*Advances in Social Science, Education and Humanities Research, volume 416*
**4th International Conference on Culture, Education and Economic Development of Modern Society (ICCESE 2020)**

# Research on Educational Practice of Innovative Packaging Structure Design

Lizhu Liang
Neusoft Institute Guangdong
Foshan, China 528225

***Abstract*—In the visual communication design curriculum system, packaging design is an important part of the core curriculum. With the global greenhouse effect becoming increasingly prominent, a series of problems caused by environmental pollution need to be solved by all sectors of the society. The innovative packaging structure design is based on practicality, environmental protection and aesthetic design principles, which meet the requirements of sustainable development of society. The course is centered on the innovative packaging structure — "one-paper molding". Based on the design principle of changing from one to many and from simple to complex, it guides students to carry out innovative packaging design practices and focuses on the cultivation of students' practical ability and design thinking during the design process. It is hoped that through the design practice, the comprehensive design literacy of innovation, environmental protection, and technology of design-oriented college students of visual communication design will be improved to promote the integrated development of innovative design with practical functions and environmental protection.**

***Keywords: packaging, "one-paper molding", environmental protection, innovative type, practicality***

## I. INTRODUCTION

The innovative packaging structure is developed on the basis of design and research. The goal is to solve the problems appearing in the research and find solutions to the problems. Making the product packaging structure model by hand is the main task of this project. Under the premise of not receiving any existing packaging structure education, students can make innovative packaging structures by themselves under the guidance of teachers. This hands-on production process allows students to have a deep understanding of the formation process and precautions of the packaging structure, and it is easier to stimulate students' creativity. According to the design survey, people can determine the production direction, select the appropriate materials, and "tailor" the packaging structure model for the product. Packaging structure can be divided into inner packaging, outer packaging, individual packaging, collective packaging, series packaging and other structural forms. According to the design principle from simple to complex, students are required to start with a single product to make a packaging structure model, and then a more complex and diverse product packaging structure is developed from a single product. From one to many, it is required to form a series of packaging structures with uniform design style, environmental protection and practical functions.

Packaging structure is an important design content in packaging design. Before developing this part of the design content, you must ensure that the packaging object — the product is ready. As the requirements of the coursework are a series of packaging design, when choosing a product, you need to be sure not to display any brand information, including logos, fonts, patterns and other visual communication design content. According to the principle of unity of the image of the product and the packaging image, these original design contents will affect the sense of unity between the packaging and the product, and restrict the packaging's next visual communication design.

## II. INNOVATIVE PACKAGING STRUCTURE — THE CONCEPT OF "ONE-PAPER MOLDING"

The concept of one-paper molding refers to the formation of a packaging structure with practical functions through the structural change of the paper itself without the use of glue and staples. "Fig. 1", "Fig. 2", "Fig. 3" and "Fig. 4" respectively embodies the concept of one-paper molding. Those who have made packaging structures know that as long as they use glue and nails, they can easily stand up a flat package development plan. For those who are new to packaging design, these sticking tools are rare because they can be used to cut the paper at will without careful consideration, and then it can be forced to stand by using glue and nails. This often violates the design principles of packaging, increases the cost of production, and reduces the aesthetics of packaging. Clients shall not pay for this. Excellent designers should have a sense of responsibility for serving the public, and have environmental protection and practical awareness. Therefore, when designing the packaging structure, students should think more about how to meet product requirements and save packaging materials and production processes. The task requirements of one-paper molding can limit students' excessive use of packaging materials, make them return to the study of paper structure, and stimulate them to create eclectic and innovative packaging structures which not stick to one pattern.

 

Fig. 1. Goblet packaging structure.

[a] http://young-package.com/

Fig. 2. Bulb packaging structure.

[a] http://young-package.com/

No matter what kind of material is selected, the texture and color presented by the packaging should be harmonious and unified. Similar materials and color combinations can give people a natural, comfortable and smooth feeling, which is easier for students who are new to packaging design to grasp. However, this is not the only choice of design materials. For some contradictory and fierce materials that are far away from each other, they can also be designed very good works, but they have higher requirements on the design level of the designers because they need materials that look extremely contrasting in texture, after designing, they present a bold, contrasting, abrupt, and stylish beauty.

