbur Schramm explicitly put forward problems about effective information transmission for the first time. In his view, only when the common experience domain of the transmitter and the receiver exists, can the transmission be truly achieved. It is an important way to gain and increase the common experience domain to design a set of symbols based on familiar environment and cultural background of the audiences or a successful map legend with simplicity and clarity.

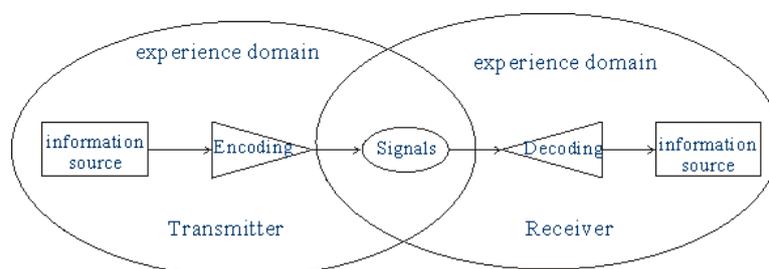


Fig.2 sketch map of the common experience domain

3) Designer's understanding of the diversity among audients

The designer's understanding of the differences among the audients comes from the following several aspects:

- ,1To find the object consumers of the maps via social investigation;
- ,2To delimit the activity space of the object consumers via the analysis of the geographic environment;
- ,3To analyze the quality of the population, including the readers' age structure, sex and type, to determine communication points;
- ,4To classify the personal factors of the map readers, mainly including the readers' cultural level, hobbies and their own quality. Only if we concretize the readers, can we make the map information transmission more vividly and accurately.

4)Interactive communication model between the designers and the audients:

In the process of designing maps, both the designers and the audients are looking for more information transmission. Interactive communication is a kind of circulation process(Fig.3). Through this process, designers and audients create, transmit and share information in order to understand each other. Interactive design fit the modern map information transmission concept the most, and also can mobilize the activity of the map designers.

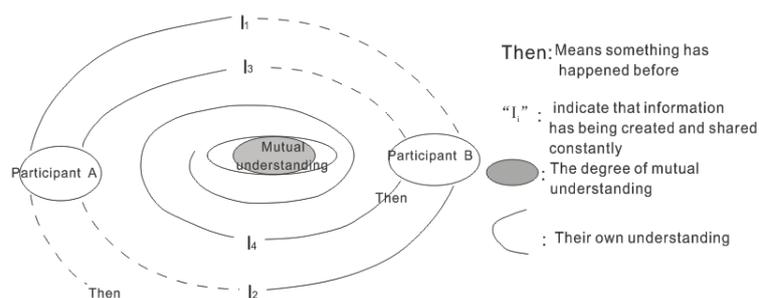


Fig.3 interactive communication model between the designers and the audients

5.2 Design strategy for effective map communication starting from the composition of information and the audients.

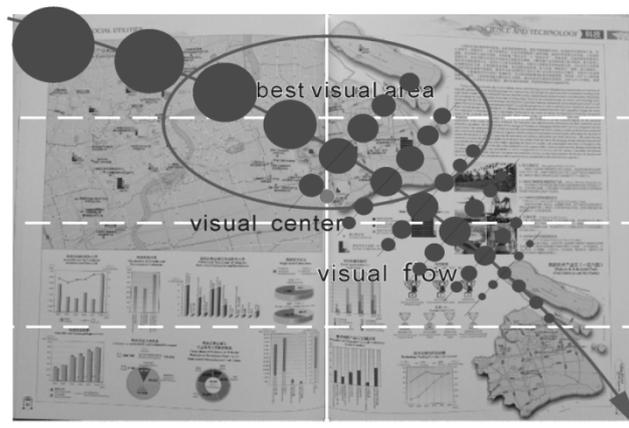
① Design strategy starting from the composition of information

Visual center: The factors to form the visual center are: the central part of the map, the bigger figures on the map, objects with sharp visual contrasts on the map, the upper parts of the frame(Fig.4).

Best visual area: The psychologist Gestalt pointed out that the left and upper parts of the frame have stronger visual appeal than the right and lower parts;

When we draw three equidistant parallel lines which intersect with the vertical central line of the frame, we get three intersection points as three focuses. When the reader's sightline moves back and forth at these three focuses, it is found that the first focus --- the point on the centerline which has a distance of $1/4$ (one fourth) height to the top is the most striking. This is the best "focus" in the drawing. Around the best focus, there is a circle declining area, its diameter is $5/6$ (five sixth) of the width of the picture, this is the "best visual area" of a map(Fig.4). By map design the important information or pictures should ideally be generally arranged near this location.

