Service Design Strategies for Long-Term Effects that Individual Moments Have on the Whole: A Case Study of "Persephone"

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Abstract. The essay targets at exploring the strategies on service design for promoting the long-term effects that generated by every individual moment through probing into design strategies of every single part of the real-time user experiences of an aftermath rescue service system "Persephone".

Keywords: Group effect · Long-term effect · Group consciousness · Persephone · Service design · User experience

1 Introduction

Earthquake is one of the most powerful disasters in the world. More than 300 million people have been seriously affected in the earthquake at 20 century. There are more than 18 % areas, and 12 % populations on earth are under the risk, and the earthquake may come suddenly without any advancing warning. No matter how advanced technology we have, human lives remain fragile in the face of earthquakes, because major survival technologies may corrupt.

In China, the underdeveloped western areas often suffer from deadly earthquake made worse by poor infrastructure and planning. It takes time for the outside rescue resources to reach the stricken areas, making the existing resources become far more inessential in the golden rescue areas. Ensuring the supply of food and safe drinking water and trying to restore good sanitation are critical, which help save more lives. However, every single resource allocation is based on the efficiency of communication. Taking the 2008 Wenchuan earthquake, for instance, the damages of the base stations, the lacking of electricity, and the traffic jam caused by exceeded number of users all exacerbated the efficiency of communication. The main goals of designing Persephone rescue system is to make every user stays notices, informed and connected in case of severe aftermath situations. Persephone helps users stay noticed, informed and targeted by opening up an entrance for the first time rescue and information exchange among victims. Based on the combination of P2P meshed network and the traditional cellular services, the success and efficiency of Persephone are based on mutual

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help, a number of participants and the delayed data accumulation. As a result, our design purpose is to increase user participation and increase the time user stay online. Users take advantages of Persephone to get access to the information they need. The concealed meaning, which is hard detected by users in the process of interaction. When a user is trying to connect others, he or she is also the crucial bridge of information delivery. In the other words, when a user is sending out a message asking for help, meanwhile the user himself or herself is also a significant node help others exchange information in the whole system. The resource data generated by groups of users could also help government and organizations conduct the resource allocation management. Consequently, it is crucial to promote user participation and residence time on Persephone app thus to promote better group effects. In order to develop a comprehensive approach to the user experience of Persephone, authors probe into user demands and psychology through a series of user research.

2 Research Methodology

When the presence of every individual user is a significant part of the whole rescue system, and the benefit from this group value may also return to the user, the key point of getting better group benefits is to make the long-term effect and group benefit perceivable and foreseeable by the participated users in the process of service receiving. The authors accumulated the data to analyze social-related thinking models, rescue concepts and current rescue behaviors of various victims survived in Wenchuan earthquake by the methodology of persona analyze. Then we organized the data with the framework of POMES (people, object, environment, message, service), structured the user needs, and sort out the relationship between users role-related behaviors and their corresponding mental perceptions. Then the authors explored the possible development of Persephone service design guidelines to help users have better emotional control, perspective taking, and to show expression of respect. On the purpose of the conversion from the user demands to design guidelines, the research applies the model of Means-end Chain and uses it to transform different kinds of user demands to the corresponding guidelines for service design.

2.1 Data Accumulation

Survey. A survey of 28 survivors from 2008 Wenchuan Earthquake through persona analyze by the in-depth interview and a five-person focus group. They are college students, government officers, merchants, and soldiers. Each in-depth interview is about 40 min. We ask people to describe their experiences of Wenchuan Earthquake. Following, we designed several scenarios by showing them video documentaries and coming up with questions. We ask them about their choices, demands, behaviors, and psychological movements. For the focus group, the researchers displayed some typical problems and demands gathered from the in-depth interviews, and came up with some design proposals. The researchers piled up rich data with tones of video, photos and recordings.

Questionaire. Methods to conduct the survey by sending out a questionnaire to 514 people of different ages and occupations came from earthquake belt areas like Wenchuan, Beichuan, Mianzhu, Chongqing, Baoji, and Xian. We greatly enriched data by questionnaires.

2.2 POEMS and Personal Analysis

After research of data collection, we input all the data into an Excel spreadsheet in accordance with the construction of POEMS (Fig. 1). POEMS considers people, object, environment, message, service and other factors synthetically. It is suitable for analysis of large amounts of qualitative data [3].

