

# The Study of Interactive Design in Service Systems for Community Self-help Charitable Facilities

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**Abstract.** With the birth of ergonomics, interactive design has covered many fields including psychology, physiology, sociology and economics. From a broader perspective, new concepts of interactive design study how to help consumers to use products or services in a more efficient, convenient and pleasant way. In the process of this study of the interactive design in service systems for community self-help charitable facilities, we used a number of different tools including depth interview, questionnaire survey, video logging and so forth to carry out researches on the social experience brought about by the industrial design of interactive products, the emotion cultivation, reconstruction effects of interactive interface, and the methods of arranging and integrating interactive information. We also explored how interactive design helped to raise the additional value and service quality in a systematic service. This article also analyzes deeply on the service design of community self-help charitable facilities, finds out current predicaments and how to get out of them from the perspective of design: making full use of interactive design and its unique properties, innovating in the process of service design, carrying out practical research and finally resulting in the rapid development of charities in communities. The outcome of this article aims to serve as a reference for governmental and social organizations to promote civilian charities in a way benefiting most people. Furthermore, with the in-depth research of interactive design, this article is also expected to propose directions for the studies on service design in the future.

**Keywords:** Community, Charitable Facility, Service Design, Interactive design.

## 1 Preface

Interactive design is an important part of service design. In the past, interactive design only focuses on the communication between humans and computers on physiological and psychological levels. With the birth of ergonomics, interactive design has expanded its field to a compound area containing not only physiology and psychology, but also sociology, economics and other principles. Furthermore, its attention has

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extended from functionality only to all requirements of human beings. The ultimate purpose of interactive design is to better satisfy users' psychological and behavioral needs, to explore methods for an easier, more pleasant and more effective acceptance of the services. Interactive design has unique characteristics, and the mechanism of the interaction between humans and machines has fundamentally changed how people think and communicate. In the past decade, the rapid development of personal portable terminals has brought revolutionary changes to all levels in the society, displaying enormous social and commercial value. This development, however, is still unbalanced. For instance, in a great number of traditional service design fields, the value of interactive design still remains to be better visual effects. From the perspective of interactive design's characteristics, it's highly accordant to the idea of service design that pursues system integration and human oriented innovation. Revolutionary changes will only occur when interactive design and service design are optimally combined.

According to the "2012's Annual Report of Charitable Donations in China" published in September 2013, the total amount of domestic donations, including money and commodities, amount to 13.3 billion USD, while in US, whose GDP is twice China's, this number is 316.2 billion, almost 24 times more. From statistics we may find out that 75% of the total donations came from citizens in US, while only 40% came from organizations other than corporations in China. Besides, the "2013's Annual Report of Charities Transparency in China" shows that only 29.6% charitable organizations got over 60 marks out of 100, and only 30% charitable organizations were qualified as far as transparency was concerned. It's obvious that the lack of charitable habits among citizens and the crisis of public mistrust against charitable organizations are the two primary factors that impede the development of charities in China.

In US, community foundations are the most important components of national charitable foundations. The construction of self-help charitable service systems for communities takes money from and spends it on communities, and makes the concept of public charities less distant. These charitable projects managed by NPO have better transparency and justice, and thus exert a positive impact on the reconstruction of trust and the cultivation of charitable consciousness. The construction of self-help charitable facilities is a systematic service design project. It involves the design of a donation service system, transparent and fair, which not only meets the requirement of community environment and residents' daily donation behavior, but also cultivates residents' charitable habits and self-management concept, leading to more involvement. At present, charitable facilities in communities are still elementary. Self-help donation boxes and used garment donation boxes can be occasionally found in communities as shown in figure 1, but in general they are boring in design, simple in functionality and low in credibility. Most of these facilities do not work as they are expected to, and exist in name only.



