

Exploring an Approach to Transforming the Traditional Chinese Cultural Heritage into Modern Product Design Education – A case Study of Yingjing Sand Vessels

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ABSTRACT

This study explores teaching approaches in design education focused on transforming traditional Chinese cultural heritage into modern product designs. It aims to develop a teaching model integrating traditional culture into product design education. The research examines the current state, main contents, theories, and principles of traditional culture integration into product design education. It then develops a basic teaching framework for integrating traditional culture into product design. Finally, the study uses design outcomes from project-based courses to collect data and analyse results. The research centres on a case study involving the redesign of the Yingjing Sand Vessel, a non-heritage vessel from Sichuan, China, within a design project-based course. Utilising Design Development Research (DDR), the Nominal Group Technique (NGT), a qualitative research methodology for data collection and document analysis. The outcomes of this study serve as a valuable exploration for developing a teaching model that fosters the integration of traditional culture into product design education and offers insights into enhancing the pedagogy and the societal impact of design courses in higher education.

INTRODUCTION

On the one hand, design faces the dual challenges of cultivating unique product identities and enhancing competitiveness in the era of globalisation. Traditionally influenced by Western design paradigms, the Chinese product design industry has recently begun emphasising cultural elements in its design approach (Yu, 2018; Ding, 2024). Although this paradigm has shifted, a comprehensive methodology for integrating cultural traditions into modern product design still needs to be developed. This state of affairs has also led to the superficial incorporation of cultural

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elements into product design in teaching and learning (Ling et al., 2024). Consequently, there is an urgent need to develop an effective design teaching system that facilitates the transformation of cultural heritage into innovative value. This shift is essential for fostering a competitive design advantage (Lin et al., 2016).

On the other hand, according to the General Offices of The State Council of China (2017), there is an increasing trend to deeply inherent moral education resources from cultural traditions to strengthen confidence in socialist culture with Chinese characteristics. Therefore, guided by the inheritance of traditional Chinese culture and technical innovation, it is necessary to develop a modern education system with Chinese characteristics. This includes integrating traditional Chinese culture into knowledge acquisition, reshaping the knowledge landscape, reimagining thought processes, and emphasising curriculum diversity. These efforts aim to create new knowledge and ensure sustainability by fusing traditional and local cultures.

In this context, the study investigates how to effectively integrate local traditional elements into modern product design within the framework of a project-based course. It focuses on a mandatory course for third-year undergraduate students majoring in product design, titled "Design Project: Cultural Creative Product Design." This course has been a staple in the curriculum of the Product Design Bachelor of Arts program at Chengdu Fine Arts Academy in China for nearly a decade. This cultural and creative design project has cultivated an interdisciplinary approach, leveraging a teaching model that engages various stakeholders, including schools, enterprises, design companies, and competitive platforms. The course selects explicitly the Sichuan Yingjing Black Sand Vessels, an intangible cultural heritage of Sichuan Province, China, as its focus, which revolves around practical design project participation, primarily aiming to equip students to understand local culture and foster innovation in product design by abstracting and transforming traditional elements.

LITERATURE REVIEW OF TRADITIONAL CULTURE INTEGRATED TO MODERN DESIGN

The Main Contents of Integrating Traditional Culture in Modern Product Design Education

To establish a localised Chinese design system in the context of globalisation, traditional cultural education must be prioritised. This involves a deeper understanding of traditional culture and an enhanced exploration of traditional and folk graphics in China (Huang, 2023). According to Kelly (2016), the strategy to achieve this goal includes offering courses centred on traditional culture and art combined with practical project work. Meanwhile, other scholars suggest integrating traditional culture into modern design education should focus on appreciating cultural heritage while exploring modern design concepts (Ling et al., 2024).

