Visual Design and Research for Presentation Based on Physiological Study of Audience Cognition

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Abstract

In modern presentation design, special attention is paid to people orientation, and to full improvement of service quality and information conveying efficiency, which should be based on the comprehensive understanding and research on people. Just based on this idea, contemporary presentation activities and presentation designers attach great important to audience cognitive science, especially the research and discussion on visual physiology. Through the research and application in this field, the effect of information conveying in presentation activities is greatly enhanced, and the quality and level of contemporary presentation are significantly improved.

Key words: Visual design; Audience cognition; Visual physiology; Presentation design

INTRODUCTION

Presentation is a kind of activity form, aiming to convey information, inspire and promote social needs, and to communicate with audiences intuitively and vividly. The concept of presentation indicates that presentation is a way to convey information based on visual sense. That is to say, visual cognition is one of the main ways for conveying information, while information conveying is the essence of presentation design. In modern presentation design, special attention is paid to people orientation, and to full improvement of service quality and information conveying efficiency, which should be based on the comprehensive understanding and research on people.

Therefore, in modern presentation design, not only the problems involving space, modeling and props and others should be solved, but the relationship between exhibited information and people should also be solved (i.e., how to make the exhibited information recognized and accepted by the public in more clearer and more accurate way). Just based on this idea, contemporary presentation activities and presentation designers attach great important to audience cognitive science, especially the research and discussion on visual physiology. Through the research and application in this field, the effect of information conveying in presentation activities is greatly enhanced, and the quality and level of contemporary presentation are significantly improved.

1. VISUAL PHYSIOLOGY AND PRESENTATION DESIGN

Researching visual physiology is to know the process how the material world (physical) has effect on people's psychology through visual physiology perception. The study on how to make the information generate via its media the most reasonable visual effect on audience and on receiving method and rules is based on the visual physiology of people and is a research process of audience perceiving, concluding, comparing, analyzing, judging and storing information. The designer's work can

also be understood as the process of processing information and programming by using different information symbols and media as per the presentation with different contents and purposes. So, the essence of visual physiology research is the provision of scientific bases for the design scheme of visual information. The contents of visual physiology are relatively extensive, so, as for presentation design, focus can be put on the following several concepts and theories related to visual cognition.

1.1 Visual Perception and Visual Capacity

Electromagnetic wave with a certain wavelength acts on the retina to excite the optic nerve, through which it enters into the central nervous system of the brain to generate sense. The sense is called visual perception. Visual perception is able to distinguish the light intensity, and the size, distance, shape and color of the object.

The central part of the retina is macula lutea, in the middle of which the fovea is called the central fovea concentrating most of the visual cells; however, the edges of the retina have less visual cells. Therefore, the most effective visual perception part only takes a small proportion of the retina, which determines that the visual perception can only hold a small amount of visual objects within a certain period of time. The amount of information held by visual capacity within a certain period of time is called as information capacity of the visual sense.

In the design, it is very important to take full consideration of the information reception ability of visual perception, the standing time of audience in presentation space, and the information reception conditions. On the contrary, the simple pursuit of expanding the amount of information will cause bad stimulation to visual perception, which will not only affect visual cognition, but also reduce the effect of information conveying. So, it is very important in presentation activity to reasonably extract and process the information as far as possible, and to present them via the medium that can speed up information identification. Also, the amount of information represented shall be reasonably distributed according to different functional requirements of space. For example, information should not be arranged massively in such space environments, in which audiences cannot stay for a long time, as the entrance, exit and access. In addition, in order to ensure the normal value of information capacity is reached in presentation, the clear information symbols (like figurative information form and intuitive information expression) should be used as far as possible to accelerate the cognition speed of visual perception; the body area of information symbols should be consciously increased to reduce the amount of information for unit volume; the comparison methods, like by size, density, light, etc. should be used to improve the visual cognition level; the visual elements such as modeling and color orderly arranged in the space should be used to effectively attract visual sense and shorten fixation time so as to increase the amount of information.

1.2 Vision, Visual Angle and Visual Field

Vision is the sensory ability of visual perception to visual objects. The vision of common people is related to the sight distance and the clear degree of visual object, which on the other hand, is associated with the volume size, lighting condition and the like of information media. The test shows that a normal person can see the object most clearly within 60-80 cm from the visual object. In presentation design, the vision conditions of the audience should be fully taken into consideration to reasonably arrange pictures, texts, items for display and other information objects so as to keep all exhibited objects be within the visual acceptance scope of the audience. At the same time, the range of vision should be appropriately adjusted according to different information contents and conveying requirements to satisfy the audience demands for different information contents. In addition, adequate assurance should be made for lighting, color, etc..

