Cross-border and Reconstruction: Exploration of Teaching Mode of Integration of Sculpture Art and Product Design

Zhao Aili* Wang Liming 2, Yu Meng 3 and Qu Qingfeng 4

1, 2, 4 Industrial design department, Heilongjiang bayi agricultural university, daqing, heilongjiang, 163319, China
3 Department of sculpture, Harbin normal university, Harbin, heilongjiang province, China,150000

Corresponding author’s e-mail: aili_fiona@126.com

Abstract. Inter-disciplinary integrated teaching method can integrate the teaching staff of sculpture art and product design courses, complement knowledge in teaching, provide students with various learning experiences, develop students' cross-border design thinking, and carry out reconstruction and innovation of sculpture art or product design. This article starts from the collaborative participation of sculpture and product design teachers in teaching, intends to renovate the traditional teaching mode, explores inter-disciplinary teaching, and provides ideas for teaching reform.

1. Introduction
Sculpture is an ornamental and commemorative object with strong spiritual connotation. In fact, the development sculpture trend has been shown for a long time. Pluralistic, varied and fashionable sculpture forms are increasingly renovating and splitting [1]. Product design is a multidisciplinary design activity. This article intends to integrate sculpture art and product design across borders, and the results created can enable sculpture art to walk down the altar of art in the form of products, enter people's lives, increase the exchange experience between sculpture art and people, and explore the cross-border conversion mode between sculpture art and product design in the course. Usually, the teaching process of product design and sculpture design course is undertaken by the teachers of this major alone. In the teaching process, the traditional teaching mode and system of this major are often followed. In the teaching process of product design, emphasis is placed upon the evolution of form and innovative design. There is no more solid and in-depth research in the process of three-dimensional structure of form. In sculpture design course, only the form of product is emphasized while other comprehensive factors are ignored. This article will empower teachers and students with different professional backgrounds and knowledge structures to participate in teaching activities through cross-border integration teaching method. Through integration, students' creative thinking will be developed, and solid modeling ability, analysis and design ability will be improved.

2. Discussion on Cross-border Teaching Mode of Sculpture Art and Product Design
Before the teaching activities are carried out, teachers of product design and sculpture major will jointly form teacher teams. Through the integration of professional knowledge, collaborative development of teaching plans and methods, and clear the final teaching goal is to cultivate students' comprehensive design ability, form factors, functional characteristics, material application and other
closely combined with innovative practice, and in the teaching process emphasizes the cultivation of design thinking ability, according to the knowledge structure and characteristics of the two professional students, according to the difference between their respective professional fields to set the teaching content, students through the form of homework to cross-border professional fields to carry out in-depth study, and the learning results will be presented in a new form. The teaching mode of the course mainly includes the following three ways: broadening the perspective of the course, changing the perspective of the course, promoting innovation through cross-border conversion mode, and training image thinking through cross-border themes. They act on every stage of the course and jointly realize the exploration of cross-border integration teaching mode.

2.1 Broaden the Angle of View and Change the Angle of Curriculum
In the process of teaching, first of all, through on-the-spot investigation, the acquired perceptual knowledge should be preserved and analyzed through various forms of records, and transformed into rational knowledge. The content of the course mainly includes basic theory teaching, field research, data analysis and display. Students who major in sculpture and product design are matched to form a group to implement the course content, this gives them a sense of teamwork on the basis of independent value evaluation system. Select cultural and commercial sites in the city for on-the-spot investigation, so that students can understand the application content and practical value of sculpture and product design, and discuss from different professional angles to form preliminary analysis results. The final analysis results will be reported in the form of PPT in class, so that students can share their research results and expand their knowledge. The specific content includes two aspects: one is "object" analysis, such as morphological element analysis, application environment analysis, material and process analysis, function analysis, etc. The other is "human" analysis, such as user demand analysis, display psychological analysis, interaction analysis between "human" and "object", etc. Through these two analysis methods, students can experience the deep feeling of the space or using the product, as well as the different psychological feelings that can be brought to people under different space environments and using scenes. These experiences can be displayed through the way of writing and picture recording. Finally, the comprehensive improvement of students' logical thinking ability and innovative thinking ability can be realized, enabling them to actively think about how to design.

2.2 Cross-border Transformation Model Promotes Innovation
In the process of product appearance modeling design, common modeling methods include stacking, wrapping, twisting, cutting, hollowing out, extruding, folding and others. This is consistent with the modeling methods used in sculpture design. This consistency also provides the possibility for its cross-border integration, and also enables us to clearly see the application of sculpture method in the field of product design and design. This application method can greatly increase students' design interest, expand students' design vision, and also promote the design works they create, bringing better aesthetic taste and artistic enjoyment to people. In the cross-border integration of sculpture art and product design, there are mainly the following ways:

The first is the cross-border conversion of sculpture into a product, that is, originally a sculpture product, which gives its product functions on the basis of retaining its original form, and realizes the feasibility of mass production in the design of materials and processing technology, and converts it into a product. Meanwhile, when sculpture art and design merge into a practical object that appears in people's life, what it gives to the object is not only a natural and romantic skin, but also a disguised handicraft with a special style. Its real value is the communication between sculptors and people through daily touching and using the object, and the transmission of personal experience and emotion[2]. For example, the sound of "sound sculpture" is a typical cross-border exhibit, and its sculptural shape highlights its good use function. See Figure 1.2
Figure 1.2. Sound sculpture product design

The second is that the product is transformed into sculpture across borders. Sculpture works absorb the advantages of product shape or product design elements to create sculpture, and can have the interactive experience process of "human" and "sculpture" to retain some of the functions of the product and form innovative sculpture works. Besides, for the product's own morphological characteristics, on the premise of not affecting the usage, the aesthetic appearance can be more favored by users, thus obtaining higher market evaluation. For example, chair sculpture is the sculpture works transformed from this product across borders. See Figure 3-4 for chair sculpture.

