Experience Design of Social Interaction for Generation Y Based on Tangible Interaction

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Abstract. Generation Y of the mainland China has the features of "chameleon": adapting to social rules in society and showing distinct personality in their own small circles. This self-contradictory presentation differentiates it from other groups in a way that is integrated into the real world. We explore the experience design based on tangible computing in the hope of better communication and interaction of Generation Y in the physical environment. We have explored the design principle for Generation Y and the design prototype "chameleon cube" based on this concept: to design a space that allows the Generation Y to experience the public environment and enter into a self-review state, and in this installation, they can relax themselves and also to express individuality. Through experimental observation and data analysis, we verify that the products based on the "chameleon design principle" can explore the characteristics of the Generation Y group and help to enhance the communication skills of Generation Y.

Keywords: Generation Y · Tangible computing · Interactive experience

1 Introduction

The concept of "Generation Y" (Gen Yers) was first proposed by the American researchers, which defines that "Generation Y" was the generation born in 1982–1994 period and grew up with computers and the Internet. In China, opinions are divided on the definition of "Generation Y". This study defines "Generation Y" as a generation born in the period with the development and popularization of computers and the Internet in China, because the development of computer and Internet technology in China lags behind the United States, and the gradual popularization of computers and Internet technology is mature during 1983–1998, which is the important basis for this thesis to define the group born in this period as China's Generation Y.

Generation Y at China and abroad generally have the following several similar characteristics: (1) independent value orientation and self-centered (2) the Internet

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environment and rapidly adapt to high-tech updates; (3) higher level of education, in the knowledge-based economic system and education requirements are relatively improved; (4) pay attention to the balance of life and work [1–3].

The social background of China's Generation Y is complex, and the political, economic, cultural and educational changes all influence the formation of the consciousness of Generation Y. China launched its reform and opening-up policy in 1979, and put forward the strategy of rejuvenating the country through science and education in 1995. At the same time, China has a long history of its traditional culture and family concept, which makes the family structure rather special and driven by the basic national policy of family planning, the unique 6 + 1 family structure was formed. Therefore, it is easy for Generation Y group to develop the self-centered character since childhood. However, this has also virtually put pressure on Generation Y as the focus of family has shifted to Generation Y, with the result that Generation Y tends to fail to meet the predefined expectations under high expectations, leading to a loss of confidence or transformation to a negative or rebellious attitude towards life.

Generation Y is deeply influenced by the traditional Chinese culture and the impact of Western culture. They are eager to express themselves but are bound by the traditional culture, which has caused the inner self-contradictions of China's Generation Y, that is, whether to express themselves bravely or to drift with the current and adapt to the society. Under the depressive contradiction, Generation Y group has developed its own unique characteristic: in the society, they can be very good at adapting to social rules, and in their own small circles, they can express distinct personalities. This phenomenon is just like the chameleon that changes its color of the skin as the environment changes, so we say that Generation Y of the mainland has chameleon features.

Generation Y is the group aged 18–32 in China, which is the current main crowd or in the near future. Most studies of Generation Y offer theoretical suggestions on employment outlook, work view, values, consumption view and learning methods etc. Few auxiliary installations or tools help Generation Y to better adapt to the real world.

This thesis will start from the virtual mode familiar to Generation Y in the way of Tangible Interaction to let the Generation Y better integrate into the real world and make Generation Y reflect and integrate into the real world naturally.

2 Related Work

Since 2000, many researchers began to study Generation Y. Interested in what was causing the change in the students; Stewart did a self-reported personality questions used to self-describe the behavior of individuals [4]. Arhin and Cormier demonstrated that Y group is more proficient at multitasking, visual learning, and using technology [5]. Other characteristics describing Generation Y include loyal, hard working, goal oriented, socially networked, team oriented, efficient multitaskers, interested in addressing social problems, and comfortable being assessed [6, 7]. This generation also possesses traditional values and has a strong family emphasis [8]. A weakness of Generation Y that is apparent in their narratives is their inability to write proficiently. This generation is well-versed in disruptive technology, including emailing, texting, instant messaging, blog-posting, and Facebooking [9, 10].

Many research focused on the family structure, parental work patterns and educational mode of Y generation [5, 7, 11–13]. Researches on generation Y consumer habits, purchasing power and so on [13]. Chung built the internet service marketing model according to the information environment change and information behavior characteristics of Generation Y users, and based on the model, discussed the service marketing strategies [14].

There are lots of studies on Generation Y group, most of which belong to theoretical or management classes. However, few designs have been made for the Generation Y, and installations are rarely designed to solve the problems of Generation Y group. Based on the previous researches, this thesis puts forward the design of products conforming to the style of Generation Y based on their characteristics, which helps guide the psychology and behaviors of Generation Y and promote better communication and integration into the society of Generation Y.