The packaging structure is the same as human clothes. If it is too large or too small, it will make people feel awkward. The size of the packaging structure is around the product. In general, the internal size of the packaging structure is 1 to 5 mm larger than the corresponding size of the packaged object, so that the product can be picked up and placed. For products with relatively regular shapes, a smaller value should be adopted; otherwise, a larger value should be adopted. The packaging structure should show the shape characteristics of the product. It is not wise to add some extra, unrelated structural changes to make people feel "junky".

The packaging structure operation will undergo a maximum of two modifications before it can be finally formed. At the conception stage, the production of the structure can be relaxed as much as possible, because it will more easily inspire creativity.

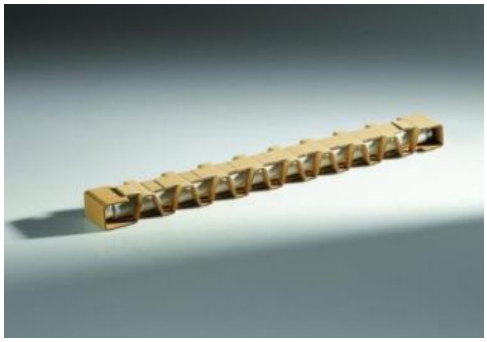

Fig. 3. Light tube packaging structure.

[a] http://young-package.com/

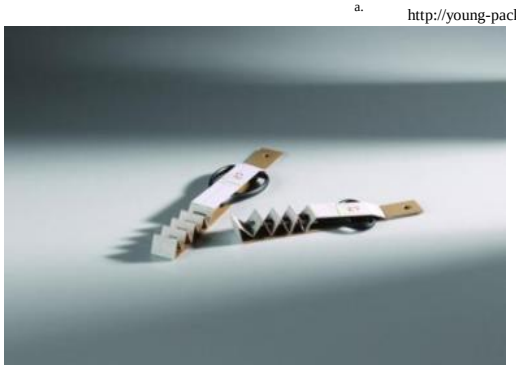

Fig. 4. Scissor packaging structure.

[a] http://young-package.com/

The concept and spirit of one-paper molding is worthy of being taught to students at the beginning of packaging design. An undivided whole is completed by folding assembly. The purpose of one-paper molding packaging structure is to meet the functional requirements of product packaging with the least amount of materials. It cleverly utilizes the changes in the paper structure itself to form the component composition of paper and paper, and paper and products to maximize its function. As shown in "Fig. 3" and "Fig. 4", although the paper itself is relatively thin, the structure of the paper material is ever-changing. Once its structure is changed, it forms a mutual combination and supports each other, which can show excellent compression and shock resistance. In addition, the occlusion, cross and overlap between paper and paper makes its structure evenly stressed, not easily damaged and more durable. In addition to reflecting the packaging wisdom of the designer, the packaging structure formed by one-paper molding can also enhance the artistic aesthetic value of packaging and attract consumers to buy.

## III. INNOVATIVE PACKAGING STRUCTURE — DESIGN GUIDANCE OF "ONE-PAPER MOLDING"

Before starting to make the packaging structure, it is necessary to provide corresponding design guidance on how to do and what shape to make. The purpose is to allow students to have a clearer direction on the design goals. Here,

the author mainly looks for the relevance of the goals. With the content of "three-dimensional composition", "tenon-and-mortise structure", and "excessive gift packaging", the author will guide laterally. With the "lateral" guidance, it won't directly tell students how to do it, which will give students more room to play. "Three-dimensional composition" is the basic course they have learned. This content is arranged so that they can find the connection between the two, can start more easily, and pay more attention to the beauty of the structure itself. The "tenon-and-mortise structure" is to allow students to pay attention to the structural changes that can be used to achieve different packaging functional requirements. The last "excessive gift packaging" is to convey environmentally friendly and practical concepts. Through these three related "lateral" contents, the purpose is to guide students to determine the direction of the design.

### *A. The one-paper molding structure is a sublimation of three-dimensional structure*

The basic design course "Design Composition" includes three major parts of composition: plane composition, color composition, and three-dimensional composition. The three-dimensional structure is based on the use of specific materials, based on visual beauty and mechanics to combine the constituent elements into a beautiful three-dimensional form according to certain structural principles. The three-dimensional composition uses the changes of points, lines, and surfaces to show the spatial three-dimensional beauty of rhythm, metre, contrast and unity, as shown in "Fig. 5". The process of constructing the three-dimensional structure is more about pursuing visual pleasure. There are no fixed requirements for the source of creativity. Most of them are vague and have no clear target. And the packaging structure formed by one-paper molding finally shows the three-dimensional beauty of the space structure of the paper material. This kind of beauty is consistent with the design composition. The only difference is that the creative source of the packaging structure of one-paper molding is to meet the functional requirements of the product. When developing the packaging structure design, the first consideration should be the practical functions of the packaging, and then the aesthetics presented by the packaging structure. Only by doing both, can consumers be moved.

