Beyond Design Thinking: Exploring Design Modes for Children's Medical Care Service and Experience

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Abstract. Since 2014, College of Design and Innovation, Tongji University and Shanghai Children's Medical Center established a design-driven collaboration to improve children's medical care service and experience. By introducing and analysing this seven-year exploration, We found that following the traditional problem-solving was not a good solution to the communication problem between children patients and doctors. So we established a new design model of an IP-based communication system for children patients, the parents and the doctors, with sense-making at its core. With the design practice and reflection, this paper attempts to understand and reframe the design modes in the context of designing for children's medical care service and experience, providing space for further discussion and practice.

Keywords: Industrial Design · Children's Hospital · Design Thinking · Media Franchise

1 Introduction

As one of the best hospitals in Shanghai dedicated to children's medical care, Shanghai Children's Medical Center (SCMC) was the first to propose the goal of establishing a 'children's hospital without crying', with the purpose of improving children's healthcare, especially their experience at the hospital (Fig. 1).

The design thinking method recognizes that no one discipline can systematically solve complex health issues alone. Hospitals need to implement a patient-centered design model while also paying more attention to communication during the caregiver and patient meetings [11]. Health systems involve engaging target populations within their daily lives where and how they live, learn, work and play. In addition to providing medical care, hospitals also need to consider exploring patients' reasons for visiting the physician, understand medical issues and emotional needs, increase prevention and health initiatives, and enhance the relationship between patients and providers [12].

Social media is a routine activity; using social media websites is among today's children's most common activities [4]. The emergence of social media has brought a more diverse experience from the value of visual, aural, oral communication and

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Fig. 1. "No-cry" Hospital Exhibition Received High Compliment and Welcome by the Doctors.

performance, experimentation, and play. There were only verbal and textual channels. There are now various channels such as graphics, audio, and games [1]. However, the diversification of information channels has not taken better care of children's experience of medical care.

Driven by great passion of designing for the real world, College of Design and Innovation (D&I), Tongji University, reached out to SCMC in 2014 and established collaboration regarding this plan, as part of D&I's attempts to tackle DesignX problems [7]. The senior students of BA Industrial Design program spent remarkable time and efforts researching in the hospital, trying to understand the cause for the 'crying' and thus identify what could be done to solve the problems. They treated this project with great seriousness as the topic for their graduation design.

In 2018, the outcome exhibition consisting of 14 works from the five-year collaboration turned out to be a great success and occupied the attention of the medical care field and the media, not only because this was the first design exhibition held in a Grade 3, Class A hospital in China, but also because the design works received high compliment. Impressed by the design outcome, the hospital would want to see this collaboration going forward and welcome more involvement of design in the improvement of children's medical care service and experience.

2 Reflection

2.1 Achievements and Obstacles

D&I team believes the collaboration was successful in that the hospital was impressed by the designs and believed design could in fact bring improvement and impact to the field of children's medical care. One of the works, an optimized version of atomizer for children, designed like an elephant which could greatly ease the fear and discomfort of children patients, was awarded as 'Excellent Graduation Work' among all the design students who graduated that year in Shanghai.

However, it was somewhat disappointing that D&I team take hand drawing, modeling, detailing and rendering to design work to be implemented in the daily treatment of the hospital. Without further investment or involvement of a company, it is very difficult for these designs to become products which could be easily accessed and put into

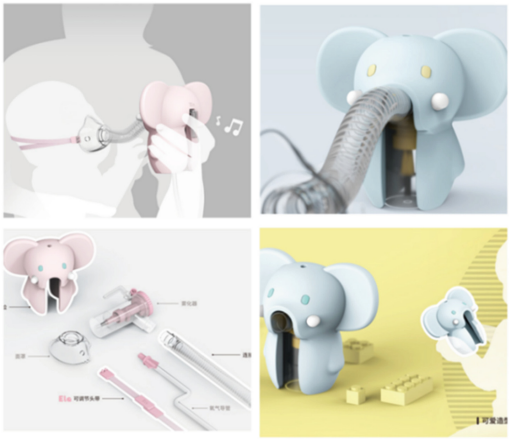

Fig. 2. Outstanding Design Work Received Award.

implementation in the hospital. And the collaboration did not lead to direct and visible improvement of the hospital as expected (Fig. 2).

2.2 The Mode of Design Applied

In the early days of industrial design, the work was primarily focused upon physical products. Today, however, designers work on organizational structure and social problems, on interaction, service, and experience design. Many problems involve complex social and political issues [8].

While further efforts are made to push forward the implementation of the design works for the hospital,The D&I team also began to think about why the design skills acquired in college, such as creativity, sketching and visual sophistication, were not being applied well in design practice.

The reflection starts from reviewing the mode of design applied in the collaboration, the design expertise we have acquired in the past is usually gained in universities. However, a new knowledge include a big-picture perspective; knowledge of other related disciplines such as marketing, production and distribution; and the ability to facilitate work across organizational silos. These tend to be developed by some more senior designers on the job [9].

