Self-Help Travel Service Design Based on the Needs of the Visually Impaired

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Abstract: Analyze the self-service design based on the needs of the visually impaired to provide comfortable, safe and convenient design for the visually impaired and provide service sharing. Starting with the self-help travel needs of the visually impaired, the paper analyzes the self-help travel environment, demand differences and other characteristics of the visually impaired. Exploring the design and application of the visually impaired self-help travel service, four basic principles of the design of the visually impaired self-help travel service are obtained: safety, convenience, equality and intelligence. The self-service travel service design based on the needs of the visually impaired should reflect the psychological needs, physiological needs and interactive service experience of the visually impaired, so as to design a service design suitable for the visually impaired and improve their experience satisfaction.

1. Introduction

Under the guidance of Healthy China, more and more fields begin to pay attention to the visually impaired group. The number of the visually impaired group in China is large and increasing continuously. To ensure the safe travel of the visually impaired group is an important measure to care for the visually impaired people and one of the practical measures to practice Healthy China. In recent years, with the development of the Internet and the construction of information city, the safe self-help travel of the visually impaired group has become one of the urgent focus issues. A large number of service design products for the visually impaired have emerged at the right moment, such as intelligent robots, guidance equipment for the blind, public information system for the blind, and bus guidance for the blind, etc. However, the visually impaired still lack safety and convenience in self-help travel, which indicates that there is still room for research. In order to make up for the lack of current service experience design, on the basis of fully grasping the actual needs of the visually impaired group, providing functional service design for them, ensuring their self-help travel, and creating a safe, convenient and comfortable public service design in line with the self-help travel of the visually impaired group is the significance of this paper.

2. Research Background

2.1 Service Design

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The current design mode is no longer only from the perspective of graphic design, environmental design, industrial design, etc., and gradually explore the cross-disciplinary disciplines, service design is one of them. With the development of integration, service design has gradually changed from a design mode to a way of thinking, which includes both visible and invisible services, and focuses on service experience and service quality, thus improving user satisfaction. With users as the center, this paper aims to improve the added value of the product. Starting from the research on the needs of the visually impaired and from the physiological and psychological perspectives of the visually impaired, this paper aims to explore the design and research of the self-help travel service for the visually impaired and create better self-help travel experience for the visually impaired.

2.2 The Environmental Problems of the Visually Impaired People's Self-Help Travel

Due to the visual impairment of the visually impaired, it is difficult for the visually impaired to receive external information quickly and accurately. The inconvenience caused by self-help travel brings great difficulties to the life of the visually impaired, and travel safety is a relatively big security hidden danger. Failed to better take into account the actual demand for the visually impaired and travel characteristics, most of the intelligent guide equipment price is higher, the guide dog training hard, limited number, city guide depending on the system such as parks, communities, hospitals, shopping malls while developing rapidly, but many devices would not be practical, positioning in healthy population is more, failed to benefit every chance of good hands. Aiming at the potential environmental risk factors of the visually impaired people's self-help travel, this paper puts forward the safety service design to ensure that all travelers can enjoy humanistic care and provide humanized and convenient services for all travelers. Barrier-free environment construction is an important symbol of social civilization and progress.

3. The Difference Analysis of the Self-Help Travel Needs of the Visually Impaired

Visually impaired people need a barrier-free service environment, including barrier-free material, information and communication needs. In recent years, with the rapid development of the economic level, people's travel activities become more and more convenient, and the visually impaired also need convenient and safe space to create an equal self-help travel environment. The difference between the self-help travel needs of the visually impaired and others is mainly reflected in the following four aspects:

3.1 Obstacle Identification

Obstacles are the biggest hidden danger for the visually impaired in self-help travel. Obstacles identification is very important for the visually impaired. Obstacles identification can effectively make up for the deficiency of visually impaired people in acquiring visual information. Such as the guide dog (electronic guide dog), guide robot, intelligent walking guide, etc., can effectively guide the path of the visually impaired, help the visually impaired to locate real-time geographical conditions, and realize the obstacle avoidance function of road obstacles. The main ways of the visually impaired self-help travel are walking and taking public transport. While walking, we should pay special attention to the identification of obstacles, collect and analyze the road conditions quickly, so as to provide a relatively safe travel environment for the visually impaired, and further improve the humanized service design for the visually impaired self-help travel.