The goal of tangible interaction is to empower collaboration, learning, and design by using digital technology and at the same time takes advantage of human abilities to grasp and manipulate physical objects and materials [15]. From a broader perspective, human–computer interaction requires physical effort, by using body movement to control the character, scene, animation and so on. Therefore, applying the tangible interaction theory and the relevant computer technologies will be an important and effective approach for exploring how to let the Generation Y better integrates into the real world and making Generation Y reflect and integrate into the real world naturally.

3 Research Process

3.1 Pre-study

Generation Y is now in college student period and we carried out qualitative observation of students' characteristics in daily life in several places in a university for three weeks, three times a day in the early, middle and late periods, each lasting one hour. In the meantime, we conducted 60 semi-open and valid questionnaires. Specifically in the first week, we observed the learning state of the post-90s college students in the library and study rooms; in the second week, we observed the active state of the college students during recess time and on the way to class; in the third week, we observed and recorded the communication and frequency of playing mobile phone during the dinner.

After qualitative research, we have derived the basic characteristic of Generation Y, therefore we needed to design a product complying with this characteristic to meet the needs of Generation Y group. Then according to the initial installation designed, design the usage scenario and put into the practice. During this process, we modified the design according to three bases: a. according to the results of the test user feedback; b. according to analysis of the users' behavior recorded in the process of using; c. new design ideas and integration of new concept. Finally, we redesigned a product with new concept and put into practical applications. All the relevant feedback collected and new conceptions were integrated into the design of the new product and constant iterations were conducted to design products that suit Generation Y group.

The above observation and analysis led us to the conclusion that the post-90s college students of Generation Y group have a distinguished characteristic, which is, spending a lot of idle time on their cell phones, mainly the communication on the network. Whether it is in the class break or on the way to and after class or after dinner, they will habitually bow their heads to play the cell phone, which promoted the generation of a current popular vocabulary – "phubbing". And in our observation, in public occasions, people will have the demand of integrating into the groups, and show some restraint of their own personalities. This has resulted in a very contradictory psychology of the Generation Y group, being reintegrated into public life but reluctant be assimilated, wanting to express their own characteristics but fear of being regarded as outliers. This gave us the idea of designing a "chameleon prototype" motive power that can reflect the characteristics of the Generation Y group.

3.2 Prototype Building

We used the user-centered interactive design method to design and complete the initial installation. Guided by observational data and conclusions reached, to design a space that allows the Generation Y to experience the public environment and enter into a self-review state. In this installation they can relax themselves and express individuality. It took us two weeks to make a preliminary physical installation, test our installation again and again, and to invite users to use it and redesign it based on the advice given. Then, after a week of modification, our installation was gradually refined and placed at our Student Activity Center (where many students organize activities, so there were many experiencers who meet the criteria). After the deployment, we invited students to experience our installation, and then interviewed them with their experiences and got as much valuable advice and user surveys as possible. Every day we would carry out observations when more students are gathered here, interview them and obtain survey data.

4 The Design Principle of Chameleon Installation

Based on our literature review and design study, we determined the following design principles for installation of "Chameleon Cube".

4.1 Create Two Different Scenes

One of the two scenes is to cater to the public scene faced by Generation Y. In this scene, students will feel that they are being watched and their own behaviors will be restrained accordingly, the virtual group interacts with the person who is experiencing, and if it violates the principles of the public, the experiencer will be excluded and cannot continue to integrate into this scene. This will result in two kinds of results, one is that the experience fits in well and the other is that the experience is ostracized. The other scene is a private space where the experiencer can express his or her own emotions without worrying about the surroundings; meanwhile the experiencer can share his or her feelings or leave the true self.

4.2 Observe Without Disturbing the Experience

In the private space, we will record the real reflection of those who experience without disturbing them, and protect the privacy of the experiencers.

To evaluate how well our method can classify the art style between the Chinese and the foreign painting. Table 1 lists experiment results when using different methods.

Table 1. Key summary from the observed

Outside the "cube"		Inside the "cube"	Proportion agreeing to share the video
Status:	Status 1. Curious and excited to go inside to experience	Experience the contents of all sides inside excitedly	90%
		Experience calmly	69%
	Status 2. Invited and wait calmly	Experience excitedly and reluctant to get out of the experience area	65%
		Still relatively calm, see what themselves are like outside the "cube" and look pensive	23%

4.3 Close to the Real Environment

This installation is completely constructed in the real scene, which will not give the experiencer a sense of deliberateness or violation and can well guide the experiencers to integrate into the scenes set in our installation.