In particular, the D&I team found in their field research: The team visited the entire hospital including waiting rooms, injection rooms, surgery rooms and wards, and students tended to focus only on existing hospital conditions and system deficiencies to view the "unsatisfied need" of parents and children patients, so that they can develop items which can ease the children's anxiety and release patients' pressure psychologically or physically.

On the other hand, during these projects, the hospital is to a certain extent treated as a system of parts, and the students seemed to believe that if these individual parts could be improved, it's more possible to elevate the patients' experience. Therefore, they usually started the design process by looking for problems of the parts and delivered the

outcome as resolutions of the problematic situation. The mode of design applied here is problem-solving.

2.3 Analysis of Problem-Solving Design Mode

The authors believe the problem-solving approach needs to be better understood before exploring alternative design modes. First devised by the management consultants, this model of an individual's, team's or company's know-how was adapted to design and popularized by IDEO in the noughties.

Design thinking is so widely used and even taken as the default approach among the industrial design students. One possible explanation of this is the influence of the wide-spreading Design Thinking promotion to larger audience by powerful design promoters [2].

It has not only been widely discussed in different communities, and has also casted influence among design schools. Design Thinking provides to the public a workable set of design procedure, according to which design begins with 'empathy' and then 'define' the problem, and develops to the stage of 'prototype' and finally 'test'. In such design thinking framework, design more or less has become a way of resolution [11].

It somehow makes design students believe these are the inevitable steps to accomplish a design. To a large extent, this is the procedure that all the works from the 2018 exhibition went through to debut in the real world.

With this approach, the designers would focus on the problems of particular situations or individual tasks at the hospital, hoping to improve the experience by solving the problems of these situations.

Identifying such design modes provides clues and reference to further explore other possibilities of design modes to tackle DesignX challenges in improving children's medical care service and experience.

3 Exploration of Alternative Design Modes

With the analyzed mode of design applied in those previous projects, which is problem-solving, how could we explore and understand other potential design modes? According to Richard Buchanan [10], there are four clusters of system based on the Mode of Thoughts, which are Construction, Resolution, Discrimination and Assimilation. When designers try to identify design space within particular situations, the approach they took up is more likely to be considered as the mode of Construction and Resolution.

With such understanding, the D&I team starts to realize that besides starting with a particular problematic approach, there may also be other options of design modes, which would be starting with a universal dialectical approach. In the Modes of Design, there are also Discrimination and Assimilation. The method of these modes is operational and dialectical, which are more from the perspective of concepts rather than situations. In other words, those approaches stand for sense-making of concepts rather than problem-solving of situations.

This is inspiring for the D&I team to further the design practice at the hospital. The issue of design for children's hospital was revisited from the perspective of sense-making. It is noticed that at the hospital communication is a key element to make the

system work, and communication at the children's hospital is more complex than that of other hospitals because it usually involves three parties, the patients, the doctors, and also the parents, who plays the role of information translator between the patients and the doctors. Confusion and misunderstanding are quite common in a communication with translators, and in the case of children's treatment, these will cause the children patients' fear and anxiety. Upon further study and field research, the D&I team decides to develop a communication system, with the center as the children patients since they the key "user" to comprehend the concept of well-being. All the treatment and communication about it is carried out with the center as the children patients [14]. And because of the uniqueness of children cognition, an effective communication system should be established with the design mode of sense-making, to enable the sense-making in the hospital system. In the next chapter, we will introduce our detailed practice and explain how we use IP-based characters to help children establish a positive perception of health care.

4 IP-Based Communication System

4.1 The Existing Communication at the Hospital and Its Consequences

It is discovered that at the hospital, the children patients, who are the problem-owner, are usually ignored in the communication [3]. On one hand, the doctors usually deliver information directly to the parents without much attention to the children's emotions and demands because they believe the adults are more capable of understanding the medical information, and this is more effective for the treatment. On the other hand, the parents assume their children are not capable or willing to follow the doctors' instructions so they tend to force the children to obey the doctors' words or receive medical treatment [6]. These will lead to the children's resistance to hospital since they are not treated with care and respect, and this will imprint the children with a negative image of the hospital.

This was also proved by the field research at the hospital. When researching at SCMC, we noticed that children's fear and anxiety at the hospital is not caused by physical pain, but more often is caused by limited understanding of the intimating surroundings, especially during injections and inhaled pharmaceutical aerosols treatment.

As mentioned by a nurse: "Actually, the injection process is finished instantaneously and children will not feel any pain. The problem is that children are not willing to put out their hands before the injection. The same is true for the inhaled pharmaceutical aerosols treatment. Children will not feel any pain, but they need to wear a mask. In many cases, the masks are frightening and make children uncomfortable. As a result, children are naturally resistant to the treatment." Therefore, a better and positive understanding of the treatment and the hospital will help to ease the children's psychological difficulties.

From the discussion above, it can be seen that the children's capability of comprehending the medical information or surrounding is the crucial point in the communication system at the hospital. Therefore, out study and design is carried out based on the cogitative uniqueness of the children.