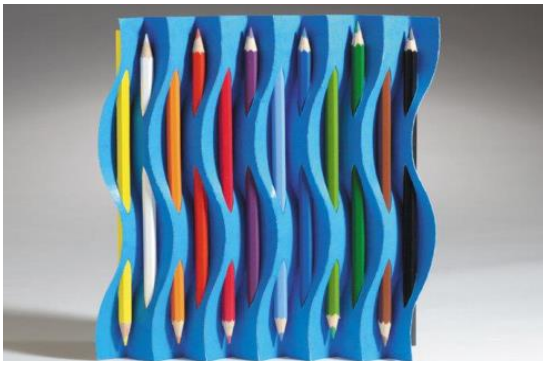

Fig. 5. Color lead packaging structure.

[a.] http://young-package.com/

### *B. One-paper molding packaging structure symbolizes the traditional wisdom of the Chinese people, which is different in approach but equally satisfactory in result with the tenon-and-mortise structure in traditional Chinese furniture*

Whether it is one-paper molding, or a deeper and more complex packaging structure, which may be two-paper molding, three-paper molding ... and no matter the packaging is formed with how many pieces of paper, there is an important criterion, that is, the structure of each part of the packaging is of natural and reasonable cohesion so that the entire packaging structure is integrated, harmonious and unified.

The design principle of this packaging structure is different in approach but equally satisfactory in result with tenon-and-mortise structure in traditional Chinese furniture. As shown in "Fig. 6" and "Fig. 7", the tenon-and-mortise structure in China is the occlusion of a tenon and a mortise. The most basic tenon-and-mortise structure is composed of two members, of which a tenon head is inserted into the other mortise eye to make the two members connected and fixed. The part of the tenon head that goes into the tenon eye is called the tenon tongue, and the rest is called the tenon shoulder. Although the tenon-and-mortise structure is relatively thin in each component, it can withstand huge pressure as a whole. This structure does not lie in the strength of the individual, but mutual occlusion and support of each other to form a complete whole. It is an ingenious combination of curved and straight, more and less, high and low as well as long and short between wood pieces. The furniture with tenon-and-mortise structure has greatly enhanced its artistic value due to its exquisite structural combination, and is highly sought after. In addition, furniture with tenon-and-mortise structure forms a whole between wood and wood, the quality of which is stronger than ordinary nail furniture and easier to repair. The soul of traditional Chinese wooden furniture is the tenon-and-mortise structure. The entire furniture can be used for hundreds of years without using a nail, which is a miracle in the history of human light industry manufacturing.

Fig. 6. Tenon-and-mortise structure 1.

[a.] http://blog.sina.com.cn/s/blog_641343bc010

Fig. 7. Tenon-and-mortise structure 2.

a. http://blog.sina.com.cn/s/blog_64134

In the structural design of the packaging, such structures engage with each other and support each other to form a complete spirit of the tenon-and-mortise structure, as well as the packaging structural design spirit, as shown in "Fig. 8". It hides the structure that affects the overall look and impression of the package, enhances the overall sense and beauty of the package; one-paper molding training limits students' abuse of materials, strengthens their understanding of the overall shape of the package. The study and observation of the tenon-and-mortise structure can help people to be more rigorous in designing the packaging structure.

Fig. 8. Paper packaging structure.

a. http://young-package.com/

### C. *Excessive gift packaging*

In the gift industry, there has been serious excessive gift packaging, with moon cakes, health products, tea, alcohol, cosmetics and other packaging as the hardest hit areas. Moon cake packaging has changed from paper, paper boxes, iron boxes, wooden boxes, leather boxes, bamboo boxes, brocade boxes, and lacquer boxes, and even chooses precious materials such as rosewood, crystal, and silk. Some moon cakes are packed like a small cabinet, and there are two layers of drawers to store moon cakes, and they are also equipped with exquisite brass locks. As shown in "Fig. 9", the price and cost of these packaging materials far exceed the value of the moon cake itself, which is a serious waste of resources and violates the practical function principle of packaging. The inundation of excessive gift packaging has aroused the concern and resentment of most people in the society. With the development of social modernization, people's awareness of environmental protection continues to increase. Everyone should contribute to the social environment. The concept of one-paper molding can help next generation of designers have excellent sense of social responsibility and environmental awareness of packaging. Therefore, one of the conditions for judging whether the packaging design is excellent is whether its packaging materials are environmentally friendly and economical.