4.4 Focus on Sharing

According to Generation Y's characteristic of being willing to share, we especially provided the sharing function for the experiencers, so that they can pass the feelings they experienced here or the most true and lovely side to other experiencers, which will also encourage the following experiencers to use the installation.

4.5 Simple Interaction

For experiencers to integrate into the installation rapidly, we need to set the humanized interactive mode. Complex interaction demands a certain period of time of learning for the experiencers, which is not conducive to experience, so our interaction will be presented through the finger touch and other forms consistent with the interactive mode in mobile terminals. In the case of improper user interactions, the installation will automatically remind the experiencer, which can also promote a good experience process for experiencers.

5 Core of the Chameleon Prototype Installation

The installation of "Chameleon Cube" is a 60 × 60 × 60 cube installation, and the eight surfaces inside and outside the cube are made of mirror materials with very good mirror effect (Fig. 1). Inside the cube 4 iPads are embedded, being separately placed in the adjacent four internal mirror surfaces. These 4 iPads are set for different purposes. We will first mark the 4 iPads to divide them into A, B, C and D.

Fig. 1. Installation of "Chameleon Cube"

The function of A side is to shoot the emotions expressed by the experiencers in the cube. The cube can only hold one person, so the experiencer doesn't have to care what others think. The function of B side is to play the behavior images of the experience outside the cube. The C side will play the videos others agree to share and the personalities expressed by others in the cube. The function of D side is to play the video outside the cube of the corresponding experiencer being played in C side. The experiencer may watch but cannot do anything to the videos.

The four iPads are connected to the background server through WiFi and the video collection is to upload the recorded videos to the server after consent of sharing is obtained. The videos uploaded will be numbered and imported to the sharing library; meanwhile the experiencer can see the facial expressions showed by himself/herself.

Inside the cube installation are all four sides of the iPad, and the functions are different. We placed a tablet with touch screen inside the cube on which the experiencers can leave messages or write down suggestions for our installation. These messages or suggestions can be uploaded to our server and we will use them to improve our installation.

6 Technical Description of the Chameleon Installation

1. Set up the LAN. Equipment are switches, laptop, network cable and iPad. The architecture of LAN is as follows (Fig. 2):

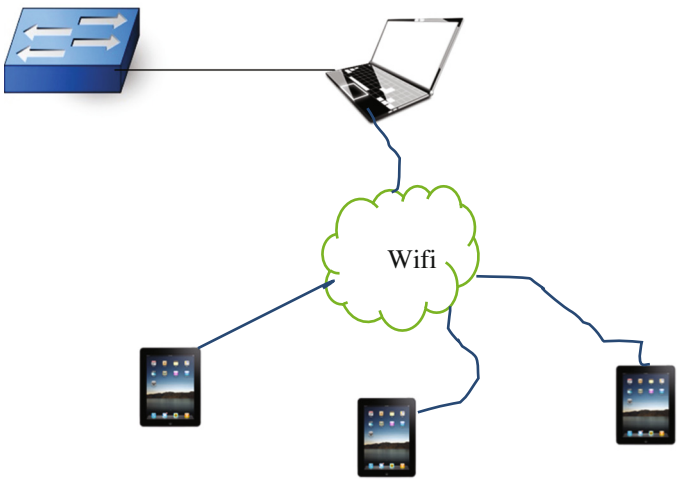

Fig. 2. The architecture of LAN

2. Wed server. Apache HTTP Server is an open source Web server project provided by Apache Software Foundation. It has several features of strong scalability, open source code and cross-platform. This system is to build a web server in the laptop, and the iPad can access to the video resources in the laptop through the wifi of the laptop.
3. Video and upload. The easiest way to take pictures and record videos in iOS is to use the UIImagePickerController. UIImagePickerController inherits from UINavigationController, which can be used to take pictures and record videos. Basic steps for recording a video: Steps to use UIImagePickerController to take pictures or record videos can usually be divided into the following:

(1) Create the UIImagePickerController object;
(2) Specify the pickup source. Normally we use the pickup source of the photo gallery or photo album when choosing pictures, this time we need to specify it as the camera type;
(3) Specify the camera, front camera or rear camera;
(4) Set the mediaType, which must be set if it is video. If it is photographing, this step can be omitted for mediaType default contains kUTTypeImage (note that the media type definition is in MobileCoreServices.framework);
(5) Specify the capture mode, taking pictures or recording videos. (For video recording, first set the media type and then set the capture mode);
(6) Display UIImagePickerController (usually opened as modal window);
(7) After taking pictures and recording videos, display/save photos or videos in proxy approach.

