

Design of Paper Lunch Box Recycling Process for Civil Aviation aircraft

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Abstract. At present, service system design is a big trend in product design, which is because service system design is not only committed to improving the design of product functionality, but also applies the methods of "user-centered", "system design" and "user participatory design" to the entire product service system. The user, use process, recycling and other methods related to the product are designed in more detail, and the psychological needs of the service provider and the service recipient are also taken into account to enhance the user's participation and interaction with the product. Therefore, this paper applies the design concept of service system design to the design of paper lunch box recycling process of civil aviation aircraft, focusing on the analysis of the design of paper lunch box recycling process in the catering service system and the design of the user's demand level. First, the paper lunch box recycling process is observed and investigated, and then the investigation results are analyzed. According to the analysis results, the service "pain points" in the paper lunch box recycling process are mainly based on: Whether the paper lunch box itself has complete functions, whether the paper lunch box recycling is valuable, whether the paper lunch box recycling operation process is reasonable, whether the paper lunch box recycling process meets the needs of service providers and service recipients, etc., to find out the service "pain points" in the whole process, and then study the service "pain points" to find out the solution to the service "pain points". Finally, a set of products and services suitable for the recycling process of paper lunch boxes for civil aviation aircraft is designed. At the same time, based on the hierarchy of human needs proposed by Masno, the basic needs of users in product design and service system design are met, and the intermediate and advanced needs are sought to be reached.

Keywords: Service System Design; Civil Aircraft Paper Lunch Box; Paper Lunch Box Recycling Process; Product Design Needs Hierarchy; Hierarchy of Service System Design Requirements.

1. Introduction

The reason why service system design has been widely concerned in the current design field is that most of the traditional product design can only meet people's needs for product functions, but can not meet people's needs at a higher level. The level of human needs proposed by sociologist Maslow is divided into: Physiological needs, safety needs, social needs, respect needs and self-actualization needs are shown in Figure 1. Based on Maslow's hierarchy of needs, Steven Bradley proposed a set of hierarchy of needs for product design in 2010 in the field of product design, as shown in Figure 2. This hierarchy of requirements is used to design new products and evaluate existing ones. The five levels of this theory are functionality, reliability, usability, proficiency, and creativity. There are also five levels of needs in service design, which are: Sensory needs, interaction needs, emotional needs, social needs and self-needs, as shown in Figure 3. When designing products and services in the recycling process of paper lunch boxes for civil aircraft, this paper takes the demand level of product design and the demand level of service design as the theoretical basis to measure the rationality, practicality and value of the whole process.

With the rapid development of science and technology, services and products have begun to show a win-win trend. For example, mobile phones have become an indispensable product for people's life, work and travel, which is the most representative product that services and products complement each

other. When people buy mobile phones, they can not only realize text communication, voice and video call functions, but also realize text communication, voice and video call functions. In addition, it can realize shopping, entertainment, office and other services, and even replace wallet, camera, notepad and other products, realizing the perfect combination of services and products in a real sense. Nowadays, people buy mobile phones more on the premise of meeting the basic functions, and then measure the services brought by mobile phones, and finally buy mobile phones. And will not blindly buy because of product function, shape, brand and other factors, therefore, product service system design has been an inevitable trend, the service system design into the product design in order to truly realize the value of the product.

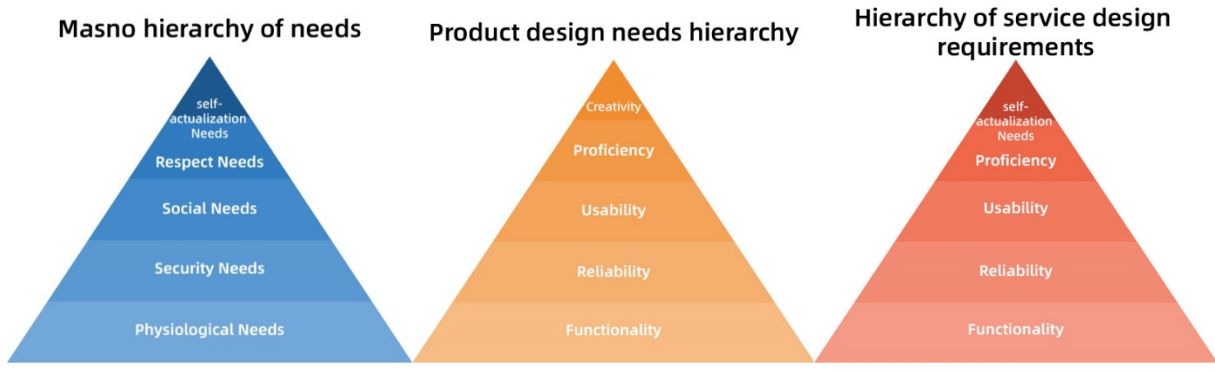


Figure 1. Masno hierarchy of needs

Figure 2. Product design needs hierarchy

Figure 3. Hierarchy of service design requirements

2. Service Design

2.1. Service Design Concept

The Board of International Research in Design defines service design as: service design sets up the service from the customer's point of view, its purpose is to ensure the service interface. From the user's point of view, including useful, usable and easy to use; From the perspective of service providers, this includes being effective, efficient and distinctive. Simply put, service design is to improve the quality of service, improve the interaction between service providers and service recipients, so the service personnel, technology, equipment, operation process and other parts of the systematic research and planning activities.