1	Behavior	Time After Earthquake	Self Description	Actor Gender	Actor Age	Object	Environment	Behavior Motivation	Service	Confusion	Advice
22	打电话给母亲	20m	我打电话给我妈，电话都打不通。	女	22	手机，电力	房子倒了，断电，没有信号	亲情	联系亲友，通信需求	寻找手机信号位置	无
23	挖掘被掩埋受害者	4h	很多人在叫喊，我就冲过去，很多人和我一起，并不知道什么情况	男	34	人力，组织，通信	房子倒了，断电	自我实现，群里意识	提供帮助，发现被救者，救援组织	信息咨询模糊，救援组织混乱	更明确的信息，更高效的救援
24	发出求救信息	10h	外面很多脚步声，说话声，我喊不出来，拿石头敲地，一直没有人发现我，过了很久才有人说这里好像有个人	男	35	人力，通信	废墟，被掩埋，	求生	提供求救信息，明确自身地理位置	如何被发现	无
25	等待外援	2d	我们那边路都坏了，两天后一些当兵的才进来，大部队进来那是很多天后	女	45	人力，外援，	道路损坏，地理位置位于山区，震后第一时间外援无法到达	生存需求	震区内外的通信，基础设施的恢复，自救人力资源，物质资源	外援到来之前如何展开自救	合理展开自救，分配现有资源
	提供救助	1d	我们刚开始自顾不暇，和大家集中在一	男	49	人力	房子倒了，断电	生存需求，群里意识，自我	联系亲友，通信需求，提供帮助	亲友信息检索困难，亲友尘	无

Fig. 1. User needs in aftermath scenarios

We categorized user demands into 11 dimensions (Fig. 2). The diameter of each axis is the influence of such user need, which is positively correlated to the certain numbers of times user mentioned directly and indirectly. Location- relating communication are the universal demanding shared by all users, no matter they are the people who need help, who offer help, who can only help themselves, organizations, government, reporters and other kinds of data collection volunteers. The second rank comes to the resource sharing, which are food, water, medical treatment and other kinds of life supporting materials. The third rank comes to the feeling statement including the senses of existence and emotion expression.

It is found that users demands are according to their roles in the situation (Fig. 3). We analyzed all the needs of types of users and narrowed down user roles and characters into three typical persona, resource demanders, resource providers and observers. As time goes by, user roles can convent from one to the other. The shape of the groups is relating to the tendency of role changing. The group of "I am safe" is the buffer pole of the community. The amount of people who are offering help increases from the buffer pole. Meanwhile, the number of people who need help decreases and add numbers to the buffer pole. There are also a group of people like reporters and college students who are the roles like the bridges and speakers of the information broadcasting. They link the disastrous areas and outside areas together, offer the information and news on both sides, and help organizations and governments make rescue strategies and

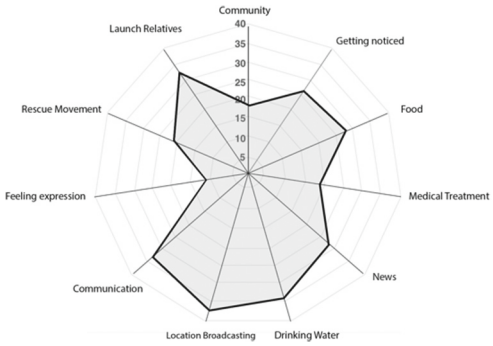

Fig. 2. User demands statistic map

allocate resources. By thinking about the needs of the fictional personas, we are better able to infer what a real person might need. Such inference assisted with our latter brainstorming, case specification and features definition.

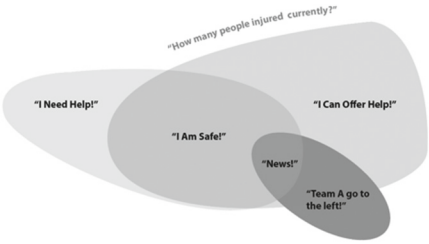

Fig. 3. Characters and roles

We classified user needs and related them into four social cognitive and psychological need categories, the norm of reciprocity, empathy, self-actualization and the sense of security (Fig. 4). Resource demanders are the users who're behaviors of getting resources are dominating in their whole movement. They can be the victims who are injured looking for medical support, who are starving searching for food or water, who are helping others finding life- supporting materials. This group of users could have the possibility to be changed into resource providers or observers once their resource demanding are relieved. The resource providers are the group of people whose main movements are providing life-supporting materials to people who need them. The resources they are providing can be physical stuff like food, water, medical equipment, as well as labour power. They can be individuals, group, organizations. Once the resource is running out, they may turn into observers. Observers mainly consist of people who are currently safe, do not need extra support but also do not have extra resources to share with others in general. They are the people survived

and observe the situations. They could turn into the resource supporters due to the organizations, guidances and self-emotional will. There are also some people who can be essential in terms of macroscopic data generation, the journalists and information collectors, who belongs to the group of observers. They are the most active and up-and-coming groups in the disastrous areas, who link data and information as well as peoples mental relationship. There are some demands like "Communication", "location broadcast", and "launch relatives", which are demanding to connect people together into collaboration.