4.2 IP-Based Communication System and Its Potentials

To develop a communication system which helps the children to have better understanding of the medical procedure and a positive sense of the medical care, we need to understand the ways children sees the world.

According to research in the field of children cognition, storytelling is one of the most effective ways for the children to understand the world, especially in communicating obscure medical terms and basic knowledge, which are usually far beyond the cognitive capability of children [13].

How could we make to big story to include all the medical information? The D&I team decides to develop a design which enables the story-telling, not only at the hospital, but also at home. A story usually includes a plot, major characters, and an ending. (Walter, S et al., 2015) Usually, the characters are the starting point of the story, and other elements of the story are brought by them or carried out around them. Without characters, there will be no story, and no "sense". So we believe designing characters will be the basis for story-telling of medical care (Fig. 3).

Therefore, the D&I team designs the character of IP, and further builds IP into an ecosystem (Fig. 4). The ecosystem is mainly divided into two parts, online and offline, and children can get access to the system through online and offline. The online part is mainly presented in the form of website, and the offline part operates based on the platform of hospital. In general, the ecosystem can provide good service through IP, whether it is an online way or an offline way.

The D&I team created 5 IP (Intellectual Property) characters based on human organs, namely the teeth, the brain, the heart, the lungs, and the stomach (Fig. 5). We also produce animation and picture books based on these IP characters to enforce children's impression about them. It creates a larger environment with IP characters and effectively integrates them into children's lives and further expands the influence of them on children [5]. At the same time, we create a communication space of IP characters within the physical environment of the hospital, including signs with IP attributes, large interactive devices, and other designs (Fig. 6).

Fig. 3. Workshops with SCMC Team to Create IP Characters.

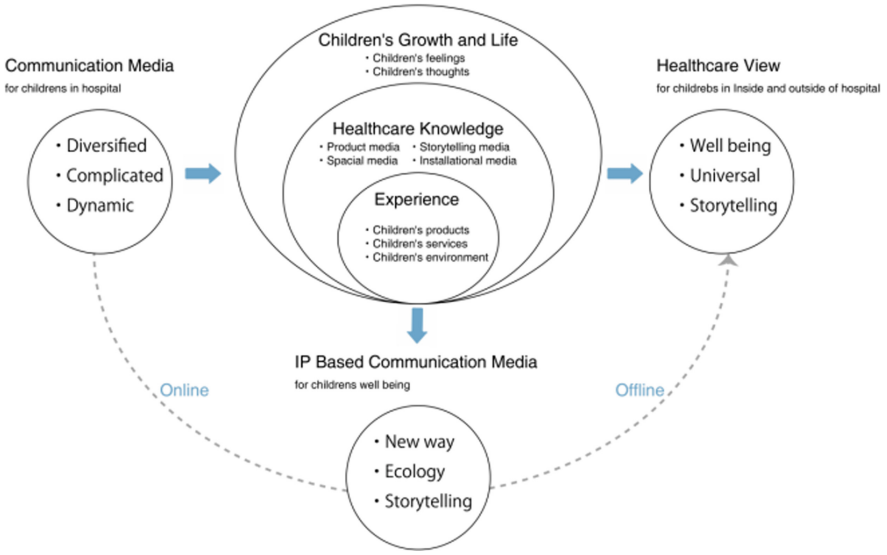

Fig. 4. IP is ecology (System Diagram)

Fig. 5. Organ as IP Design Prototype

These IP characters have different personalities and stories about them could be developed as an effective media to communicate with the children. This does not only provide a set of tools that enable the parents and the doctors to communicate with the children about medical knowledge, but also help to enlarge the shared context among the children, the parents, and the doctors, so that better understanding could be achieved during the treatment process. These IP characters could also be easily used at home for the

Fig. 6. Designs in the IP-based communication system.

parents to communicate with the children patients, as an extension of the communication at the hospital, facilitating the treatment or medication at home.

From the perspective of children, IP characters are no longer virtual but also friends in their life. Bringing IP characters into reality makes it easier for children to accept medical facilities and hospital, and reduce their fear during the medical process, and finally have better medical experience.

5 Conclusions

We found that the use of IP to build virtual characters is easier for children to accept and is beneficial to the healthy growth of children. IP steps into the real world and resonates with children, which makes it easier for children to accept medical devices and hospitals by story-telling, and reconstructs the relationship between children patients and doctors;As a medium, IP creates a space for communication in the process of children's medical treatment, which can convey medical and health knowledge through different ways;IP is an ecology and a design mode. Further, IP can cross the media to narrate and spread through multiple channels, which strengthens children's cognition of the real world, and is characterized by the narrative and story-telling.

This paper reports on the series of practice by College of Design and Innovation, Tongji University, during the design-driven collaboration with Shanghai Children's Medical Center for improving children's medical care service and experience. The design mode applied during this process is reflected, discussed and elaborated, providing a framework for repositioning it. While problem-solving still plays important role in the ongoing collaboration between D&I and SCMC, the potential role and impact of an alternative design mode, sense-making, has been noticed and will be further explored.

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