WEARABLE INSTALLATION DESIGN: GUIDE WOMEN TO REALIZE INNER POWER VIA PHYSICAL COMPUTING

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ABSTRACT

This paper shows how people's psychological emotions can be positively influenced through exploring a series of interactions via digitalization and physical computing. Under the context of "female interaction", I analysed women social situation and based on Amy Cuddy's theory "Body shapes the mind", a series of wearable interactive installations were designed for women's, aiming that they can realize that the little positive body changes are meaningful to inner power. After the project, it's still worth thinking, that the relationship between human and digital world and how to make use of physical computing in empowering not only women.

INTRODUCTION

Nowadays, people have an unprecedentedly close relationship with the digital world, where a single comment or word can affect our emotions and psychology world. However, as a designer I was able to build a positive conversation between digital and physical world by helping people to be positive and think positive about themselves.

Under the context of "female interaction", I started to explore the women's features and women's social situations. Many studies show that women tend to rate themselves as more emotionally expressive and more self-deprecating thoughts than men report themselves to be (e.g., Simon & Nath, 2004); which is contributed to some sociocultural factors, such as gender roles, power and status difference between men and women. Also, It's a consequence of a social stereotype effect (Brody, L.R., & Hall, J. A. 2010). Now, Female are still inevitably suffering more stress and stereotype than male in the society. Then, I did some research about the women social environment and the prejudice and stereotypical comments against female on the Internet:

"No one will marry girls who wear jeans"---Satyapal Singh, Union Minister and former police commissioner of Mumbai

"Female scientist cause trouble for men in labs"—Sir Tim Hunt, Nobel Prise Scientist

"Women are not fundamentally suited for politics"—Yoichi Masuzoe, Governor of Tokyo

"Chinese women's depravity has led to the nation's depravity."—Minhong Yu, the founder of the New Oriental Group

"Virginity is the greatest gift you can give someone." —Tony Abbott, Prime Minister of Australia

It suggests that no matter which country they come from, women still suffer from prejudice and stereotype from the society, regardless of the development of society and technology.

So, my goal is how to make use of digital tools such as, physical computing to design a product or a system, or an interaction, which can encourage female to stay positive and feel powerful.

LITERATURE AND THEORY

BODY SHAPES THE MIND

"The nature of the poses influenced how powerful or powerless people felt, body shapes the mind." Amy Cuddy, an American social psychologist, wrote in her book "Presence" (Amy Cuddy, 2015). After lot of researches and experiments her group made, it shows that, with a power pose, for example, a deep breath, upright seated posture, opening the arms and etc, testoterone(the assertiveness hormone)will rise, whose profile is associated with high assertiveness and low anxiety. Moreover, posture doesn't only shape the way people feel, it also shapes how people think about themselves. Erik Peper, a professor of holistic health at San Francisco State University, found that, it is much easier for people to retrieve positive memories about themselves and making them feel optmistic about themselves, when in positive postures. In conclusion, Human's mind and emotions will have impact on the body and the way people deal with things. Similarly, the body also shapes the mind, which inspire me to design for women.

PHYSICAL COMPUTING

Physical computing: "building interactive physical systems by use of software and hardware that can sense and response the analog world, in the broad sense, physical computing is a creatice framework for understanding hunan beings'relationship to the digital world(Dan O'Sullivan and Tom Igoe, 2004)." However, it was usually misunderstandingly considered as Arduino and different sensors and a simple DIY game tool. Indeed, it can be used to create many creative and interesting projects which can interact with people, but more importantly is to be aware of its deep meaning, and empower ourselves through it. "to make sure that I use technology not for its own sake, but always so it empowers people.(Tom Igoe, 2011)" Physical computing can bridge the analog and digital world but we can decide how to build the bridge.

Based on those researches, I planned to use visual or acoustic way via physical computing to let female realize that a little positive change of body languages could bring about a huge psychological transformation, during the interaction between women and the wearable installations. In this case, female are more likely to gain a positive mind.

CONCEPT AND PROTOTYPE

After all the researches and previous preparation, the concept is becoming more clearly to combine the power pose and physical computing and enabling women to realize the inner power. During the interaction with the wearable installation, female are supposed to realize that the little positive body changes are meaningful to the inner power. First of all, we concentrated on three inner transformations, from escaping to facing it, from anxiety to calming down and from pessimist to optimist. According to Amy Cuddy, and her research team, the high-power poses are both expansive and open, low-power poses on the contrary are constricted and clenched(Carney, D; Amy Cuddy; 2010). In order to find out which power pose can really bring out some powerful feelings, I need to consider the way women wear the installation, and the way women interact with the physical computing system. During the experiment, I found that, when they covered the eyes, they tend to feel afraid and unsafe. And when they lowered the head or held the breath, it's more likely to feel nervous and upset. Therefore, according to these different transformations, I tested different power poses and chose the most suitable power pose to corresponding transformation. The final three positive poses and actions are: from covering the eyes to facing, taking a deep breath, and straighten the back. Since the form of a product or an installation will influence how users subconsciously interact with it, it is important to make prototypes of installation and analyse the interaction process. I made some very simple prototypes with paper and metal wire, then let users wear it and observed the way they interacted with it.