	The norm of reciprocity	Empathy	Self-actualizaion	The sense of security
Resource demanders	resource launch getting connected location launch	building confidence receiving notification getting attention	expression of emotion updating self information	real-time oriented getting informed comfort
Resource providers	notification broadcast explicit guide	real-time oriented information getting attention encouragement	resource info updating complement feedback	getting accessed given authority
Observers	public opinion news	broadcast notification	micro monitoring authority building trust	system reliability real-time oriented information tendency statistics

Fig. 4. User need of Persephone service and user experience

The norm of reciprocity is the expectation that users will respond favorably to each other by returning benefits for benefits, and responding with either indifference or hostility to harms [4]. The norm of reciprocity could be the motivation and also the surveillance to promoting users be a part of the system. Even if a user is neither seeking for help or offering help, it is sensible to stay online in terms of "Norm of Reciprocity". Embedding the idea of the core technique of the P2P meshed network in the service design is a good way to chase for the "Norm of Reciprocity". Every user is a significant node for the whole information change, especially for the users who is a single bridge between two group of users, which is indispensable. However, for the government, public opinions supervise their behaviors when they do the resource statistic and allocating and strategy making.

Self-actualization is a term that has been used in various psychology theories, the quest for spiritual enlightenment. The concept was brought most fully to prominence in Abraham Maslow's hierarchy of needs theory as the final level of psychological development that can be achieved. Showing how much influence a single users behavior has on the whole. Every small step of further

approaching on help offering deserves a feedback, which is a subconscious and implicit motivation that encouraging users to explore more.

The sense of security is essential and for the people who is calling for help, which offers them courage and patience in the severe situation. The sense of security is essential. For the people who is calling for help, the sense of security offers them courage and patience in the severe situation. One of a good way to chase the sense of security is to enhance the frequency communication and decrease the chances that messages had been sent out but had no return. Each users status will be visible to all users in the same area, users can tap the note to see every users current status.

3 Service Design Strategies for Promoting User Experience in Individual Moments

3.1 Roles and Characters

There are three roles, "I need help", "I am safe" and "I am safe and I can offer help". In addition, to being themselves (Presenting their own name and contact information), users can choose the roles representing their current status according to their dominating behaviors in the aftermath situation. During the chaotic situation, as resources are limited to access and people are more sensitive to the uncertainty than usual, message exchanging should be more accurate, brief and comprehensible. We should enable users who are in severe situations using as fewer operations as possible to send out the crucial life-supporting information. When selecting "I need help", the tags of "medical", "water", "food", and "electricity" appear for them to select, and multi-selection is supported. The "medical" tag will be selected by default, users can touch the tag to remove selection (Fig. 5).

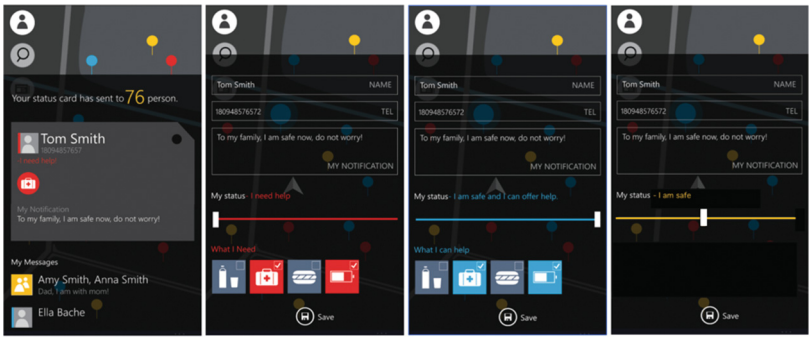

Fig. 5. User Roles and Characters; 3–1 User Centre; 3–2 "I need help"; 3–3 "I am safe and I can offer help"; 3–4 "I am safe"

This design is in perspective of building the sense of security, which means the more severe and emergency the situations are, the fewer operations the users need

to do, and the most crucial information will always be launched to the public. The same tags go for the role of "I am safe and I can offer help", by means of achieving the sense of consistency, and making everything comprehensible and efficiency. Three roles can be changed due to the slider bar by very easy operations as users role could change over time. The updated information of users role will be broadcasted to the public one minute after user editing to prevent false operation, and to increase information change efficiency by minimizing information load over the whole system.