3.2 Voice Guide

Conventional road signals have little effect on the visually impaired. Therefore, voice control must be used to complete navigation activities to meet the visual guidance needs of the visually impaired. Information source guidance based on voice control provides navigation, psychological and emotional communication for the visually impaired. In communities, intersections, buses, shopping malls, libraries, subways and other areas where the visually impaired are active, voice control devices are set up to effectively control the road conditions intelligently and report passing vehicles, driving directions, transfer methods, etc. Under the background of big data information network, voice guidance is formed to meet the needs of the visually impaired for self-help travel. Visually impaired people can wear intelligent devices to voice the warning information, feedback to the road condition information of the visually impaired people and realize human-computer interaction to enhance the experience of the visually impaired people, to bring greater convenience to the self-help travel.

3.3 Braille Prompt

Although the visually impaired have lost all or part of their visual functions, in current life, the visually impaired mostly rely on the Braille touch to transmit information and obtain road guidance. Therefore, the visually impaired are more independent and constantly promote their own development. Braille signs and Braille maps should be set up at bus stop signs, shopping mall guides, elevator handrails, hospitals and toilets to facilitate the visually impaired to obtain surrounding road conditions and other prompt information, help the visually impaired to build map memory and improve the self-help travel efficiency of the visually impaired. In order to meet the reading needs of the visually impaired, a touch interaction framework is built to accurately convey information to the visually impaired through tactile cognition.

3.4 Barrier-Free Facilities

In recent years, people's requirements for the construction of spiritual civilization have been gradually raised, and the care for the vulnerable groups has also risen to a new height. Barrier-free design as a new design concept, the use of barrier-free facilities in public environment can help the visually impaired to safely and conveniently achieve the purpose of self-help travel. Barrier-free facilities more consideration to the visually impaired in the public space of the actual demand, through detailed design, the optimized design scheme, to translate “accessible design” into effect, agreed to make the experience to the visually impaired and normal service, provide real barrier-free environment for the visually impaired, visually impaired by service as the main design purpose, adhere to the basis of safe, comfortable, convenient, Reflects the “people-oriented” design concept.

4. Visually Impaired People Self-Help Travel Service Design and Application

How to enable visually impaired people to travel independently in cities safely is still a difficult problem to be solved. How to avoid vehicles, pedestrians and obstacles is the main purpose of service design. Therefore, the design concept of intelligent interaction is proposed, hoping to reduce the difficulty of self-help travel for the visually impaired through interaction, so that the visually impaired can participate in social activities.

4.1 Intelligent Interactive Application of Touch

The visually impaired are a special group, because of the lack of vision, they have to make up for it through other senses. With the advent of the Internet era, intelligent devices emerge one after

another. For the visually impaired, intelligent touch interaction is more convenient for the visually impaired to complete the purpose of obtaining information. Tactile perception is just like the eyes of the visually impaired, such as the blind mobile phone, which can interact intelligently through touch and use the Braille keyboard to enable the visually impaired to complete the use and achieve the purpose of navigation.

4.2 Intelligent Interactive Application of Voice

In order to ensure the self-help travel safety of the visually impaired, intelligent voice interaction is used to remind the visually impaired of the location of obstacles, road conditions, road surface conditions and destination navigation, with strong real-time performance. It enables the visually impaired to understand the external road information through hearing, communicate with the visually impaired face to face, deeply observe the visually impaired group, listen to their appeals, so that they can participate in the society, and provide a strong guarantee for the self-help travel safety of the visually impaired. Information selection through intelligent voice. For example, blind navigation glasses can identify road conditions through AI, and Bluetooth voice can be transmitted to the ears of the visually impaired. The blind person can be reminded in advance to leave time for them to respond to the information received and make timely judgments to ensure travel safety.