Fig. 9. Excessive gift packaging.

a. http://www.gyprint.com/3g/display.asp?id=711

## IV. THE INNOVATIVE PACKAGING STRUCTURE — "ONE-PAPER MOLDING" WORKS PRACTICE

### A. *Experimental works of kungfu tea cup one-paper molding structure*

"Fig. 10", "Fig. 11" and "Fig. 12" are one-paper molding packaging structure of kungfu tea cups. The creative inspiration is from traditional Chinese scroll books. The packaging is made of kraft paper. The kungfu tea cups are fixed with hole size, combined with traditional book shapes, and finally produced. The packaging shows the principles of space design and mechanics. The packaging structure of the scroll enhances the stability and anti-shattering function of the package, making the package as a whole, which not only highlights the aesthetic qualities of traditional Chinese culture, but also has good practicality features. As an experimental work, the design is bold, creative and refreshing; the hand-made work is clean and neat. However, a fly in the ointment is that the material selection of the rope is not rigorous enough, and it appears crude and rough. It may be a good way to choose a paper rope of the same color instead.

Fig. 10. Kungfu tea cup — part 1 of scroll packaging structure.

[b] Neusoft Institute Guangdong, Fu Hai

Fig. 11. Kungfu tea cup — part 2 of scroll packaging structure.

[a] Neusoft Institute Guangdong, Fu Hai

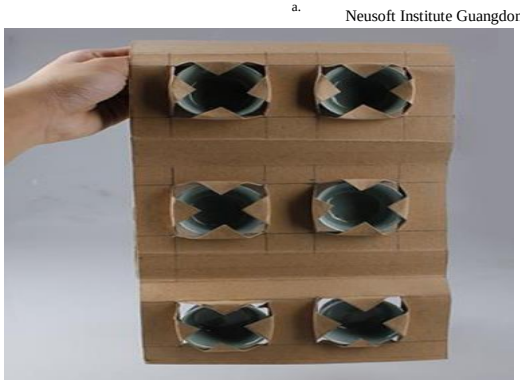

Fig. 12. Kungfu tea cup — expanded view of scroll paper packaging structure.

[a] Neusoft Institute Guangdong, Fu Hai

"Fig.13" and "Fig. 14" show another one-paper molding packaging structure experimental work of another kungfu tea cup. Students use corrugated paper to dig a hole through the rope to secure the cup. The packaging structure is novel and symmetrically arranged. In addition to showing the visual beauty, the products inside can also be well displayed. The use of corrugated paper and rope makes it have good anti-shatter and portable functions. In addition, the packaging structure is standardized and the display effect is good from all angles. The shortcoming is the method of using rope to cross the paper, which is more troublesome and can't complete the packaging action quickly. The choice of the material of the rope seems too rough.

Fig. 13. Kungfu tea cup — tying rope paper packaging structure.

[a] Neusoft Institute Guangdong, Chen Bingtong

Fig. 14. Kungfu tea cup — untied tying rope paper packaging structure.

[a] Neusoft Institute Guangdong, Chen Bingtong

### *B. Spoon portable packaging structure experimental works*

"Fig. 15" and "Fig. 16" are experimental works of one-paper molding packaging structure of porcelain spoons. The inspiration for the creation comes from hand bags. This work chooses kraft paper as the packaging material, and looks like a hand bag outside. In fact, it actually uses the change of paper structure to fix the porcelain spoon; the appearance is simple and neat, the product and the main packaging structure are hidden inside the packaging and only by unpacking the packaging structure can the inside packaging structure be clearly seen.

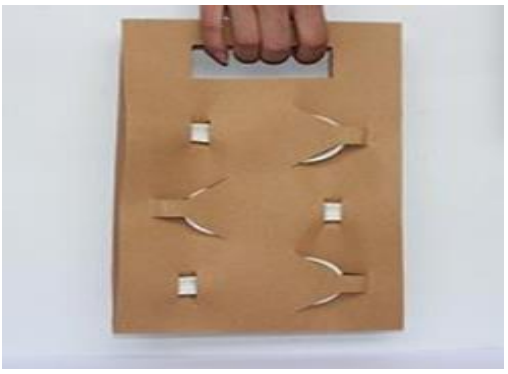

Fig. 15. Packaging structure of porcelain spoon.