From the above, we can get the recorded videos, and then we will upload the recorded video to the server:

(1) Save the recorded video in the specified folder;
(2) First is the asynchronous export of block data. So after the completion of asynchronous operation, the results of asynchronous operation cannot be obtained immediately. Wait until the completion of block before continuing to obtain the results.
(3) VIDEO_EXPORTING_URL uses fileURL with no need of creating a file in advance. Session can directly create a file and write. If there is already a pointed file of fileURL, there can be problem of not being able to store.
(4) Loop playback

As a result of the use of web server, the realization of online broadcast function is achieved through the web. The specific method is to call the video price-control of html, and then use js to achieve the loop playback of video resources.

7 Discussion of Experience Results

The installation was hung below the ceiling center in one of exhibition rooms. Many visitors observed or experienced outside the installation, while one person is allowed to experience inside the installation. Our designed experience lasted for three days. At first, most students seemed not to notice this installation, and most were still "phubbing" or expressionless, walking without communication. About 2/3 of the students who noticed the cube would be curious and approach the "cube" to watch. Some of them didn't stay long and left immediately; some would stand outside one of the mirrors to observe themselves and the environment reflected (Fig. 3).

The students we invited to enter the "cube" were those who stood outside the cube for relatively a long time and who did not notice the cube or did not stay long after noticing it. In the second and third day, some interested students find us and expressed the wishes to experience the cube. Those who entered the "cube" are the respondents of the experiment and questionnaire. Due to limited objective circumstances, the

Fig. 3. The experience scene

experiencing time inside the cube is no more than 2 min. Iteration was used to improve the content of the questionaire. This process was shown as follow. Firstly, questionaire survey was conducted to get feedback. Secondly, the content of the questionaire was improved according to feedback. This cyclic process was ongoing till the test made every survey question clear in questionaire, which promoted the accuracy of the questionaire result. In actual, seven times cyclic iteration was implementated to reach the satisfying suevey questions. Later, 60 questionaires was selected randomly as the sample and divided into two groups on average as status 1 and status 2.

Table 2. The mean values of the valence and arousal levels

	Status 1		Status 2		ANOVA F-values	
	Outside the "cube"	Inside the "cube"	Outside the "cube"	Inside the "cube"	Status	Outside vs. Inside
Valence	5.6 ± 0.9	8.1 ± 1.1	4.6 ± 1.3	7.1 ± 1.3	6.5	11.8*
Arousal	5.0 ± 0.8	8.9 ± 0.8	4.9 ± 1.1	6.8 ± 1.5	9.9	7.9**

The values are the F values for all subjects
*p < 0.05; **p < 0.01; ***p < 0.001.

At the conclusion of data collection for each of the tasks the subject was asked to provide a subjective rating for his or her responses to the experimental "cube" using 10-point rating scales. The scales were used to designate the levels of valence (1 = very unpleasant, and 10 = very pleasant) and arousal (1 = lowest arousal, and 10 = highest arousal).

The mean values of the valence and arousal levels of all conditions for all subjects are reported in Table 2. ANOVA revealed a significant task effect for the mean value of valence and arousal level, indicating a higher emotion-induced arousal level during inside "cube" than that outside "cube". Table 2 showed the within-the-group sample comparison of the status 1 and the status 2 respectively, and then the sample comparison between the groups.

8 Conclusion

In this thesis, we show an exploratory design serving the Generation Y. Our results show that the design principle of our chameleon installation is appropriate. It promotes the Generation Y group to better express themselves and self-reflection, so as to better integrate into the real world and take the initiative to share with friends around their true side, which is of great help to us to study Generation Y. At the same time, this work provides a framework of ideas and methods for us to determine design principles for specific groups of people.

In future studies, we plan to add more interactions and functions to the chameleon installation for broader experience effects and explore the use of advanced sensor technology in our chameleon installations while conducting more detailed data recording and analysis. The experience summary and design process and methods described here can provide a valuable reference and innovative exploratory spirit for designing products that are more suitable for the Generation Y.

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Appendix

See Fig. 4

Questionnaire Feedback

This questionnaire is only for understanding of the level of post-experiential questionnaires. This questionnaire survey is absolutely anonymous, definitely it will not have any negative influence on your life and study. Thanks for your participation, thank you!

1. What do you think of the quantity of the survey questions in this questionnaire? ( )
A. Moderate B. Overmuch C. Too little

2. Do you understand every survey question in the questionnaire clearly? ( ) Which survey question you can't understand, list them please_____
A. Yes B. No

3. Are you interested in the content of the survey question in this questionnaire?
A. Totally interested B. Partially interested
C. Partially not interested D. Totally not interested

4 You degree of satisfaction to this questionnaire is (10 marks in total):_____

5 What is your suggestion about this questionnaire?
_____

Fig. 4. Questionnaire feedback form

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