People-oriented Information Visualization Design

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Abstract. In the 21st century with rapid development, in the wake of the continuous progress of science and technology, human society enters the information era and the era of big data, and the lifestyle and aesthetic system also change accordingly, so the emerging field of information visualization is increasingly popular. Information visualization design is the process of visualizing all kinds of tedious information data, so as to quickly accept information and save time-cost. Along with the development of the process of information visualization, information design, also becomes hotter and hotter, and emotional design, people-oriented design is an indispensable part of in the design of information. This paper probes information visualization design through emotional analysis of information design based on the social context of people-oriented experience from the perspective of art design. Based on the three levels of emotional information design: instinct level, behavior level and reflective level research, to explore and discuss information visualization design.

1. Introduction

In the context of informatization in today's society, information visualization as a new discipline becomes more closely related to the public's life. It plays a vital role in the process of social development, especially in Internet environment under the big data context. Information visualization is an indispensable development trend. In short, information visualization makes the complicated information data into images, clearly conveying information to the users. This is an interdisciplinary integrating a variety of categories, involving computer graphics, computer-aided design, human-computer interaction, and art and so on. In the long process of history, the data information presented in a graphical way can be traced back to the time before text existing, when ancient human convey information by using stones to draw graphics in the caves they lived in. After analysis, human's acceptance of the figures is much higher than the acceptance degree of the characters. Meanwhile, figures can also convey information across the nation and language, so in today's society with the frequent exchange of information, information visualization can reduce communication difficulties and save the time of communicating and understanding. Information and interaction design is the presentation method of information visualization, which attracts increasing attention from the present society. At the same time, under the background of experiential social economy, the service focus of information visualization design is shifted from “task-centered” to “customer-centered”. [1] Therefore, the design mode focusing on users' feelings and experiences and taking users' personal experience as the prime premise becomes the most popular one in contemporary art design field as well as the design with topicality, so people-oriented design has become the focus of current art design circle.

2. Emotional analysis of information visualization design
Information visualization design involves a wide range of fields. Its purpose is to present the information data graphically to customers by designer's summarizing, organizing, and extracting of the information data, so that the audience can have more intuitive and convenient understanding to find the hidden characteristics, relationships and patterns of data information. With the rapid development of the Internet, the customers of information design become more popular and generalized, so in the design organizing, we should take into account the users' personal experience and emotions.[2] When doing the visual design, we should integrate aesthetic concept in addition to the efficient transmission of information, so that the audience can feel the aesthetic experience and immersion of information exchange. Therefore, we should do enough research on the audience, and deeply mine the information. Besides, we need to analyze the emotional factors to produce a good enough visual information design. The book “Emotional Design” writes that “the human brain has different levels --visceral level, behavioral level, and reflective level. The visceral level responses fastest, which can judge the good or bad and safe or dangerous quickly; the behavioral level is people's behavior; and the reflective level is the highest level, which means it only monitor and reflect the behaviors and try to make the behavioral level have a preference. “[3] Hence, the author makes emotional analysis of information design from the visceral level, behavioral level, and reflective level.

2.1. Visceral Level
“Design at visceral level is the natural law. “[4] The reflection of the visceral level is the characteristics and nature survived in the choice and reinforcement of survival of the fittest generated from the evolution of mankind and the nature. For example, the males have beautiful and gorgeous feathers to attract the females and get the mating right; plants bloom colorful flowers and exude seductive smell to attract bees and insects to spread pollen and so on. Generally, it is the reaction at visceral level of user to judge whether a design work is “beautiful”, which is from the most instinct and straightforward level that users experienced. Therefore, the aesthetic visual display including chart plate, color matching and using of text of information design can influence the users' emotional experience in visceral level most directly. “Design principle at visceral level is innate, regardless of race and culture. If you follow these principles, you can make a very attractive design even with very simple things. “A good information design work should not simply convey the data information, but should explore from the intuitive visual aspects to design the work that people can't help looking at it once see it and have immersion experience.

There are many examples about raising the sales through adjustment of appearance. Apple launched iPhone 4 mobile phone in 2011 as “Figure 1”, which turned out at the time when keyboard phones are the majority. This is an epoch-making products, with the extremely exquisite appearance, simple and delicate icons, interactive design that is easy to operate making sales of Apple mobile phone increase steadily, and receive the users' praise. The automobile industry also has such an example. Volkswagen studied the preferences of Chinese users before replacing a series of products and designing the appearance as shown in “Figure 2”, resulting in the monthly sales of a number of models rise straightly and rank the first in China. Therefore, in the social context of such a high intensity, a good design can seize the users at the visceral level because it is the level with most rapid response. The design with a sense of beauty can attract the attention from more users in shortest time, so that the user's emotions can enter a higher emotion level “from bottom up”.