The flow path of the sightline: There is a popular rule when one is reading a map, that is, from the left to the right, and from the upper to the lower parts of the frame, i.e., there seems to be a focus curve from the upper-left corner, gradually, down to the lower-right of the map. Along this curve, the attention of the reader is declining, and in spite of this, the points on this curve attract more attention of the readers than the other points which are more distant from this curve(Fig.4). Usually, this curve is called “the flow



path of the sightline”. The sight line flow is very interesting. The designer can use the reader’s visual habit and design the layout to comply with this rule. Therefore, when we arrange the map content, we usually put the map title at the top left corner, and the legend at the lower right corner. Of course, it also increased the visual weight feeling for the two parts.

Fig.4

②Design strategy starting from the audients

The discrete stimuli in view can be organized together and form a whole in reader’s brain because of their relations. This kind of phenomenon is called vision’s structural characteristics.

Visual balance: When more than one map and graphics are composed together within a map border, maps’ and graphic’s layout involves space partition. However we can’t ignore the structure of graphics’ and maps’ contents for pursuing pure balance. Only when the balance displays some meaning, can its function be played.

Visual selection and configuration: In map reading process, we hope that readers can grasp the most important information in the shortest possible time. Through the expression ways such as symbol size, the brightness and saturation of colors, contrast of colors, three-dimensional symbols, pictographic symbols, etc. visual selection can be enhanced. For example,

graphical representations of high grade road and important residential areas in transportation maps, roads and flyovers in image maps, index symbols in thematic maps.

The trend of visual Gestalt is generally reflected when people see some incomplete or defective graphics but they have a kind of involuntary mental beautification function. We cannot isolate the symbols such as road tunnels, culverts, the disappeared underground parts of a river, or of a contour, the road along block graphics in a map, but take them as a whole. We will have an overall impression after we browse these symbols in the whole geographical environment. For example, symbols in Fig.5 can express some unfinished buildings and facilities, undeveloped (or reclamation) area, places to produce raw materials for processing or places to process semi-finished products, even areas inviting investment and so on. The map



designer can omit some parts of symbols, so as to heighten the visual impact, making full use of “seeking the perfectness” of the readers.

Fig.5 symbols of visual Gestalt

Visual illusion: In order to improve the performance of image maps, we can use the illusion of color distance so that the 2D surface can produce multi-layered planes. For example: by landscape in layering, reasonable use of color distance illusion and image distance illusion of color, stereo effect can be obtained. The mountains are provided with bright and warm colors, plains and valleys are represented with light and shade. It will produce the illusion of distance and height, i.e., the geomorphology has stereo effect.

5.3 Design strategy starting from the audients

Using the general principles of cognitive psychology of map spatial cognition to study readers' psychological state and explore rules of map influencing readers' psychology can make the map works more popular. What strategy can inspire readers' happy emotion most? It can be summarized as the following:

- ① To attract attention from the audients with the help of novelty effect

Modern people's thirst for beauty increases while they pursue scientific progress. The difference of modern and the past maps lies in the fact that map's aesthetic standard is getting higher and higher.

This is mainly reflected in the following aspects: pluralism of the themes, pluralism of the map format, individualization of the times sensed symbolic visualization, aesthetic style of the visual colors.

②To heighten the information amount of the audients' memory

Miller's experiments showed that in the three stages of memory, the information amount is reduced(Fig.6). The information amount of the feeling memory is the most followed by that of the short time memory, and the least information amount is for the long time memory. Hence, we can use the diagrams or symbols which are familiar or novel to the map audients in order to heighten the information amount of their memory.

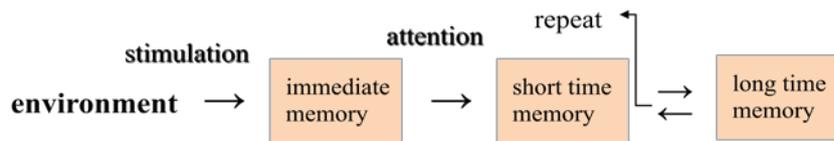


Fig.6 three stages of memory

③To convince the audients

The purpose of disseminating information of excellent map is not only to let the readers be informed, but to persuade them to change their mind and attitude to certain things represented through the maps.

④To express your attitude exactly so as to let your audience notice your voice

As a map designer we must understand the market, study the essence of design and analyze a variety of psychological, behavioral characteristics of map consumers. Only in this way, can we grasp the activity rules between the map designers and map consumers and help us heighten the level of map design and satisfy our map readers with map products at different levels.

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