3.2 Location and Resource Launching

For people to pay attention to something, they must first perceive it [6]. Everything is based on Bing map, including who is nearby, and their roles related resource status (Fig. 6). According to the norm of reciprocity, the expectation that users will respond favorably to each other by returning benefits for benefits [4].

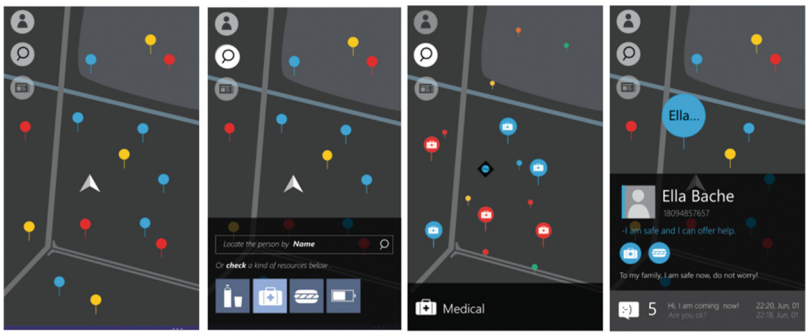

Fig. 6. Location, resource launch, and people nearby

Every movement of a single user can be accessed by the nearby users made the norm of reciprocity visible by each user. In real situations, a user can have a dominating role as "I need help" or "I am safe and I can offer help", and also be an observer on the third perspective. Being a part of the system and out of the system at the same time, users will get attentions of other and get noticed by others at the same time. People are motivated by progress, mastery and control. When they feel they are learning and mastering the situation, they are more motivated to be part of it [6]. Also perceiving something does not mean paying attention to something, the existing features of making everyone feels a sense of control in the chaotic situation could not only motivate people reacting more in the dimensions of information sharing and exchange, but also help resource supporters getting the sense of self- actualization, and encourage them to explore more.

3.3 Emotional Design Respect: People, Families and Friends

After earthquakes, people are scared, hurt and helpless. They want to contact their families, friends, people they are familiar with. They want to obtain food, water and other life-supporting resources. They want to help and help others. No matter the resource demanders, the resources supporters or the observers, the safety of their friends and relatives is one of the universal demanding. Users can send out a sentence of words to families and friends in from self-information editing centre (Fig. 3). Meanwhile, how far the information could reach could be told by users on the user centre page through the sentence "Your status card has been sent to X Person", which is based on the norm of reciprocity and empathy for each other. Users creating bridges for information exchange with people nearby, and they help each other survive. Users can sense what another person is experiencing from within the other person's frame of reference, and the capacity to place oneself in other's position [5]. Making people become bonds of information delivery for each other, motivate people to stay online. The success and efficiency of Persephone are based on mutual help, a number of participants and the delayed data accumulation. Based on the norm of reciprocity, the more users stay online, the more chance users get to find the information of their relatives and friends.

3.4 Communications and Notifications

Users can launch a targeted user on the resource map to do the information exchange, using other users as the bridge of message delivery. "The Group chat" is added to the system as one of the communication features. Doing things together bonds people together, and people who engaged in synchronizing activities are more cooperative in completing subsequent tasks (Scott Wiltermuth and Chip Heath, 2009). Group activities could be organized in group chat, and build the sense of security for each single user. Notification (Fig. 7) is the window to receive information from the outside of the disastrous areas. The notification could be editing from Perseboard, which is the data buffer running on Azure.

Fig. 7. Notification

4 Conclusion

This research is based on the service design of Persephone, an aftermath rescue system taking advantage of P2P meshed network. Through user research based on the methodology of persona and POEMS, and sort out the relationship between users role-related behaviors and their corresponding mental perceptions, and transform different kinds of user demands to the corresponding guidelines for service design in the perspectives of "The norm of reciprocity", "Empathy",

"Self-actualisation" and "The sense of security". By probing into design strategies of every single part of the real-time user experiences of an aftermath rescue service system "Persephone", the authors explored the possible development of Persephone service design to help users have better emotional control, perspective taking, to show expression of respect in the process of service receiving, thus promotes the long-term effects that individual moments have on the whole. However, the study has its limits in data supporting because of the few amount of data samples. Although typical, the aftermath situation Wenchuan earthquake cant represent the whole China. Enrich the source of data accumulation could help us explore more possibilities of design strategies that could promote long-term effects by enriching user experiences in individual moments.

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