![iPhone 4](image1)

![Volkswagen](image2)
2.2. Behavioral Level

“The behavioral level is related to the use and experience of the product. The experience itself contains a lot of aspects: function, performance and usability. “When a product break through the level of “beautiful or not” at the visceral level, it will meet the question of “useful or not” at the behavioral level, which is also the value of this product. If the work only has fine appearance while it has defects in function and use or has insufficient attraction, it will not produce any value, which may lead the users feel irritable and depressed during using process and thus deny the love to the appearance at visceral level.

In the information visualization design, behavioral level refers to the interactive design of information, of which the quality will directly affect the user's operation and emotional experience. The interaction design mainly includes two parts: one is the interaction between data and themselves in the screen; the other is the interaction between users and data, also known as human-computer interaction, and emotional analysis at behavioral level mainly reflects in human-computer interaction.[5] A good interactive system needs to contain two important features--user experience and usability, of which usability is the core, so good user experience is the ultimate goal to achieve as shown in “Figure 3”.

“The first step of a good behavioral level is to understand how users use the product.” [6] Therefore, designers need to deeply dig and organize the data to achieve this goal in the visualization of information, and understand the needs of users correctly as well as the operation at subconscious level. In the design phase, designer should apply the people-oriented design principle to get the best results, and focus on understanding and meeting the real users of the product.

Therefore, when the designer design the product at behavioral level, they should abandon the self-centered design ideas, combining with the users' feedback and more research on product design, and continuously modify and improve the product with the users' comments to ultimately produce outstanding design work. In the information design, the engineers and designers need to work together in order to better complete the information visual design. Engineers transform the data information and develop the algorithm and system; designers research and care the user's inner needs and beautify and design the visual information from the angle of art to make the work achieve excellent level in function, understandability, usability and feel. At the beginning of design, they should let potential users participate in it, and involve in the design process with the team through starting from the initial model and sketch. When it is completed finally, the product also passed a variety of using tests, and can come onto the market after the final test and adjustment. This kind of work that involves users' participation and goes through repeated modification combining with the actual user experience is the real interactive design taking user experience as the core and criteria.
2.3. Reflective Level

“Design at reflective level covers many areas, closely related to the information, culture and the meaning and use of the product. Only at the reflective level, there is the sense of consciousness and higher level of feeling, emotion and perception; only at this level can we experience the full integration of thoughts and emotions. ‘‘Reflective level is the top level, which is the unique human emotions. It is also the embodiment of personal feelings that People have different experiences and understanding based on different education, culture, race, and age and so on. The reflective level is constantly changing since as time goes on, the individual's environment and the status constantly change and emotions at reflective level will gradually change. For example, the product that we once liked has not changed at visceral level and behavioral level, but we no longer like it at reflective level, so we reject the appearance and functionality of the product, and vice versa.

Reflective level is not only related to the individual differences, but also able to bring satisfaction to users, which other levels cannot complete. For instance, watches have the same functionality at the behavioral level, but at the reflective level, watches of luxury brand will bring the users satisfaction and the feeling of personal pride, which cannot be brought by ordinary watches. Except the level of material and workmanship, added value of culture connotation of the brand directly impact on the users' reflective level. In the aspect of information exchange, that of Apple's product is excellent enough in the industry. In addition to the attraction of representation of the product, the convenience of the interactive system, easy operability and user-friendly operation are better than mobile phones of other brands, which attracts users to choose at the reflective level. Meanwhile, the price higher than that of other mobile phones also gives users the satisfaction at reflective level. Therefore, the information design product that is outstanding at reflective level can improve users’ overall impression, and good user experience can even eliminate some initial negative emotions.

3. Discussion on people-oriented from the perspective of design

Information visualization includes a wide range of disciplines, and people-oriented information visual design requires cooperation of multiple disciplines. This chapter explores people oriented from the perspective of art design. From the denotation, people oriented means the work should take full account of the user's identification, aesthetic and emotional experience of design work, and the design should accord with the user-centered creation idea, namely user-friendly design. And enhance the user's emotional identity through the application experience and interactive feelings.