Figure 1: Prototypes

TECHNICAL PROCESS

FROM ESCAPING TO FACE IT

The "face it!" is a head wearing installation. (2) The front is an iron wire structure with a plane and touch board behind is fixed in a band. The technical principle is that, the touch board-based system is equivalently a capacitive sensor trigger. The front plane, which is painted by conductive ink, is connected to the electrodes of touch board with an alligator clip. Since our body can also act as a 100pF capacitor, as long as users try to cover the eyes by touching the plane, the Soundtrack wrote in the program will be triggered which is edited with Logic Pro. The soundtracks record the prejudice and unrespect comments against female, which are found on the Internet. When the user doesn't cover the

eyes or putting hands down, the “Sound” will stop. The touch board with a speaker is fixed on the band behind.

Main hardware list:

-Bare conductive touch board

- Conductive Ink

- Alligator

- Speaker and Micro USB

TAKE A DEEP BREATH

When creating the part’s Arduino system, (3) I wanted to visualize the inner heart changes during taking a deep breath. Breathing can be detected by a Sparkfun humidity and temperature Sensor Si7021. After testing in indoor environment (humidity and temperature), the two thresholds were confirmed. When user takes a deep breath, the value showed in Serial Monitor will above the threshold, which will trigger the heating pad on. With the heating of heating pad, thermochromic ink written letters PESS, which cover the OPTI, will gradually fade away. Then show the OPTI, which was printed with normal ink. The letters on the installation will from PESSIMIST to OPTIMIST because of a deep breath.

Main hardware list:

-Humidity and Temperature Sensor Si7021

-LED and Diodes Transistor

-Heating Pad

-Thermochromic Ink

-Arduino UNO

STRAIGHTEN YOUR BACK

“Straighten your back” is an installation which can be worn on shoulder(4). This part’s technical principle is similar to the first part, which basically using a capacitive sensor. There are two metal pendants, which hang behind, are connected to the Arduino circuit. The front part is a plane with “negative pattern” supported by two servo motors. When the two pendants are touched, the servo motors are triggered and will rotate 180 degrees, then back. As a result, the plane with “negative pattern” will move down and when the two pendants can’t be touched, it will move back. I used a gear structure to transfer angular displacement of servo motors to linear displacement of plane. So, if user touches the pendants behind, the negative pattern will move down and become blurred (because of the translucent material above), during the process, female involuntary straight the back.

Main hardware list:

-Servo Motor

-Arduino UNO with capacitive sensor library

Figure 2: “face it”

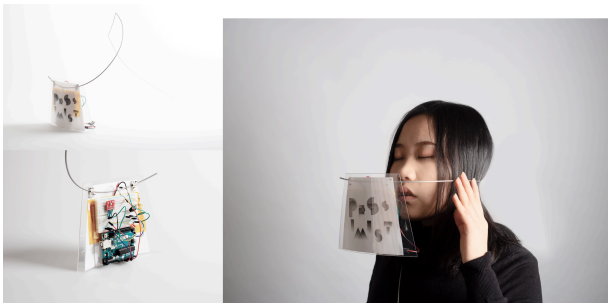

Figure 3: “take a deep breath”

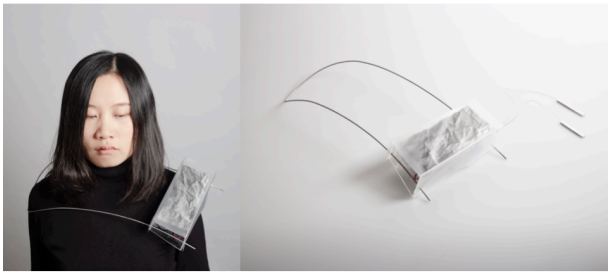

Figure 4: “straighten your back”

RESULTS AND DISCUSSION

After finishing the three wearable interactive installations, I interviewed the female users after they experienced these three installations. Most of the experiencers indicated that they did have a feeling of relax and somehow little changes in mind. This series of interactive wearable installation designs are the first to try to explore how can people interact with digital tools and a series of interactive conversation to empower themselves. Under the context of “female interaction”, it shows numerous possibilities for designer to make a change and empower the human, society etc. with the help of interaction with digital world, AI, future and even people themselves. Behind this project, it is worth thinking about those questions future: how to live with digital? How can people be positive effected when interactive with digital world? People’s emotions are easily affected in computer-mediated communication. On the other hand, people can also be empowered in computer-mediated interaction (Derks, Daantje; Fischer, Agneta H.; Bos, Arjan E.R., 2008).

CONCLUSION

How to build a series interaction between physical and digital world, realising an interesting conversation between human and computer, and empower people’s inner heart, still need deep discussion. In the digital

world, we deeply immerse in the information and enjoy convenience of high technology, such as AI, automation, intelligence, virtualization, at the same time, people's mind are also imperceptibly shaped by them. Can we design the shape process? I hope that, my exploration of "female interaction" can give an insight for people on how to via physical computing guide women to try power poses and gain powerful and positive feelings. And how to use digital tools empower people's inner heart.

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