Since visual sense is always under constant motion, consideration should be not only given to static fixation effect, but also to watching ability under dynamic state. The shortest fixation time for visual perception is about 0.3 s. However, people's vision will reduce to 1/3 during walking, so, relevant information should be exhibited as concentrated as possible during the design to avoid reducing the vision of the audience due to vision distraction.

Visual angle is formed between the central fovea of the retina and the edge of an object when the eye is looking at the outside world. The smaller is the visual angle, the stronger is people's vision, and clearer is the object. Therefore, the most important visual information should be arranged within the central range of visual angle. In case that the visual object cannot be guaranteed in the center of the visual angle, it is best to increase the area or lengthen sight distance. For example, the information symbols needing to be seen clearly should be generally arranged near the visual horizon. For excessively large exhibits, the space position of the audience can be raised or the exhibits can be lowered to fit with people's central range of vision.

Visual field is the special scale that the eyes can see. Visual field is proportional to sight distance. So, the longer is the sight distance, the bigger is the visual field. In visual field, the actual spatial horizontal center line is slightly lower than the visually sensed spatial horizontal center line; therefore, conscious realization of making the lower half be slightly bigger than the upper half during design can comfort the visual sense of people. Otherwise, people will feel that the division proportion for space or modeling is improper.

It can be convinced, from the above simple description of visual physiology, that the perception of

visual information and the scientifically of visual physiology must be considered in presentation activities. Hence, designers are required to respect the scientifically and use it to serve for presentation design.

2. VISUAL FUNCTION AND PRESENTATION DESIGN

The visual perception of people is to cognize the objective world actively but not passively. Each time for visual perception watching object is a process of selecting, cognizing and judging the objective things. In order to cognize and judge the visual object, visual perception should have the function of summarizing and simplifying the visual object, and the function of discovering and observing the visual object in depth and meticulously.

2.1 Simplification Function of Visual Sense

Since the first requirement for visual perception is to perceive the world quickly, it is extremely important for visual perception to recognize the basic features and essence of the visual object. As pointed out by American Rudolf Arnheim in *Art and Visual Perception* that, human eyes tend to regard any object as the simplest shape that can be obtained under known conditions. For example, a circle with a gap is still a circle in the visual sense; a triangle without sharp corner on the top is still a complete triangle in visual sense; and a crisscross pattern is still a square in visual sense.

Based on this theory, the presentation design should be carried out from two aspects. Firstly, focus should be put on overall design and big modeling, and clear 3-D shape should be used as the basis of various local shapes. For example, basic modeling elements can be standard shapes (circle, square and triangle), or basic modeling elements (point, line, plane, cube, straight line, curve, broken line, etc.), or standard space positions (up & down, right & left, front & back, inside & outside, symmetry point and symmetry axis), or standard space directions (horizontal and vertical directions). Secondly, focus should be put on the combination rule and design of shape. The visual object should be designed as per such combination methods as repeat, gradual change, symmetry, transition, coordination and balance, to help visual perception to quickly determine the basic features and formation rules of the visual object, so as to fast cognize the information as per the requirement of the simplification function of visual perception.

Visual perception can not only see the obvious shape and combination relation, but also perceive the spatial relationship between background and the shape. Therefore, the designers should, during design, take the actual shape and virtual background as a whole, which can not only greatly enhance our understanding of the modeling, but also by using the organic relation between actual and virtual spatial forms, enrich our imagination

and expression for shape. For example, the size, position, light and density of shape should be determined based on the relation between the shape and surrounding shapes & background. The shape and background are mutually affected, but people often get used to notice the actual shape and neglecting the virtual background, because they do not know that the virtual shape and background are also one part of the space. By modeling, designers aim to establish the overall relationship between obvious positive pattern and half-hidden virtual negative pattern.

The simplification function of visual perception doesn't mean single shape, poor structure and the reduction of modeling numbers. When the presentation space contains only few shapes and relations, it is simplified; if the shapes and structure features are used as less as possible in presentation space to organize orderly the complex shape elements as a whole, it is also simplified. The experimental study on modern psychology shows that the similarity and succession of visual elements are the main methods to help the visual perception to give play to its simplification function.