In 21st-century China, higher arts and design education should integrate traditional national culture into its framework and promote unity among different nationalities through "localisation" (CHEN, 2011; Lebedev, 2021). China is a multi-ethnic country with a long history and rich regional ethnic cultures that are crucial to China's heritage and identity. Multiculturalism emphasises the importance of acknowledging differences within mainstream culture, particularly by embracing popular culture to reflect the richness of Chinese culture. Therefore, to bring design education in line with international standards, it is essential to preserve and integrate national, regional, local, and popular cultures (Beacco et al., 2016).

Principles and Methods of Traditional Cultural Elements Transformed into Product Design

Zhang (2019) delves into the semantics of regional products. His insights offer principles that could bridge traditional culture with modern design, forming a teaching path for converging traditional and contemporary design methodologies. Zhang centres on the amalgamation and reconfiguration of traditional cultural symbols in product design, encompassing symbols of Chinese philosophical consciousness, traditional forms and lines symbols, colour representations, and material symbols, as depicted in Figure 1.

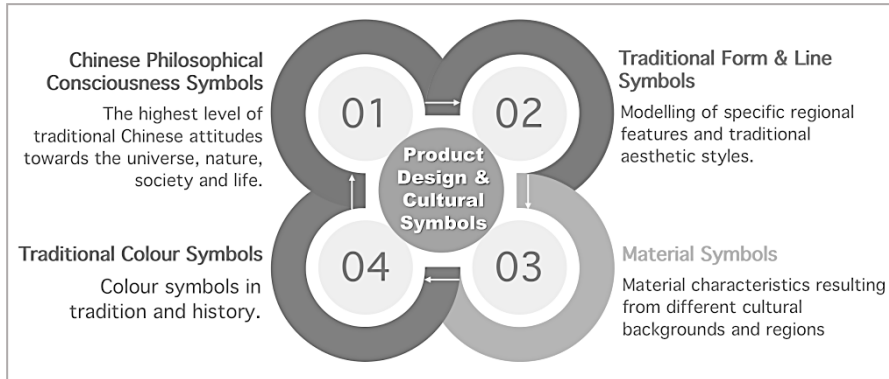


Figure 1. Product design and cultural symbols. (Adapted from Zhang, 2019; redrawn for this study)

Another two scholars Lin and Sheng, building on previous studies in 2011, point out that cultural symbols could be incorporated into the design with the three design features identified to the inner level (such as stories, emotions, and cultural features), the mid-level and the outer level (dealing with function, operational concerns, usability, and safety), and the outer level (including colour, texture, form, decoration, surface pattern, line quality), as shown in **Figure 2**.

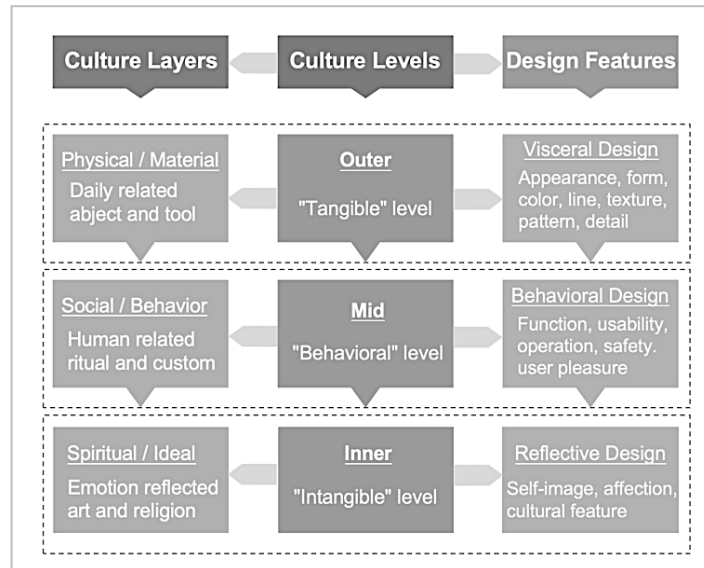


Figure 2. Three layers and levels of cultural objects and design features. (Adapted from Hsu & Lin, 2011; redrawn for this study)