4.3 Interactive Application of Somatosensory Intelligence

Body feeling intelligent interaction with movements, voice, eye, etc., and the surrounding environment of smart device interaction, through the intelligent device, which can identify the motion of the visually impaired to feedback information, improve the visually impaired in the process of interaction of immersive experience, get rid of the limitations of traditional operation of the device, to the visually impaired in the process of self-help travel more convenient. More attention should be paid to the psychological and emotional needs and experiential needs of the visually impaired. For example, visually impaired people can interact with each other through somatosensory intelligence to complete complex page search. They can control the navigation system through actions, eliminating tedious steps and completing navigation in a simple and clear way.

5. Design Principles of Self-Help Travel Services for Visually Impaired People

5.1 The Principle of Security

For the visually impaired, the dark world is full of dangers. However, we can improve the security features of service design by means of design, guide the behavior of the visually impaired to be safe, and meet the activity needs of the visually impaired to travel independently. If the material, process and ergonomics of service design are not safe enough, it will have a certain impact on the travel of the visually impaired, and even cause harm. The safety of service design is embodied in two aspects, one is the psychological safety of the visually impaired, the other is the physiological safety of the visually impaired. First of all, we should stand in the perspective of the visually impaired and explore the psychological and emotional state of the visually impaired. The visually impaired group is in a weak state and needs good treatment so that the visually impaired can feel warm interaction and privacy protection. Secondly, due to the loss of vision of the visually impaired, as far as possible to avoid hard, protruding design, so as not to scratch the visually impaired, material selection of high safety materials, anti-fall, anti-slip, so as not to cause physical damage to the visually impaired. Such as smart cane WeWalk (see figure 1), set inside the Google

maps and voice assistant, help the visually impaired to complete the navigation requirements, from the point of view of human body engineering, the cane external sleek, curved, avoid damage to the visually impaired, in use can easily remove the assembly, designed the compass and LED lights, can carry out remote control.

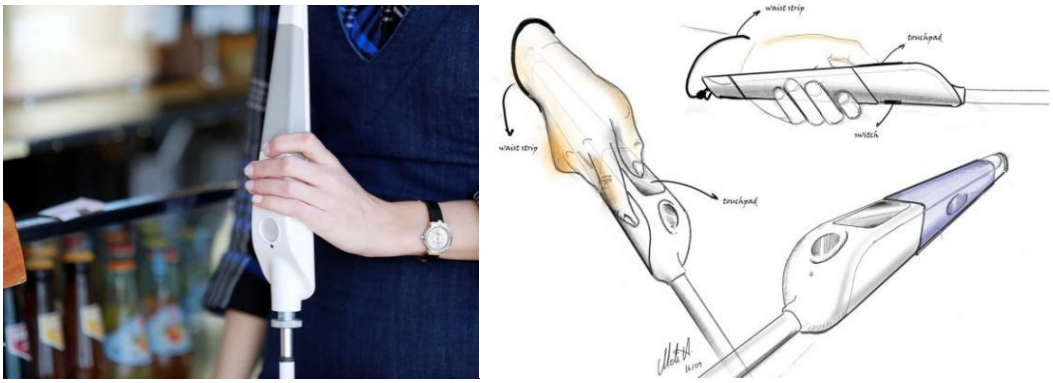

Fig.1 Smart Cane Wewalk (Image from the Internet)

5.2 The Principle of Convenience

It is very necessary to facilitate the self-help travel for the visually impaired. What seems simple to ordinary people is no small pressure to the visually impaired. The lack of vision makes the visually impaired always in an unknown state to the public travel environment. Due to congenital defects, the level of education, also determines the degree of acceptance and understanding of the visually impaired for today's society, the degree of use. In particular, when the design is convenient, the visually impaired can solve their travel needs without seeking help from others, and realize self-care in basic life, which can make the visually impaired feel the improvement of their self-worth, thus reducing the psychological burden of the visually impaired to trouble others. For example, the voice robot at the entrance of the shopping mall can ensure that the visually impaired can quickly understand their destination orientation through human-computer interaction, so that the visually impaired can feel the convenience of the use process. The use of Braille, such as the Braille information implanted on the armrest (see Figure 2), enables the visually impaired to independently understand the distribution of functional areas and find the desired destination through the sense of touch.

