

# *Innovative Design for Upcycling Waste Materials*

--Take campus cultural and creative souvenirs design as a sample

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**Abstract:** In the contemporary era of rich material life, people are paying more and more attention to cultural and creative products in order to improve their own quality of life and meet spiritual and cultural needs. Campus cultural and creative products are no exception. This article focuses on the domestic campus cultural and creative products, combined with the green and environmentally friendly Upcycle design concept. Firstly, it analyzes the innovative design problems of waste material recycling in the campus, and the advantages of the Upcycle design concept applied to campus cultural and creative products. Secondly, it elaborates the relationship between the Upcycle design (recycling creative design) and cultural creation design, and the value evaluation of circular redesign, then the deepening method of circular redesign. With the design cases of campus cultural and creative souvenirs, it goes further explore of a creative approach to integrate circular redesign and campus cultural and creative souvenirs. Upcycle design can not only improve the quality of life, but also integrate spiritual culture into the innovative design of waste materials. More importantly, the integration of Upcycle design and campus cultural and creative souvenirs has brought active explore and practice of environmental protection and green production. It aims to enhance the public's awareness of green environmental protection, and encourage college students and other ordinary users to participate in Upcycle design.

## 1. Introduction

### 1.1 Problems in the Innovative Design of Recycling Waste Materials on Campus

At present, why is there little attention given to campus cultural and creative design for campus waste recycling materials? The reasons are as follows. The first is that many domestic colleges and universities do not pay much attention to the quality education of green design, circular redesign and other related concepts. The second is that students have a weak understanding of green design, and they are not aware that campus waste materials can also shine in cultural and creative design. The third is that there are still many problems in domestic campus cultural and creative souvenirs, such as lacking of creativity, poor quality and low cultural value, etc. Not only that, it also lacks a mature campus cultural and creative industry system, which can drive students to actively participate in the exploration and innovation of campus cultural and creative industries.

## 1.2 Definition of Upcycle Design Concept

In recent years, although the word Upcycle has gradually entered people's field of vision, it is not a new design concept. Upcycle can be disassembled into two words: Up and Cycle, which means upgrading and recycling. Many people also translate it as creation, recycling, upgrading and recycling, and waste upgrading. In contrast, the term “cycle creation” is more appropriate. In the innovative design of campus waste materials, in order to achieve the goals of recycling waste materials, protecting environment, and reducing resource waste, it's more particularly important to integrate campus cultural and creative souvenirs into the Upcycle design concept.

## 1.3 Application Advantages of Upcycle Design Concept

The application of Upcycle design concept in campus cultural and creative design refers to making campus cultural creative design of recyclable campus waste materials. This is the key point to break through the lack of campus culture and the unclear design positioning of campus cultural and creative souvenirs. The advantages shown by it are: (1) The raw materials are easy to obtain and the cost is low. A large number of wastes are generated on campus every day, such as waste clothes and fabrics, discarded express packaging, discarded shopping plastics, discarded books and papers, etc. All of those can be used as raw materials for recycling creation design to save the cost of purchasing raw materials. ‘

(2) The cultural value of recyclable waste is easy to promote. Many young colleges and universities in China have not developed for a long time and have not yet formed a unique campus cultural connotation. Cultural characteristics of some colleges and universities even have geographical limitations. So, it's difficult to promote campus cultural products. But the waste generated in campus life can be recycled, and its own cultural value can be used in the promotion of the theme of green campus culture, such as the selection of waste food packaging patterns, the color of waste packaging plastics, and the text in waste books and textbooks.

(3) It provides a new direction for campus cultural and creative design and encourages students to experiment and innovate bravely. The sustainable development of campus cultural and creative design is inseparable from product innovation. The innovative form of the combination of Upcycle design concepts and campus cultural and creative products can harvest a large number of fans.

(4) Cultivation of green environmental protection awareness helps to shape a good campus culture image. Campus cultural and creative souvenirs is an important way to promote campus branding. The application of the green and environmentally friendly circular redesign concept in campus cultural and creative design can not only subtly enhance students' awareness of green environmental protection, but also convey excellent spiritual culture and establish a brand image of a green campus.