Traditional culture is not confined to mere forms, styles, or symbols. It encompasses a profound philosophy that extends into aspects of daily life, value systems, and the emotional richness of cultural heritage. Within various educational frameworks, there is a growing recognition of the need for a holistic integration of culture, aiming to impart a deeper understanding of the humanities to students and infuse contemporary innovation and design with cultural depth. Those principles and methods highlight the importance of integrating various levels of traditional cultural symbols into modern product design. Zhang categorises these symbols into philosophical, aesthetic, material, and colour aspects, providing a comprehensive framework for incorporating cultural heritage into the design. Lin elaborates on how these cultural symbols can be embedded into design through three distinct layers—outer, mid, and inner—each with specific design features and focus. Together, they propose a holistic approach to enriching product design with deep cultural significance, ensuring that designs are functional, visually appealing, rich in cultural heritage and emotional resonance.

RESEARCH METHODOLOGY

Design Development Research (DDR)

This study relies on the theoretical principles of Chinese traditional heritage elements transforming modern design while exploring the design teaching model based on the design development research (DDR) in design education. According to Richey & Klein (2014), the differences and relationships between the two general design and developmental research types are shown in Table 1. below:

Table 1. Two types of developmental research by Richey & Klein (2014)

Aspect	Type 1	Type 2
Emphasis	The study of a special product or design program, the development and evaluation of projects	The study of design, development, or evaluation processes, tools, or models
Product	Lessons learned from developing specific products and analyzing the conditions that facilitate their use	New design, development, and evaluation procedures and/or models, and conditions that facilitate their use
Result	Context-specific Conclusions	Generalized Conclusions

The traditional heritage cultural core elements integrated into modern design education research must incorporate user feedback evaluation regarding strengths and weaknesses. This is a special teaching design to design, develop, and evaluate the importance and effectiveness of the teaching design model based on specific projects. Therefore, the study uses the first research design and development type to create a teaching design and model exploration.

Based on the DDR research method, this study employs qualitative research. It divides the course teaching design progress into five steps: 1) the preparation stage, document analysis, field research, and the Nominal Group Technique (NGT); 2) the second stage, teaching design and teaching model; 3) the third stage: teaching & learning implementation; 4) the fourth stage: assessment of instructional outcomes; 5) and the fifth stage: summary and conclusions for development the new teaching design and teaching model in the near future. In short, as shown in Figure 3, a more efficient teaching model is constantly upgraded and developed through the final assessment results and the feedback from each session on the previous one.

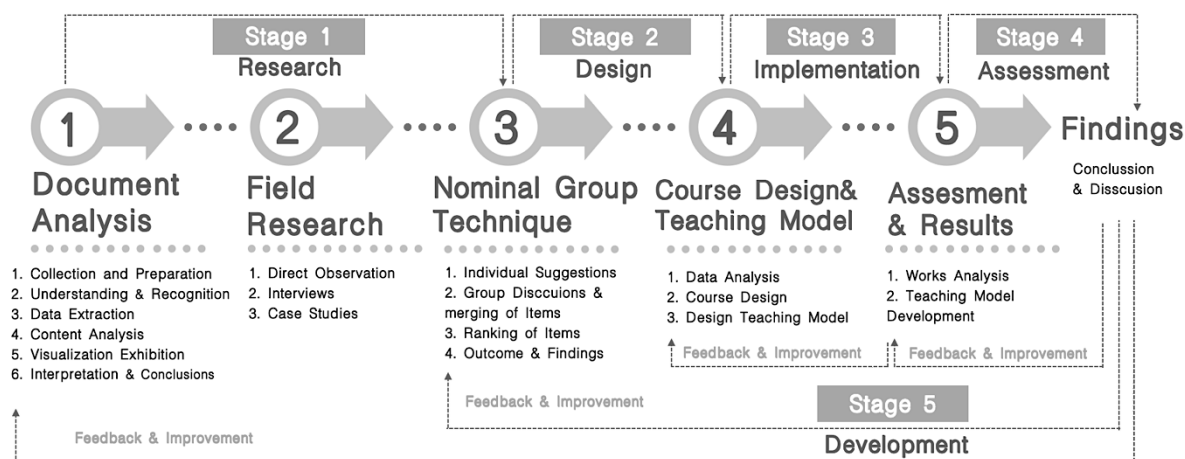


Figure 3 Research design and process by the author

Participants and Pre-teaching Preparation

The participants in this study consisted of three faculty members and 51 Year 3 students from the Industrial Product Design BA programme of the Chengdu Academy of Fine Arts in Sichuan Province, China. As shown in Table 2.