5.3 The Principle of Equality

Visually impaired eager to like normal people, also have a self-service travel, visit, purchasing, the demand such as learning activities, than the people around you strange eyes, not the public's support and understanding, reflect equality in service design, will be visually impaired of retrieval, pay attention to the emotions behind the visually impaired, passed to the visually impaired, with a variety of forms to visually impaired to feel the experience of equality, To improve the experience of the visually impaired self-help travel, so that the visually impaired feel pleasant services. Care for and respect the visually impaired, starting from the interests of the visually impaired, this equal service concept, so that “people-oriented” deep into every corner, everywhere reflects the humanistic care. For example, today's guide devices are no longer just guide dogs and sticks, but more wearable devices, such as Ustraap bracelet (see Figure 3), which can not only identify obstacles, but also judge whether obstacles are hard objects. Visually impaired with overhand ring, can understand through the bracelet to the surrounding environment, some places are not allowed to guide dogs to enter, but this bracelet is small and beautiful, visually impaired people as usual, by

vibration, bluetooth, voice transmission is realized the purpose of navigation, let the visually impaired as normal as ordinary people travel, reduce the visually impaired the psychological pressure of observer-based cutting force substances are used.

Fig.2 Handrails Used in Braille(Image from the Internet)

Fig.3 Ustraap Bracelet(Image from the Internet)

5.4 The Principle of Intelligence

With the development of new media technology, service design is more and more reflects the trend of intelligent interaction, public environment facilities introduced more intelligent information equipment, to serve the visually impaired groups, focus on the needs of visually impaired the self-help behavior starting point, to explore a new method for designing application service, construct a practical intelligent interactive service design, convenient travel and life for the visually impaired.

With the advent of 5G era, we are in an environment of rapid technological development, rapid development of information and intelligence, the design of intelligent self-help travel service for the visually impaired arises at the historic moment. Smart cane, intelligent barrier-free library, mobile phone for the blind, travel blind clothing, guide glasses and other intelligent devices have emerged one after another to meet the self-help travel needs of the visually impaired. Such as by voice equipment can self-help search positioning, bluetooth voice navigation, AI obstacles, self-help travel, such as smart shoes Le Chal (see figure 4) can realize the results of independent travel, the main purpose of this smart shoes is able to visually impaired to the specified destination, at the same time avoid obstacles, to join the parts of vibration in the shoes, The vibration is used to remind the visually impaired of the direction to turn. At the same time, it is connected with the smart phone and GPS positioning system to ensure the self-help safety of the visually impaired. It replaces the

role of others' help with intelligence and improves the self-care ability of the visually impaired.

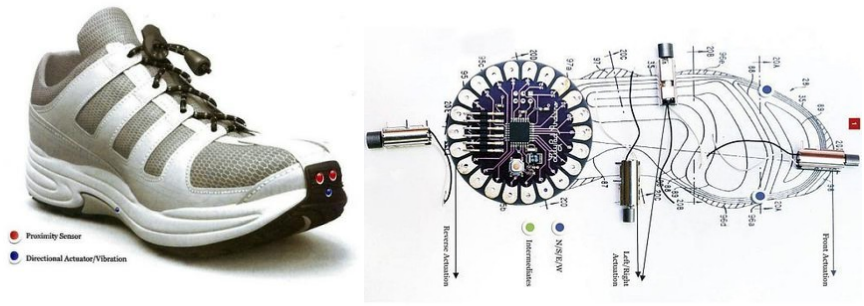

Fig.4 Smart Shoe Le Chal(Image from the Internet)

6. Summary and Conclusion

For visually impaired, you first need is security, based on the current status of visually impaired travel environment, in this paper, the results of demand of self-help travel service design study, for the better construction for visually impaired self-help travel public social environment system, the government should increase the investment in the accessibility of public facilities, through in-depth analysis of the results of demand of public service design to study, Improve the practical functions of facilities, help them solve practical difficulties in life, truly achieve “people-oriented”, let the visually impaired through the service design, feel the humanistic feelings.

The degree of social civilization is changing from material civilization to spiritual civilization. Based on the needs of the visually impaired, the service design with practical application value is proposed to provide a safe public social environment for the visually impaired to travel independently and meet their psychological and physiological needs. By studying the design of the self-service travel service for the visually impaired, it will realize the pleasure of the visually impaired in the public environment, which has the practical significance of long-term value.

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