## 2. Features of Circular Redesign

### 2.1 The Difference between Upcycle Design and Recycle Design

Upcycle design is different from Recycle design. Upcycle design is to use waste materials directly as recycled raw materials for creative design and production, while Recycle design is to recycle waste materials and conduct centralized smelting, pressing, compression molding and other processes. The secondary processed materials are used for production, and then products are designed and manufactured. Such as straw plastic, cans and cartons. Not only that, they have different design concepts. From the aspect of process steps, Upcycle design can save more raw materials than Recycle design. We have seen programs similar to “Life Tips”, where water bottles

are made into funnels, old clothes are made into fashionable dresses, old cardboard boxes are made into toy cars, and broken flower pots are made into unique potted landscapes. These are all creative products designed by Upcycle.

## 2.2 The Connection between Upcycle Design and Cultural and Creative Design

Upcycle design has a special relationship with cultural and creative design. Products derived from the Upcycle design concept do not require additional processing of waste materials into raw materials, so they will not destroy the cultural information carried by the waste materials themselves, such as patterns, modeling structures, textures, and material colors. On the basis of function, products design based on the cultural characteristics of waste materials can greatly increase the artistry and achieve practical and beautiful effects.

The raw materials used in Upcycle design tend to be diversified. On the one hand, it is reflected in the diversity of different materials. On the other hand, it is reflected in the richness of different changes in the same material. For example, for the same fabric, because of its different styles and patterns, the finished design has its own uniqueness and contains different cultural connotations. In this way, the works designed by Upcycle are not only products, but also cultural and creative products, and even works of art.



*Fig.1 : Disinfectant Spray Can Made of Upcycle Fabric (Designer: Lee Duksoon)*

Figure 1 shows one of the subject projects of the Huashang International Cultural and Creative Research and Development Center: the design of anti-epidemic medical supplies. Its design inspiration is to use recycled waste fabrics to design a disinfectant spray can. This design takes advantage of the flexibility of the fabric. With a waterproof layer to make it a container for disinfectant, it can also be compressed and easily stored.

## 3. Value Evaluation of Circular Redesign

In common sense, the value evaluation in product design refers to the realizability and commercial value of the product. In addition to the basic value evaluation, the sustainable design requirements of the product should also be added as the focus of consideration and evaluation in the cultural and creative products after the circular redesign.

We do not just use waste materials to define environmental protection. The significance of environmental protection lies in the consideration of resource and energy utilization. Whether the Upcycle product we design consumes more raw materials requires a thorough and detailed

evaluation by the designer. The evaluation dimension of Upcycle design is very different from ordinary design. It mainly reflects in the following points.

(1) User and market: in the design and conception stage, through market and user research, as well as user population base analysis, user needs can be found. Therefore, the target function and performance of the product can be determined at the beginning of the design, and the sale of the products can also be ensured. Then, the subsequent refinement work is to control costs. Most of the products of circular redesign are based on the characteristics of waste materials. What products can be made from waste materials is being considered first. Then market and user research are conducted. With user needs analyzation and further supplement and improvement of the practical value of the product, the products are sure to meet the demand.

(2) Cultural value: The charm of cultural and creative design for consumers lies in the reflection layer of people (Norman divides the emotion in design into three levels: instinct, behavior and reflection). It gets a unique sense of cultural identity through the narrative interpretation of the product. As it mentioned above, the waste itself carries cultural information. If the cultural information can be consistent with the style of the product, it will greatly enhance the cultural value and attractiveness of the product.

(3) Environmental protection requirements: Since it is an Upcycle design, it makes the environmental protection concept more thoroughly. We need to evaluate the resource and energy consumption of the designed products and the existing products which are of the same positioning. At the same time, it is necessary to consider the product's life cycle time limit to see whether it is durable. The pollution of the used waste to the environment, and recycling services to achieve sustainable design are also be considered. Value evaluation is a continuous process. In order to achieve quantification of the complete product, it's necessary to follow the in-depth design, and continue to concrete and clarify the evaluation after proposing the design concept. If the design is not worth continuing advance, it should be stopped in time.

#### 4. The Deepening Method of Circular Redesign

The deepening of the circular redesign is to gradually make the design concrete and realize the feasibility of the product.