Table 2. The participants and data collection details

Respondents	Instruments	Data analysis
3 Teachers	Document Anlysis; Field Research & NGT	Qualitative
51 Students	Document Anlysis of the Stendents' Work	Qualitative

Course objectives from syllabus analysis

As a senior-level mandatory course, Cultural Creative Product Design is a culmination of the design fundamentals, foundational skills, and methodologies acquired during the initial two years of study. The curriculum for this course places a significant emphasis on fostering students' proficiency in applying design principles to comprehend and transform cultural concepts. This is achieved through a multifaceted approach involving the exploration of local cultural ideas and their integration into specific products, the examination and extraction of cultural elements for functional innovation, and the development of creative skills in extending and integrating materials, all while concurrently considering the alignment of design with contemporary market innovations and consumer trends as well as modern lifestyles. As shown in Table 3.

Table 3. Summary of the course objective and teaching outline

Phase Steps	Course Targets	Outline of Teaching Content
1. Understanding of Basic Knowledge	Understanding and transforming the core values of culture	1) Knowledge and understanding the cultural connotation of Yingjing Black Sands;

2. Understanding & Applying	Knowledge and understanding of function and materials in product design	1) Knowledge of the material of Yingjing Black Sands; 2) Understanding of the main craft skills 3) Recognise the traditional Yingjing Sands products and their function
3. Understanding & Analysis	Analysis and understanding of the user's needs	User analysis and design concept
4. Analysis & Application	Creative redesign	Design thinking and ideas
5. Extended Capabilities	Cultivating cultural heritage-orientated design thinking	Explore and study the influence and modern transformation of cultural heritage and design

Project understanding: product design based on Yingjing Black Sands culture

Sichuan Yingjing Black Sand Vessels are an intangible cultural heritage of Sichuan Province in China. According to the documents conducted in China, the production of Yingjing sand vessels dates back over 2000 years, with its development continuing. Yingjing black sand, which emerged during the Spring and Autumn Period and the Warring States Period (The Qin & Han Dynasties), is considered a significant traditional handicraft with a rich historical background in Sichuan province (Xuemin et al., 2023). The main production hub for Yingjing sand vessels is the Ancient City Village in Liuhe Township, Yingjing County, Ya'an City, Sichuan Province. This location also houses the Yandao Ancient City Site, a provincial cultural relic under protection (Ying et al., 2020). Currently, Yingjing Black Sands Vessels production still follows the traditional handmade workshop production method inherited from history. This primitive and simple handmade production is characterised by delicacy, uniqueness and non-repeatability, so the unique advantages of Yingjing Black Sands Vessels lie mainly in the materials and traditional craftsmanship. However, it also has the unavoidable disadvantage of needing more ability to innovate and help meet new lifestyles through mass production (Xuemin et al., 2024). See Figure 4 below for some traditional Yingjing Black Sand Vessels.



Figure 4. Traditional Vessels from Yingjing, photo by the author

Field Research in Yingjing

Field research is a qualitative data collection method aiming to observe, interact with, and understand people's experiences in a natural environment (Bailey, 2017). This study uses three field research methods: direct observation, qualitative interviews, and case studies. The teachers

travelled to Yingjing County, Ya'an City, Sichuan Province, in August 2022 to conduct a three-day field study of Yingjing Black Sand Vessels, which involved visits to the Black Sand Vessels Museum, Black Sand Vessels commercial street, handmade workshops, interviews with practitioners, and brand shop visits, as shown in Table 4.