**Fig. 1.** Charitable facilities currently in use

Interactive design may bring revolutionary changes to service design in the following three ways. Firstly, based on a deep understanding of user behavior, interactive design helps users to establish a highly efficient behavior pattern that suits the information society. Secondly, by influencing users' emotions and moods, interactive design affects their attitudes, perceptions and behaviors in a psychological way. Finally, basing on the studies of social and economic rules, interactive design makes full use of information integration to provide a highly efficient platform for people to actualize self-organization and self-management. From the viewpoint of the innovative research of interactive design in service design, this article explores how interactive design may have positive and innovative effects on behavior guidance, emotion cultivation and information reconstruction in a systematic design of community self-help donation facilities.

## 2 Research Workflow and Methods

The researches for this article involve multiple research methods, analyzing and discovering theoretical and practical values of interactive design in the process of a systematic and innovative research on community self-help charitable services.

- Depth interview: Communicate with community residents in a face-to-face manner in order to confirm the practical values of the research of community based charities, to discover potential problems and their sources, and to conclude research targets and solutions in the end.
- Questionnaire Survey: According to the result from the interviews did in the former step, a survey questionnaire shall be designed. Because this research targets at all communities in China in order to pick a typical research subject for more general adaptability, the community in which our questionnaires are collected was strictly filtered. It was finally decided to be one with even age distribution. Guided by

surveyors, residents at different ages in the community enrolled in the survey, and finally 153 valid copies were collected and used statistically in future researches.

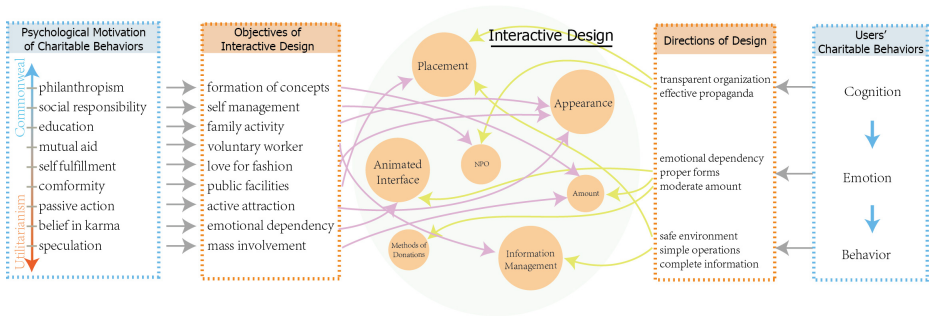
- Video Logging: With video and image logging tools, basic information about the community was recorded in real time. This helped us to know the basic functional regions in communities and the behavioral habits of residents in the community.
- Testers' feedback: Several testers were invited to experience all the periodical outcomes obtained during the design process. Testers' psychological and physical experience was recorded as references for later design improvement.

### 3 Analysis of the Psychological Model

According to the depth interviews with residents in the community, their motivations of charitable donations were analyzed, as shown in the left part of figure 2. From utilitarianism to the spirit of commonweal, several common psychological motivations of residents' charitable behaviors were listed, where the spirit of commonweal is believed by us to be the ideal target of social development. Residents' charitable donation behaviors may be guided by interactive design, transforming from utilitarianism to the spirit of commonweal which contains more positive energy. In this research, source of each psychological motivation was analyzed, and all the interactive design targets were figured out to realize the positive transformation mentioned above. These design targets might seem separated, however, they are important design elements.

From the viewpoint of consumer psychology, consumer behavior can be divided into 3 stages generally, i.e. perception, emotion and behavior. The use of self-help charitable facilities in a community also follows this rule: users need to know about this self-help donation device, then establish emotional relationship by acquiring more information from this device, and finally turn the emotion into an actual donation behavior. In the analysis of these stages, the most important factors affecting product design on each stage are extracted. For example, on the perception stage, a resident forms initial recognition of the self-help donation device via appropriate advertising and their understanding of the management team's transparency. These factors affect people's initial recognition of the facility directly, and shall contribute significantly to the interactive design.

Based on the targets and directions of interactive design, we may figure out several important design components, e.g. industrial design, placement design, interactive interface design, information architecture design and etc. Donation amount, NPS management and donation methods are several key points of the interactive design for self-help donation facility, which need our special attention. Design targets and directions determine the main structure of the interactive design. In the phase of prototype design, they are very important principles that shall guide the actual design work.