Similarity refers to that the similar things and shapes are always related in visual sense. For example, a basic modeling element, no matter how it changes, is always integrated into a whole system in visual sense, so are color and texture. For another example, disordered objects, due to the vicinity of location, are also considered in visual sense as different from another distant group of objects; sometimes, these objects will be uniformly regarded as similar objects in visual sense. For instance, The Big Dipper in the night sky is an obvious embodiment that the visual perception has the function of simplifying the seven independent stars into a ladle. In modeling activities, by using the similarity characteristic of visual sense, various individual parts and irregular distributions and arrangements can be organized as a whole with strong uniformity. In addition, these parts can be grouped or organized into a new form of relationship.

Succession is the time embodiment of the organization principle for each part of shape in visual sense. Succession constitutes rule, in which each shape takes up a proper position and has its own duty in the orderly structure, so a unity with a higher degree is reached. Since the succession is generated in the simplified principle, the exhibited information can be understood and remembered well.

2.2 Discovery Function of Visual Sense

Visual perception has not only the simplification function for quickly finding object, but also the function of constantly discovering objective things. Visual perception will never stay in the known objective objects and things. It will pursue the discovery of new things and constant development of things. So, designers are required to innovate in idea and form expression, and create unique presentation environment and form to motivate the

audience's interest and curiosity so as to stimulate the power for exploring. In presentation design, based on the understanding of simplification and discovery functions of visual perception, we put our focus on that breaking mechanical reproduction and using some dissymmetric and irregular patterns should be emphasized while emphasizing the integral unity. The key is that such dissymmetric and irregular patterns will cause curiosity and intension of visual perception. This will greatly enhance interest in and attention from the visual perception to them. This is precisely the visual effect that the designers pursue of. Only in this way, it can be ensured that the audience can further understand and receive all kinds of information as represented.

In presentation activities, causing the curiosity and interest of visual perception is an important way to effectively convey information. To realize the effect, comparison and variation methods can be used to stimulate the visual sense during design. Specifically, such design means, like true-virtual changing, comparing in unity, changing in the rule, etc., can be adopted to adjust the changes in the visual sense of the audience so as to arouse their interests and enhance visual cognition.

The individuality and diversity of presentation form are the main features of the contemporary presentation design. They are mainly reflected in two aspects, and one is the uniqueness of the whole idea of presentation. Whether it is expo or product exhibition in store, we should, based on people orientation, pursue of the presentation design different from other conventional designs, which are conducive to constant promotion of the progress of presentation level. The other one is the pursuit, from visual form and effect, of the form design that can help visual perception to obtain change and comparison. For example, the presentation space and prop modeling may have the combinations of being big- small, curve-straight, concave-convex, up-down, long-short, abstract-concrete, and point-line-plane-cube; the layout and 3-D space may have the changes in density, distance, gathering and scattering, repeat, gradual variation, centripetal variation and diffusion; the material and texture may have the choices in hardness, weight, fineness, light and transparency; the light and color may have the comparisons and changes in lighting, color tone, strength, direction, hue, purity and brightness; and the presentation technique may have the designs in dynamic-static state, internal-external side and demonstration participation.

The above processes make the audience feel satisfied in constant curiosity and exploration and highly focused in fresh and exciting feelings. Also, in the above processes, the audience gives full play to the imagination. This moderate visual tension and post-fixation relaxation are a kind of creative consciousness activity, and is the cause of aesthetic pleasure.

2.3 Visual Aesthetic Perception

Visual aesthetic perception is the one based on visual physiology. It is generally not affected by nationality and culture and other factors. It is the physiological experience that everybody have, including the feeling to the unity and change of space and modeling, the feeling to cold and warm color tones, the preference to orderly things and the focus on comparison & variation, and the bad feeling to dark and messy things, etc. So, the design with too much information and improper light sensation, exceeding the limit of visual physiology, without consideration of unity and change rule of modeling, and not meeting visual function requirement, cannot have aesthetic perception. As the ground rule of formal beauty matching with visual physiology, visual aesthetic perception is expressed in some aspects, like integral-local layout, universality and individuality, comparison and coordination, key point and subordination, symmetry and balance, rhythm and rhyme, scale and dimension, etc.. They have a main feature—unity and change rule. The above several form relations are the specific embodiments of unity and change.

CONCLUSION

In contemporary presentation design, the concept of people orientation and comprehensive service is the focus. To realize such concept, comprehensive analysis and research should be conducted on the cognition behavior of people in presentation activities, which not only reflects the concept of people-oriented design, but also is the basic condition for effectively conveying the information as represented. Therefore, only the design based on cognition theory research can meet the physiological and psychological needs of the audience for accepting information, can also meet the essential requirement of conveying the information as represented. Consequently, the research and application of these theories are very meaningful to the sponsors and audience of presentation activities.

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