2.2. Components of the Service System

The service system is composed of four parts: "people, technology, organization, sharing information". Figure 4 shows the relationship diagram of civil aviation catering service system. This paper designs and studies the recycling operation process of paper lunch boxes in "organization" under the service system.

Civil aircraft catering service system Relationship Diagram			
Person	Technology	Tissue	Shared information
Service provider Service recipient	Product and its function	Operation process	Products and r elated information
Service provider: flight attendant	Food truck:Transporting food and other items	Receiving food Truck drinks	Dining car: shape,size, material
Service recipient: Passenger	Lunch box: contains food	Distribution food Lunch box recycling Food truck recycling	Lunch Box: Shape, size, material

Figure 4. Neural network structure

1. Paper lunch box recycling process and service pain points for civil aviation aircraft

The service process of paper lunch box recycling for civil aviation aircraft is divided into four steps, and the step contents and service pain points are as follows:

Step 1: The passenger submits the after-dinner box. At the end of the meal, passengers will give the paper lunch box and garbage to the flight attendant.

Step 2: Recycle the lunch box. Two flight attendants wheeled the passenger food truck to receive paper lunch boxes and garbage from passengers.

Step 3: Place in the dining cart. Two flight attendants put paper lunch boxes and garbage into the passenger food truck.

Step 4: Recycle the food truck. The two flight attendants will push the civil aviation food truck back to the kitchen, pour the garbage into the civil aviation garbage car, and then put the civil aviation food truck into the food truck recycling equipment, lock the buckle, after the plane arrives at the destination, the staff will successively send the civil aviation food truck through the cabin channel to the civil aviation distribution food truck.

The four steps of the paper lunch box recycling service process of civil aviation aircraft seem simple, but there are a lot of operability. There are service pain points in the interaction between people in the service process -- flight attendants and passengers, flight attendants also have service pain points in the operation of lunch boxes, dining trucks and catering waste, and there are also problems in the product design of paper lunch boxes in the service process. The paper lunch box recycling service process of civil aviation aircraft needs to be systematically analyzed and studied to get a reasonable service process.

In view of the above service pain points, the pain points of paper lunch box recycling process are summarized as follows:

1. There are defects in product design before paper lunch box recycling:

1.1 Paper lunch box enterprise identification problem

1.2 Garbage in paper lunch boxes fails to be sorted in time

2, the paper lunch box recycling process due to the paper lunch box failed to remove the garbage in the box caused by space waste

3. After paper lunch boxes are recycled, the flight attendants have a huge workload

The core pain points of the above pain points are: 1, the design defect of the paper lunch box itself; 2, the recycling problem of the internal garbage of the paper lunch box. Therefore, in the design and study of the paper lunch box recycling process of civil aviation aircraft, it is necessary to focus on the above pain points.

2. Design and research of paper lunch box recycling process for civil aviation aircraft

Through the detailed analysis and research of service pain points, the design and rectification should be carried out according to the service pain points, and the rectification should be targeted at the four components of the recycling process.

The design points of "people" are: Make the operation of flight attendants convenient and improve their work efficiency. Passengers, as service recipients, can not only experience the service of the whole food recycling process, but also participate in the food recycling process and even become service providers. A large amount of post-meal work can be assigned to each passenger in the form of "participatory and empathic". It can not only improve the efficiency of the food and beverage recycling process, but also increase the fun of the on-board ride experience. Passengers can participate

in the entire recycling process, and the tedious work focused on a small number of flight attendants can be equally shared with each passenger in an interesting and interactive way.

The design point of the "technology" is to further improve the function of the lunch box, so that it can make the operation of the flight crew easier, further improve the dining experience of passengers on the plane, but also can play a role in promoting the corporate image of the airline.

"Organization" refers to the operation process of the entire recycling system. The product involved in the whole operation process is lunch box. The design point is to optimize the recycling process of paper lunch box for civil aircraft, simplify it, and make it more humanized and efficient.

The design point of "sharing information" is to use the knowledge of lunch box packaging design to design the production process and outer packaging of the lunch box, and strive to design a lunch box product that meets the public aesthetic, convenient operation and interesting experience. In terms of material, we should pay attention to the information of aviation ancillary products, and find that it can save transportation costs, and facilitate the operation and recycling of flight attendants. Convenient passenger experience, environmentally friendly materials.