**Fig. 2.** The relationship among psychological motivation, behavior and interactive design

## 4 New Concepts of Interactive Design for the Self-help Donation Facility

In the research of interactive design of community self-help charitable facilities, interactive design not only satisfies audience visually, but also creates emotional adherence, cultivates enthusiasm in charities, raises donation behavior ratio and provides effective design patterns for systematic and human oriented services.

### 4.1 Reconstructing Interactive User Behavior via New Ergonomics

Through analysis on human behavior and its features, we may provide more human oriented physical experience to users through interactive design and thus guide their behaviors in a proper way. In this research, physical experience of a user is the first and foremost factor to consider, where physical experience refers to the idea that a considerate design of a product's placement, appearance and interactive methods offers its user a better, safer and more comfortable physical experience. This better experience will, hopefully, lead to residents' more active and healthy donation behaviors and the actualization of design targets.

- Human oriented interactive industrial design

According to the analysis of the psychological model of charitable behaviors, there are three targets to keep in mind during the interactive design: 1. To meet the requirement of family activities. 2. To satisfy users' flavor of fashion. 3. To actively attract users' attention. In the questionnaire survey, social recognition of charitable behaviors was inspected among residents in the community. 94.77% people are willing to bring children to join daily donation activities held in the community. From the perspective of sociology, community self-help donation facilities can become a very good platform to cultivate charitable habits of the next generation, and thus create profound social influences. Fashionable style is another important stimulation that attracts people and makes them feel that charitable donation is not only a civilized

behavior to show their affection, but also a modish behavior to fulfill themselves. Because of this, contours of the machine shall mainly contain simple and stylish lines to suit adults and children at the same time. While we were designing the prototype of the machine, we considered these factors sufficiently. The main shape of the machine was simple and modern. To fit heights of users at different ages, it is best that an interactive screen fill the facade of the machine from top to bottom, but concerning the cost of having a very large screen, it's more cost efficient to have 2 screens. One of them is larger, and the other one is smaller, located at the upper part and lower part separately. The upper larger one is for adults, while the lower smaller one provides a personalized interactive platform to children. To meet different psychological requirements of adults and children, sound sensors are installed in the machine. Children may clap or shout to communicate with virtual characters in the screen, which may hopefully arouse their interests.



**Fig. 3.** Industrial design of the donation machine

- Placement of facilities

During the action of donation, convenient access, safe environment and a novel interactive experience can contribute to a participant's donation behavior effectively. Videos were taken to study the active regions and action patterns of residents, and a flow graph was drawn on the basis of resulting data, as shown in figure 4. On weekdays, there were 2 typical types of people streams. One of them was the stream of working people on and off duty mainly during rush hours in the morning and in the afternoon, and their routes began at their buildings and ended at the main entrance of the community, or otherwise. The other typical stream of people were composed of retired elderly people and school age children. They were most active during 3:30 to 5:00 pm, and their main active region was the central garden. From the figure below we concluded that the central garden was the most important gathering region for people

in the community, the 2 people streams mentioned above both crossed the central garden. Furthermore, in a typical community central garden usually occupies the community center which is convenient, spacious and safe. In conclusion, central garden is the best location for us to install donation machines. Please note that sensitive areas embodying public authority, e.g. neighborhood committee and property management department, shall be avoided.



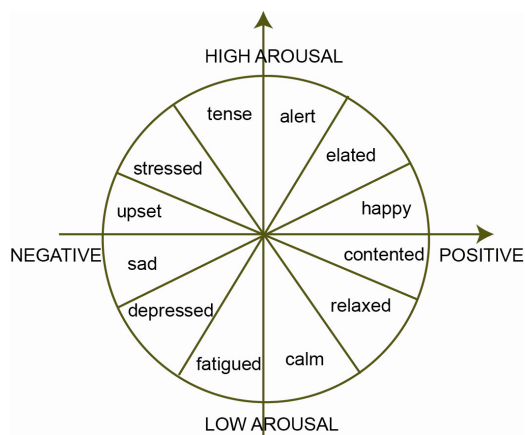
**Fig. 4.** Placement decision of the self-help charitable donation facilities in a community