Table 4. Summary of three methods in the field research

Direct Observation	Interviews	Case Studies
The process, ingredients and procedures of traditional black sand handmade products are complicated and the efficiency of manual production is low.	Demand for traditional black sand handmade wares, especially traditional edible casseroles and decoction herbal pots, is low Demand for black sand handmade wares is decreasing year by year.	<ul style="list-style-type: none"> Brand: Zhu's Sand Ware; Founding Designer (Master Craftsman): Zhu Qingping Transitioning from traditional artisanal products to mid- to high-end crafts, we have solved some of the problems associated with traditional sandwares that are not resistant to burning on modern stoves and the pollution of the environment caused by production wastes.
The product category of Black Sand Ware is still relatively traditional, failing to keep pace with the times with more innovation and not enjoying high sales and awareness among young consumers.	The lack of skilled personnel, which is decreasing year by year, has led to the weakness of the artistic addition of black sand artefacts and the ability of modern innovation and research and development.	<ul style="list-style-type: none"> Brand: Yingyao Sand Vessels; Founding Designer (Master Craftsman): Ye Yao Developing from traditional artisan products to high-end customised artworks, the company fully integrates business platform operation, personal influence and philosophical concepts, and lifestyle into its sandware works to create a high-end food culture and brand of fashion concepts.
The local government pays more attention to the regional non-heritage cultural resources. It actively promotes cooperation and innovation at all levels, such as investing in the construction of the Black Sand Museum, Black Sand Street, Art and Culture Village, etc., but the management needs to be upgraded.	Innovative R&D of black sand materials and low effectiveness of raw material supply chain optimisation and management	<ul style="list-style-type: none"> Brand: Ying Shan Shao; Ying Handcraft Workshop Founding Designer (Master Craftsman): Young start-up designers. With a certain modern design education background, willing and enthusiastic to devote themselves to the research and development of the production process and product design of sandwares, most of which are mainly tea wares, but also artworks of decorative wares.

Teaching Design with The Nominal Group Technique

The process of the teachers' meeting in this study, based on NGT, unfolds as follows: 1) Group members articulate their opinions regarding the proposed solution, accompanied by brief explanations; 2) Redundant solutions are removed from the comprehensive list of all proposed solutions; 3) Members then rank the remaining, as shown in Figure 5 and Table 5.

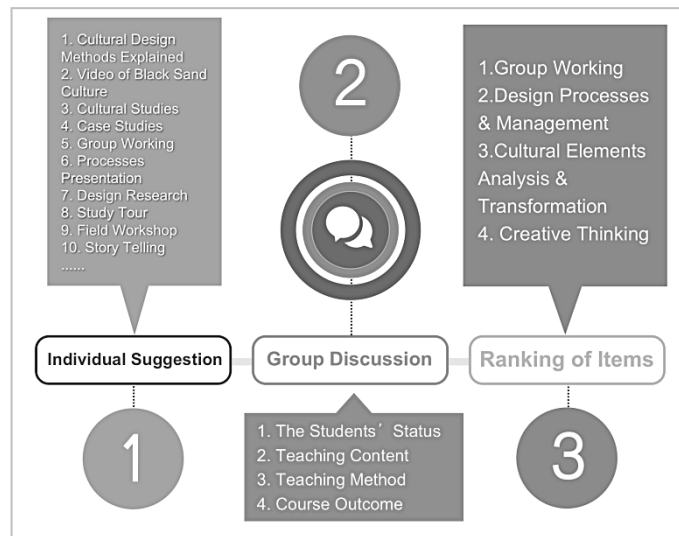


Figure 5. The NGT process in this study.

Table 5. The discussion of the teachers' meeting.

Teacher Meeting	Discussion Topics	
Wang L.	Teaching content	1) Knowledge related to Yingjing Black Sand 2) Cultural creative design methods and core elements transformation 3) User and Market Analysis
You Xue M.	Teaching Method	1) Lecture 2) Group Working 3) Field Trips & Workshops 4) Process presentation & tutorial
Zhang S.	Course Outcomes	1) Design process analysis & presentation 2) Final work

Pedagogical Framework and Teaching Design

The pedagogical framework and teaching design are based on analysing the syllabus, field research, and discussions with the nominal group technique. It focused on integrating traditional culture into the cultural creative project of 'Yingjing Black Sand Products Redesign', as shown in Figure 6.