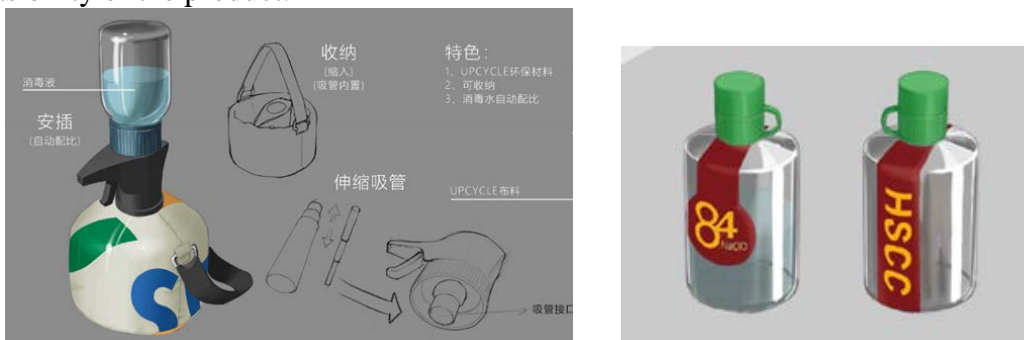


Fig.2 Upcycle Disinfectant Spray Can and Disinfectant Bottle Design (Original Design) (Designer: Lee Duksoon)

As shown in Figure 2, after putting forward the idea of this design, the designer considered that the disinfectant is corrosive, so he designed the bottle into two parts. Its upper part is a disinfectant bottle, and the lower part is a watering can. Combination of up and down makes the mixed diluent to be sprayed through the nozzle. At the same time, to meet the storage requirements, a retractable and detachable straw is also designed inside, and the disinfectant bottle is also designed separately.

In the process of deepening, concurrent design should also be realized. Concurrent design is a

very common design idea and method now. In the design conception stage, more plans should be proposed. Then, the feasible plans will be refined after preliminary screening. In this way, enough options can be reserved for the final design evaluation. It is also conducive to constructing series and perfecting a complete set of design options.



Fig.3 Upcycle Gloves and Protective Mask (Original Design) (Designer: Lee Duksoon)

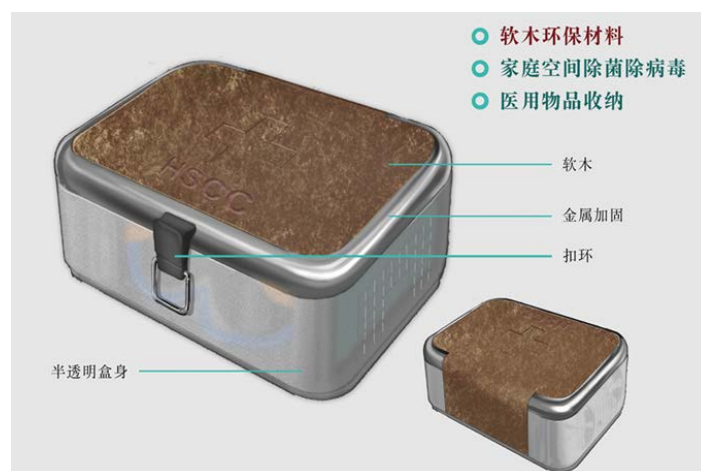


Fig.4 Anti-Epidemic Packaging Box for Households (Designers: l Lee Duksoon, Wu Jiyue)

As shown in Figures 3 and 4, according to the characteristics of Upcycle design materials, gloves, masks, and epidemic prevention medical kits were designed in parallel. The design evaluation was carried out after the deepening process. It is also a comprehensive evaluation method, including business, environment and humanities. After evaluating multiple parallel designs, select one or several of them as the final plan, and finally combine a series of anti-epidemic medical supplies.

## 5. Recycling and Upgrading Campus Waste Materials and Transforming Them into Daily Necessities: a Design Case of Military Training Uniform Cycle Creation

### 5.1 Status Quo of Recycling of Used Military Training Uniforms

Military training uniforms are clothing that students need to wear uniformly when receiving military training. These military training uniforms are a combination of jacket-style tops and breeches-style trousers. Generally, most students only wear military training uniforms during military training. Once the military training is over, many students will choose to leave the military



training uniforms idle, discarded or donated due to the single style, average quality, and few usable scenarios, instead of choosing to keep the uniforms or continue to wear them. So, it causes a lot of waste of clothing and damage to the ecological environment.