Figure 3.4. Chair Sculpture

The third is the integration and reconstruction of sculpture and products. With the development of new materials and technologies, the application of new materials, new technologies, new processes and even new science has brought plenty room for changes in product shape design. The application of new materials, new technologies, new processes and even new science also endows sculpture with new value connotation, expands the language expression form of sculpture itself, and makes its form more diversified and connotation richer. For example, the products designed by the famous female designer Zaha Hadid are very plastic in material selection and modeling design. The products designed by Zaha Hadid are shown in Figure 5-6.
2.3 Design Theme to Implement Cross-border Innovation

In the practical part of the course, themes such as "distorted space" and "bionic trace" are selected. All cross-border design activities are carried out around the theme, which needs to be reflected by highly recognizable symbol elements.

First of all, students draw up specific design topics according to the given subject direction, use data analysis, brainstorming and other methods to find basic elements such as design routes and keywords, and then use graphics and diagrams to interpret the content expressed by the keywords. In the end, students form analysis reports based on the summarized data content. All the data content will pave the way for the future design.

The second is to draw the first draft of the next design around the theme and the information obtained in the previous link, and to tightly focus on the theme selected by the group in the design process. Teachers encourage students to try to use reverse thinking, reverse assumptions and other ways to show the form through exaggeration, distortion and other means of intention and comprehensive materials.

The third is the plan evaluation stage. According to the plan selection and evaluation activities among groups within the class in the first draft, the students show their design ideas to other group members and teachers in the form of PPT and design documents. In the process of showing, other group members and teachers give responding opinions, select the best plan, and show the group to record.

The fourth is the arrangement and revision of the plan, and in the subsequent courses, the final selected plan will be discussed and revised according to the questions raised by other groups and teachers in the previous stage. In the ultimate plan display, the characteristics of the product or sculpture should be fully reflected, and the whole picture should be displayed in the form of effect diagram, copy or video.

Through these four thematic trainings, the cross-border integration of sculpture art and product design can not only broaden students' vision, enable students to find new design methods and approaches through cross-border methods, but also broaden their professional perspectives, enabling students to create more excellent sculpture and product design works in communication and collision.

3. Inspiration from Cross-border Sculpture Art and Product Design

Integrating sculpture art into product design is not a modern design method. Many artifacts in ancient China are reflected. Stone Age tools are carved articles for daily life or labor \(^3\). Many modern industrial designers have well integrated sculpture into product design. For example, German designer Lugi Colani, known as the "design geek", had a solid modeling foundation in his early learning of sculpture. In his sculpture works, we can feel the extremely high modeling quality and strong sculpture artistic style. At present, we have introduced this kind of interactive cross-border
exploration into the classroom. Focusing on how to carry out various attempts through integration and innovation, we have carried out design practice exploration on how to carry out design creativity and perfect the teaching method of design products. Teachers and students of the two majors jointly carry out theoretical study and practical work.

This kind of cross-border collaborative teaching can integrate and complement the professional skills of teachers, and at the same time open students' horizons, so that they can see different worlds outside their majors, and learn nutrition for their own use, thus achieving the purpose of improving their design thinking ability. This way of integrating the knowledge of many professional fields in the same course is very different from the traditional way of the whole class to carry out design practice according to the requirements of a teacher. This measure also provides a variety of references for the employment direction of students. Therefore, in the future teaching process, this cross-disciplinary learning mode will be continuously developed, instead of sticking to the traditional fixed teaching mode. In the teaching process, the purpose is to solve the needs of users and real life problems, and to cultivate students' comprehensive innovation ability that not only deeply understand their own professional characteristics, but also can integrate other design professional knowledge across borders.

4. Conclusion
Under this teaching mode, students are provided with diversified design thinking modes through investigation, discussion, design, evaluation and other links. They are no longer constrained by the original design field, but also have the spirit of pioneering and innovation. The final works also show good design results under this open thinking mode. This open cross-border design method greatly propels students' participation and interaction in the classroom, and at the same time it also greatly stimulates students' enthusiasm and initiative, encouraging students to create design works with unique artistic charm.

Acknowledgment
Fund Project: 2018 HeiLongJiang Province Art Science Planning Project -- Research on innovative design based on Sui Ling black pottery technology of heilongjiang province (Project Number: 2018B080)

References
[1] Peng De. (2017) Future Trend of Sculpture. Sculpture.
[2] Yu Ziyu. (2015) On the Combination of Sculpture Art and Product Design-Creating a New "Communication Field". Sculpture.
[3] Wu Shaoan, Yu Siying. (2015) Research on Product Design Combining Function Realization with Sculpture Art. Sculpture.
[4] Blanco Lukic, Barry Katz. (2012) NONOBJECT Design. Tsinghua University Publishing House. Beijing.