#### 4.2 Establishing Emotional Dependency Using Visual Language via Interactive Experience

Mood affects psychological process in many ways, including decision, planning, memory and attention (Berkowitz 2000). Certain moods may be so powerful that they overwhelm all rational thinking. From the perspective of cognitive psychology, mood is an important motivation of cognition, the determinant factor that allows information to enter the brain and build cognition, the switch that filters input information and evokes reasoning. In an article, Beale gave a detailed analysis on virtual mood proxy, and studied how proxy technology and emotional power affect audiences' altitude, perception and behavior in the process of human computer interaction. Therefore, leading users' emotion in a correct direction plays an important role in bringing better cognition, establishing emotional dependency and finally leading to the actual behavior. Interactive design may create a mood atmosphere for users and guide their consumption behaviors. An excellent interactive design may bring audience 2 different types of emotional experience. The first one creates a virtual experience which makes

people feel as if he or she is really in a virtual environment. This kind of immersive experience brings a sensory illusion to accomplish the emotional communication. This kind of design usually requires a closed space with projected virtual environment on surrounding space, or the usage of head mounted displays. The other kind establishes a virtual environment psychologically through the development of the content, very similar to what films do to audiences in a short period of time. Interactive design makes use of visual language to create a virtual story telling environment and lets audiences immerse in this environment for a short period of time. What makes it different from a film or video is that an interactive design may use its unique human computer interaction to enhance this emotional relationship. If we prolong the interaction, this relationship is prolonged as well, and its users may develop an emotional dependency on the product. Compared with the first kind of design, the latter one doesn't require expensive hardware. It uses merely virtual visual language to develop a deep emotional relationship between humans and computers, which is more suitable in our case. We'll mainly consider this kind of design when we plan interactions for the community self-help donation facilities. It's expected that an emotional dependency on donation behavior may be established in donors' minds via carefully and scientifically designed interactive visual content.

The target of interaction emotion design call be expressed in "A.C.A", i.e. Attract audiences, Continue their passion and lead to their Actions. On the basis of the 2 dimensional emotion model proposed by Russel in 1991, this article studies deeply the mechanism of emotional proxy and affects a user's altitude, perception and behavior through emotion cultivation.



**Fig. 5.** Russel's 2 dimensional emotion model

- Choosing the donation amount: Mood is a determinant factor of user altitude and behavior, while the amount of donation affects residents' mood directly. A properly designed donation amount is not only an important starting point to encourage donations in a wide range but also an important method to establish emotional relationship between users and the machine. According to the survey result, 69%