Based on the above design research, aiming at the recycling process of paper lunch boxes for civil aircraft, the following design points are obtained:

3. There are Defects in Product Design before Paper Lunch Box Recycling:

3.1. The Key Points of the Design of Paper Lunch Box Enterprise Identification Problem Are:

All major airlines have their own corporate culture identification system, but many airlines lack the sense of innovation in the design of corporate identity system, and the update of corporate identity system is not timely enough, which leads to the backwardness of the entire corporate identity system. Therefore, in the design of corporate identity system of major airlines in China, we should:

3.1.1. Design According to the Characteristics of its Own Airline

3.1.2. Design According to Culture

3.2. The Main Points of the Design of Waste Classification in Paper Lunch Boxes are as Follows

In the past, passengers usually put food and beverage waste directly into the lunch box after eating, and finally submit it to the flight attendant for recycling. During this period, the garbage inside the lunch box is: Food waste and food packaging, due to the failure to classify the internal garbage of the lunch box in a timely manner, resulting in a waste of internal space of the lunch box, and even a lot of food waste is not properly placed leading to the phenomenon that the paper lunch box cannot be closed, so that the recycling of the air crew remains unchanged, therefore, the following design can be carried out in the classification of food waste:

3.2.1. Print the Garbage Recycling Steps Inside the Lunch Box Lid to Help Passengers Establish the Correct Garbage Recycling Process

3.2.2. Design Fun Recycling Process for Children Passengers

3.3. Main Design Points of Paper Lunch Box:

Because the garbage inside the lunch box has not been recycled in time, leading to a serious waste of space inside the lunch box, when the garbage disposal problem inside the lunch box has been reasonably solved, the waste of space inside the lunch box has also been effectively improved, and at this time, there are new problems after the garbage classification inside the lunch box: There is a lot of space inside the paper lunch box, forming a new phenomenon of space waste, therefore, it is

necessary to design and study the shape and recycling of the paper lunch box itself, and its design points should be:

3.3.1. Print the Folding and Recycling Process of the Lunch Box Inside the Lunch Box Lid

The key points of the design of folding and recycling of lunch boxes should be: the process is simple and easy to understand, the operation steps are concise and interesting, and the video demonstration steps can be obtained by scanning the code on the on-board video or the lunch box to help passengers complete the recycling operation. Refer to the following figure for recycling steps:

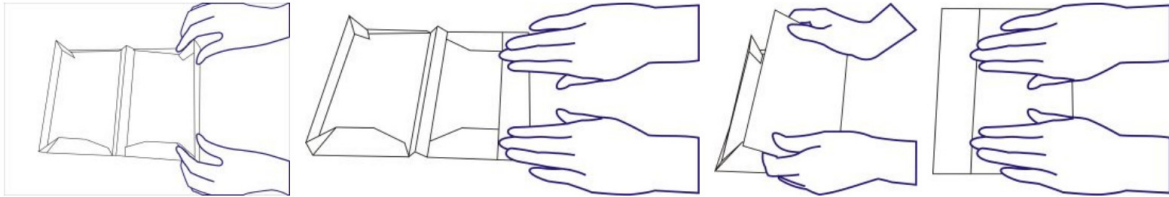


Figure 5. Recycling steps

3.3.2. Design Fun Lunch Box Folding Process for Children's Passengers

For example, folding the lunch box is designed as an interesting operation, which will increase the flight experience of children passengers, increase parent-child interaction, and exercise children's hand-brain coordination ability, and play a certain educational significance.

2. Design pain points during and after the recycling of paper lunch boxes: since passengers have classified the catering waste in the early stage and folded the paper lunch boxes, the pain points in the recycling of paper lunch boxes in the middle and later stages have been solved, which facilitates the operation of flight attendants.

4. Conclusion

This paper conducts a systematic study on the design of paper lunch box recycling process for civil aviation aircraft. Through analyzing the recycling process, it combines four components of the service system: "People, technology, organization, sharing information", according to the functions of each part, found the pain points in the entire paper lunch box recycling process, and designed and analyzed the pain points, and finally got the corresponding solution. The solution not only dispersed the heavy workload of the "people" in the service system, but also dispersed the heavy workload of the air crew. It also involves passengers in the whole process, solves the problems of lunch box recycling and garbage sorting in a fun and humane way, and takes into account the ride experience of children, adding a design scheme for children.

In this design and research scheme, Masno's level of needs, product design needs and service design needs are also taken into account at the beginning of the design. The corresponding level of needs and the corresponding needs to be solved are as follows:

Masno needs level: to meet the physiological needs, safety needs, social needs, respect needs, in which for passengers to achieve corporate culture identification needs, garbage classification after the use of lunch boxes to reach the emotional needs of high achievement, but not to meet the needs of self-realization.

Product needs hierarchy: functionality, reliability, availability, proficiency (flight attendants meet this need, passengers do not meet it), flight attendants do not meet the need for creativity, children's lunch box recycling meets this need.

Level of service design needs: to meet the sensory needs, interactive needs, emotional needs, social needs, among which garbage classification after the use of passenger lunch boxes has reached the

emotional needs of high achievement, flight attendants have not reached the demand for creativity, and children's lunch boxes recycling has reached this demand.

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