A good information design product must provide the user with the amazing application experience, which is the approval of design product at behavioral level, namely the applicability of information design. At the beginning of the users experience of the product, we must first improve the work at visceral level to make users have the feeling of “I want” from the aspects of color and graphic design, and then they will develop the psychological feelings of “what it can do” at behavioral level. Therefore, we need to deeply explore when collecting data and implementing user research. Another core of information design is interaction. Good interactive design allows users to have a sense of immersion and take participate in it initiatively, and thus approve the design works, which is also the reflection of user-centered design. Therefore, the process of interaction and experience is the key point that needs the designers' focus. They should make complex product simple and easy to use, which is influenced by different culture, race and experience of participating users. Complicated and poorly designed interactive operation will affect the user's experience emotion, since it may bring frustration to the users, making the users feel depressed, and even generate negative emotions to affect the feelings of interaction, resulting in the failure of the work. Hence, to enhance the user's interactive experience, interactive design must strengthen the interestingness, so that users will be immersed in them, and their emotional identity will be enhanced, to stimulate the reflective level.
When entering a university, the freshmen will pay more attention to the food and entertainment projects, so we deeply explore the food information of a normal university based on users' need, and obtain the data information by integrating our own experience and network evaluation for information visualization. Age of the freshmen is about 18 years old and the number of boys in normal university is much smaller than that of girls who have higher recognition of the color, so we need to choose saturated and contrasting colors, and use cold and warm colors to distinguish eastern area and western area in school. Besides, we can supplement the new graphics and text words that are more easily for freshmen to understand, and add the map guide to complete the information design of food in the normal university as shown in “Figure 4”. First of all, from the perspective of visceral level, “beautiful” color schemes and graphic design is more able to seize the users' eyes compared to other old school information maps. The information design form and color form of food in Normal University is clear and attractive, we can carry out clear and understandable visual design aiming at the flat design style that can be accepted by young people through the redesign plan of the map supplemented by circular data charts. In regard to the color scheme, distinguishing the information of eastern area and western area by the two color tones of cold and warm can let students know the location of shops through a glance, which can help users to build a clear understanding in their own minds. We select the relatively advanced color scheme in the cold and warm tones—orange on behalf of the warm fire and green tones on behalf of health, so that users can feel pleasant when reading the information and this color scheme is more likely to be accepted and loved by young college students, which is the manifestation of deep research and personal experience of designers. Secondly, if we skip the visual image of visceral level to analyze from the functionality and usability at behavioral level, this information visualization design arranges the data through the deep research of users group initially. Displaying diagram design by circle can make users no longer feel confused and puzzled in the using process, and comparison and display of all the information is simple and clear with strong sense of design. Particularly the campus map of flat design through the induction and reorganization, and teaching building and school buildings through the modular and geometric process is easy to understand during using. At the same time, extracting the information and constructing the scene of the overall layout and planning of the school in the brain will not bring strangeness and confusion, and can provide the users with a good interactive experience as well as enjoyment during the use. Finally, when analyzing from the reflective level, the data arrangement and visual design of good campus map information and information of food that is inseparable from life can bring a strong sense of honor and the sense of belonging to student groups, narrow the distance between the users and the school. Especially for the freshmen who have just entered school, we can eliminate the tension caused by just entering an unfamiliar environment, so that
students will love and accept the school, which is worthy of approval for this design from all aspects. Therefore, from the above analysis of visceral level, behavioral level, and reflective level, this kind of design based on users emotions, centered on users, and considering for users time for the user all the time, is the people-oriented design.

4. Conclusion

From the above analysis and discussion, “user experience” has become a hot topic in today's society, and the development and progress of all walks of life has been optimized and reformed centering on this word. With the rapid development of mobile data end and the gradual realization and complete of various functions, users will be eager for better interactive experience. With the advantage of multiple disciplinary, information visualization design has become the design discipline of greatest concern in the 21st century, which not only prospers in the user experience-oriented social economy, but also plays a guiding role in the future direction of other design disciplines. User-centered design ideas will also become the mainstream of the future design as well as the center soul of information design. People-oriented design principle is also guideline that information visual design must practice. Information visualization concept has developed rapidly for nearly three decades since it was proposed, and the design disciplines tend to converge. In the future, it is difficult for the design of single direction to meet the various users' needs, so only when it integrates into a variety of cross-disciplines can it keep up with the progress of the times, to provide better services for the community and bring enjoyable emotional experience to users. Therefore, development prospect of information visualization design in the future is very broad, more designers will be devoted in it, and they will cooperate with other researchers of non-design disciplines to produce better products.

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