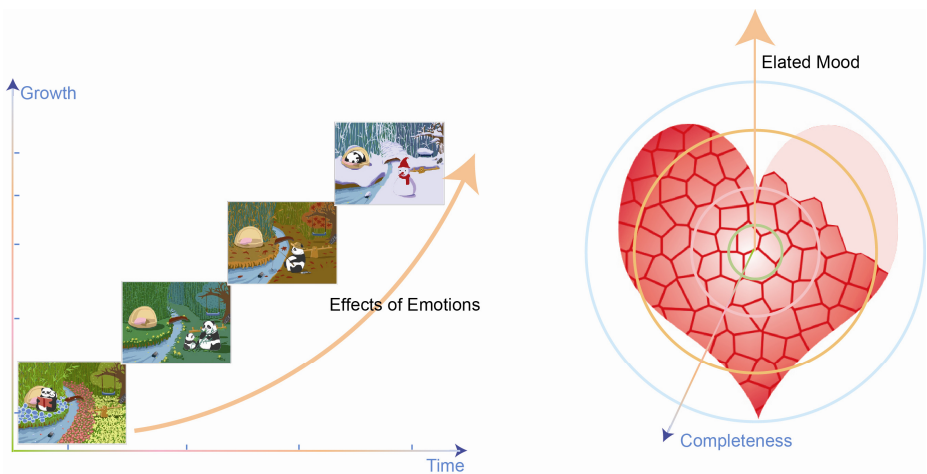


people selected 10 RMB or lower for a single donation, suggesting this amount is pleasant and safe for most people, and is also a healthy and sustainable donation amount. This proves the conclusion we drew after reading materials and making interview: small single donations over time is a sustainable and healthy social charitable behavior that may be chosen to encourage nationwide involvement. This concept is also justified by the successful experience from abroad or domestic charitable practices, such as “Yi Foundation”. According to the “2012’s Annual Report of Charitable Donations in China”, although the total amount of donation drops while compared with 2011, non-governmental small donations increased considerably.

- **Donation methods:** In Russel’s emotional model, the more satisfaction one gains, the more positive power is gathered. As for donation behavior, the biggest obstacle is the lack of transparency. To raise transparency and satisfy donors, it’s favorable to make donation details and money usages more specific. In our case, donations are divided into 2 categories: continuous foundations and funds for emergent events. Foundations may accumulate without upper limit, and they aim at helping vulnerable and disadvantaged groups in a continuous manner. Funds focus on unexpected accidents. They start at special times and have upper limits set by donation administration committees. Once the upper limit is reached, one donation project ceases automatically.
- **Interactive Lights:** Interactive design has many means to deliver emotions effectively, including the use of interactive audio and lights. Experiments proved that a physical interaction is more likely to make users feel an actual human computer interaction. When designing the appearance of the donation machine, we added an interactive light shaped like a heart at the top of the machine. In normal times, this heart emits warm and consistent light, sending out positive energy of merciful wishes. While emergent events happen and immediate help is needed, the heart blinks quickly, and blinks to show gratitude when a donation is received. Adding light to a product is not a novel idea, but if used properly in an interactive way, the light may communicate with users and shorten the psychological distance between human and machine. It works especially well to attract distant pedestrians.
- **Theme and flow of the interactive animation:** It’s proven to be an effective method to attract attention that story telling interactive animation is included in the design. It helps to shorten the distance between audience and the product, establishing an intimate emotional relationship. Our questionnaire survey revealed that 90.85% people agreed on this viewpoint. However, not all themed interactive animations can help to obtain the anticipated result. Only the animations with themes fitting the products’ basic properties well and customized for specific audience can guarantee success. For example, since the keyword of the product in this article, namely self-help donation machine, is charitable donation, the basic emotional tone shall be friendly and warm. Secondly, different audience directly affect the setting of themes. Target audiences of the donation machine includes everyone in the community, covering all age ranges. As a result, the selection of themes shall take everyone’s preference into account, be consistent with universal values and aesthetic perspectives and avoid prominent age bias. Survey results also support our

viewpoint. Among all the options provided in the questionnaire, themes named education game and pet story got 45.75% and 35.59% votes in a single selection question, while the theme named gun game, which has a strong age bias, got less than 1% support.

- Besides, animation based interaction is a very important way to establish an emotional attachment. According to the two dimensional emotion theory introduced by Russel, people gain more positive power when they feel more happiness, fulfillment and relaxation in the course of interacting with animation. In the foundation donation projects, the growth of a panda becomes the primary clue. The x axis is time and the y axis is the growth level of the panda. Time in the animation is correspondent to the time in the real world, and the panda goes through seasons together with us, shortening the emotional distance between people and the machine. The y axis records how little panda grows, gains skills to survive, and begins independent life. Its growth is supported by donations. When a user approaches the machine and makes a donation, the little panda corresponds to thank him or her. When donations have reach a certain amount, the little panda enters a new growth level, suggesting that one's donations help the little panda to grow. This design not only delivers positive energy of mutual beneficial charities, but also encourages donors to care about the growth of the virtual little panda continuously, leading to multiple donations. According to our survey, 59.74% residents will make donations more than once in a month. In other emergent donation projects, the target and concept is expressed in a jigsaw puzzle game. Each donation becomes a piece to fill a heart shape, and when the heart is progressively complete, people get more and more stimulated and are more likely to donate. When the heart is finally complete, the donation mission is accomplished. This vacancy filling visual style encourages residents to strive for a same purpose, enhances cohesion of the community and spreads the idea of transparent, moderate and healthy donation behaviors.