[a] Neusoft Institute Guangdong, Liang Kangying

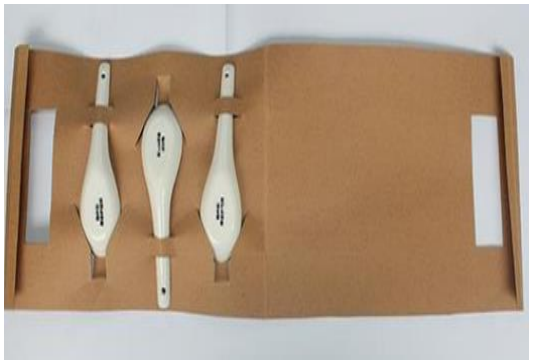

Fig. 16. Expanded view of porcelain spoon packaging structure.

a. Neusoft Institute Guangdong, Liang Kangying

As an experimental work, the disadvantage is that the paper is too wasteful. Only three spoons are packaged and it seems that the use of materials and space is not compact enough. If you can improve on this basis to maximize the role of paper, it can be more reasonable to pack more spoons.

### *C. Bulb packaging structure*

"Fig. 17" and "Fig. 18" are a series of bulb one-paper molding packaging structures, which are changed according to the design method of from one to many. The packaging extends from a single structure to multiple packaging structures. The structure is both uniform and changeable. The one-paper molding structure is clean and neat, the packaging structure is overall and rigorous and the space is compact and reasonable, which reduce the waste of paper, reflecting the characteristic of environmental protection. The product can be seen through the side of the package, and the rectangular packaging structure is easy to place, which can save transportation space and reduce the cost of goods during transportation. Because it is convenient to store, it can be sold directly on the shelf for customers to purchase according to their needs.

Fig. 17. Bulb packaging structure.

a. Neusoft Institute Guangdong, Pan Yuanqing

Fig. 18. Expanded view of bulb packaging structure.

a. Neusoft Institute Guangdong, Pan Yuanqing

### *D. Gift packing structure*

"Fig. 19" and "Fig. 20" show a wedding tableware gift packaging. The packaging also combines the concept of one-paper molding packaging structure. It is purely handmade and uses the form of paper carving hollowing out. There is a certain difficulty in production. The pattern and text on the front of the packaging box are finely carved and engraved, which reflects the author is with concentrated attention. The visual effects are clear, concise and decent. Looking through the hollowed out area, the products inside are partly hidden and partly visible. In addition to echoing the color of the product inside, the festive red color also harmonizes with the earthy yellow color of kraft paper. The drawer-type packaging structure increases the ritual sense of opening the packaging. After opening, the products are neatly arranged, and a one-paper molding structure is used as a space between the products. In addition to increasing the protection of the product, it also makes the overall look more beautiful.


Fig. 19. Tableware gift packaging.

a. Neusoft Institute Guangdong, He Haixin

Fig. 20. The internal structure of tableware gift packaging.

[a] Neusoft Institute Guangdong, He Haixin

## V. CONCLUSION

Innovative packaging structure design education practice guides students to combine "hand power" and "brain power" on the basis of project design surveys under the design thinking of "environmental protection", "practicality" and "innovation", with the design method of from one to many and from simple to complex to change from a single structure to multiple packaging structures.The structure is uniform and changeable, clean and neat, overall and rigorous, and the space is compact and reasonable. It reduces the waste of packaging materials, reflects the environmental protection and practical characteristics of packaging design, and cultivates students' awareness of environmental protection, practicality and innovation. It is hoped that they can play a role in environmental protection and innovation of the country and the world, and meet the strategic needs of sustainable development of the country.

## REFERENCES

[1] He Kezhi, Cao Lijie, "Design and Application of Paper Packaging Container Structure" [M] Beijing: Cultural Development Press, 2007.10 (in Chinese).

[2] Na Xinyuan. "Confidence in Chinese Packaging Design" [D] Beijing: China Academy of Art, Master's Degree Thesis, 2008.5 (in Chinese).

[3] Palace Museum "Packaging Art of the Qing Dynasty" [M] Beijing: Forbidden City Press, 2000.9 (in Chinese).