Used military training uniforms have their own cultural characteristics. One is that the material is wear-resistant, and the other is that the process of military training gives it emotionality. Therefore, used clothing can be recycled and reused. It can be creatively designed on the basis of wear resistance and emotionality, and be processed into nostalgic campus souvenirs, or be made into common supplies in life, as shown in Figure 5 Campus Cultural Creation Supplies design.



*Fig.5 The Circular Redesign of Military Training Uniforms (Original Design) (Designers: Lee Duksoon, Hu Yang)*

This design work takes campus freshman military training suits (tops, trousers, hats and shoes) as recycled materials for Upcycle design. The clothing structure and material fabrics of military training uniforms are used in the design of campus cultural and creative souvenirs, including glasses cases, notebook covers, canvas bags, etc.

## 5.2 The Creative Methods and Characteristics of Used Military Training Uniforms in Campus Cultural and Creative Design

The cultural and creative design methods of military training uniforms can be combined with the characteristics of campus life. Starting from the needs of students and considering the practicability and ornamental characteristics of the design products, it gives full play to the practical value of the original materials of military training uniforms. Under the premise of not destroying the material characteristics, this method aims at and preserves the structure of different parts of the military training uniform, carries out upgrade creation design, or dismantles and reconstructs to design a new product, and gives new use value by fusing the attributes and characteristics of other products.

The creative design also starts from the structure. For example, the trousers of military training uniforms are designed to be tightened. The shape of the cylinder can be used to create a new storage tool according to the storage nature of the circular pen holder. Another example is that the upper

pockets of military training uniforms also have storage functions. On this basis, the surrounding clothing area can be enlarged, so that the two-sided sewing can be made into a file bag with more storage space. One more example is the upgrading design of military training shoes which are easily overlooked. With the protruding parts of the front and back being cut off, they can become the new slippers of the dormitory according to the style of the slippers. These cultural and creative products are simple to make without losing the functionality of the product, and have the creative advantages of low cost and high use value.

From the perspective of visual design, the broad and thick fabric of military training uniforms can be disassembled into ordinary product materials. The original camouflage pattern can be used as a special pattern for new products, and then reconstituted into a slightly more complex and more beautiful canvas bag, or layered and cut into a wall-mounted storage bag. As for the characteristics of the raw materials for military training uniforms, they can be combined with the attributes of other products. For example, the outer skin design of the notebook is the integration of the protective and decorative functions of the military training uniform fabric with the practical functions of the notebook, thereby making the product more value-added.

These creative design methods fully demonstrate the advantages and value of Upcycle design concept on the basis of using the physical characteristics of military training uniforms, the combination of materials and functions not only does not lose the original functional value of waste materials, but realizes the efficient use of resources and energy.

Conclusion: In China, more than two-thirds of cities are surrounded by garbage, and a quarter of them have no place for garbage. A total of 533.3million square meters of land has been occupied by garbage, and environmental protection issues are imminent. Recycle started very late in China. It was not until 2006 that relevant policy documents were released. In addition, most of the waste recycling is self-employed, and the recycling of waste products through family workshops is likely to cause secondary pollution. At present, only large-scale enterprises are focusing on how to recycle their own products, as well as the recycling of waste materials in production. Small and medium-sized enterprises only achieve pollution-free emissions.

As to Upcycle, it lacks a large-scale Upcycle industry organization, and lacks large-scale well-known companies to promote. Most research is limited to studios and universities, and there are few more mature commercial institutions, so Upcycle has not been popularized in the public eye. However, the Upcycle design in a campus with many students not only has a talent base, but also has a rich source of raw materials. Combining the design ideas and creative methods of Upcycle design can improve the design and practice level of students, and also allow students to promote environmental protection design methods and strengthen public awareness of environmental protection. It enables designers to make full use of the waste materials around them to realize the creation and value enhancement of new products, so that green design ideas can be truly popularized. The combination of the concept of circular redesign and campus cultural and creative design is an innovative form of campus cultural and creative development. It provides a new direction for campus cultural and creative design and encourages getting rid of the traditional single design. Designers must be brave to innovate and experiment in order to achieve sustainable development.

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