**Fig. 6.** Design of the interaction animation and the cultivation of user emotion

### 4.3 The Construction of the Information Reconstruction and Supplement Service System in the Interactive Interface

The scientific organization and delivery of information are two of the most important targets of service design. It is a key point of interactive design to actualize efficient data mining and spreading. In the comments and suggestions section of the survey questionnaire, most feedbacks were concerning the publicizing of information, which suggested transparency is the key to the success of a charitable project. Liu youping, vice director of the “ZhongHua Charitable Donation Information Center” gave his comments on the report about the transparency of charities in China with the following statements: “As for charitable organizations, the public mostly wants to know where the donations go and how they are spent, which are on the contrary done poorly when charitable organizations reveal information to the public.” The multimedia property of an interactive interface guarantees that it’s a perfect platform for information distribution. How can we use technology properly so as to offer users with the information they need in a convenient way? It is an issue to be solved by designers.

Before feeding data to an interactive interface, it’s necessary to analyze information in the first place. Some parts of it might be revealed to users directly, while other parts might need to be processed before revealing. Interactive interfaces cope with information in 2 ways. The first one is a direct display, where the choice of a proper visualization style for convenient and effective communication is the key issue. The second one is data processing, where information are processed for multiple times and data mining is done to achieve more profound effective information. The interactive interface plays an important role in collection and organizing information online. Information is a very important resource to service design, and deep processing of information may raise additional values of the service design remarkably.

In the process of designing the information system for the interactive self-help donation machine, the following steps are followed. Firstly, information are categorized. Some information is suitable to be revealed directly, including members of the administrative committee, workflow of the donation machine, donees’ application information, the expenditure of the money and so forth. These kinds of information is visualized in an easy-to-understand way and shown to users directly in the multimedia interface. As for online information collection, users may submit donation applications or give suggestions to the administrative committee by speaking to the voice recorder, and the recorded voices go automatically to the committee via internet. Besides, more information based services might be developed based on the characteristics of the interactive interface. For example, a donee may apply to be a volunteer to provide services to the community and may make appointments using the interface. Potential of an interactive interface is unlimited, which is very meaningful to the continuous expansion and improvement of the service design. By handling information in an appropriate way, many better new services may be developed.

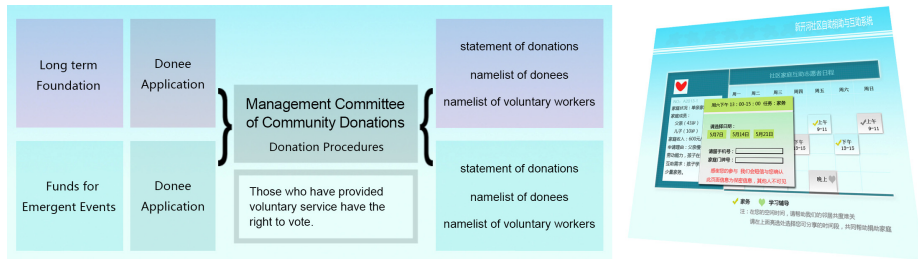


Fig. 7. Management interface for interactive information system and design for additional value

## 5 Conclusion

Today, interactive design has become the most important tool in product and service design. Better study on interactive design helps to optimize the workflow of service design, to expand its range and augment its value. Based on a practical study on the service design of community self-help charitable facilities, this article did a theoretical study and innovative practice on the values and potential of interactive design in service system design, providing some references for future studies on service design and interactive design. Moreover, how to promote community self-help charitable projects will continue to be an important issue in the development of societies in the future. Paul Brest, the former CEO of Hewlett Foundation, also believed communities play a significant role in charitable activities. With theoretical and practical references for the establishment of more effective charitable projects in communities, we hope that the results from the practical researches in this article will be helpful to governments and non-profitable organizations, promoting the healthy growth of civil charities.

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