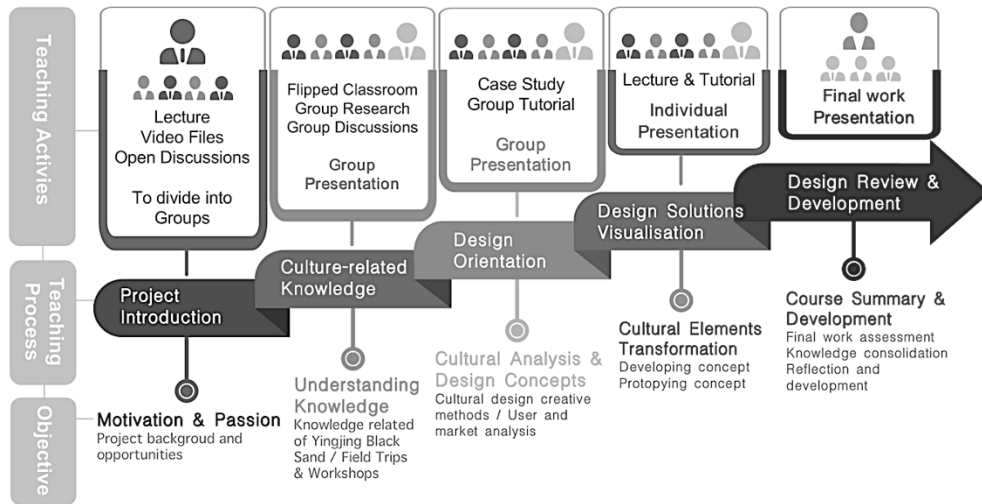


Figure 6. The teaching design and pedagogical framework by the author

Student-centred Learning Model Driven by Group Work and Presentation

During the whole teaching process in class, teachers play primary roles involving classroom coordination and teaching planning. The emphasis lies on fostering an inclusive classroom environment that prioritises student interaction, focusing on the often "invisible" aspects of the design process to make these cognitive processes more explicit. This facilitates the comprehensive development and presentation of thinking pathways and rules. The teaching process unfolds through five main stages:

Stage 1 Involves group work centred around the assimilation of project-related information and building awareness of the design project.

Stage 2: Building upon the shared and digested information from Stage 1, this phase focuses on extracting cultural elements to formulate design directions and cultural transformations.

Stage 3: Students regroup for case studies, discussions, and conceptual translation studies based on their individual design direction preferences. This stage also includes collaborative efforts in product function, innovation design, and user and market analysis.

Stage 4: Begins with a lecture on the methods and principles of cultural and creative transformation, followed by group discussions to gain a deeper understanding. Students then individually determine their design concepts and elements, initiating the visualisation and development of their ideas.

Stage 5: The final design proposals are presented and reviewed, concluding the course with a comprehensive summary and an opportunity for reflection.

Design Analysis and Transforming Process and Visualisation Teaching Management

In each group work phase, the teacher utilises visualisations such as hand-drawn sketches, charts, and data representations to guide the evaluation process. This approach diverges from the requirement for students to submit generic design descriptions and sketches as part of their program reports (see Figure 7). Instead, it steers students through the intricate process of comprehending, extracting, transforming, and innovating multifaceted and culturally diverse themes. The aim is to methodically break down the essence of these themes, resulting in a

product rich in humanistic qualities, highly functional, and commercially viable. This approach allows for the organic integration of various elements into a cohesive and layered whole.



Figure 7. Excerpt from the student design transforming processes used in their presentation

RESULTS AND DISCUSSION

Findings from the Course Design Work Analysis

The project ‘Yingjing Black Sand Products Redesign’ course process of the design model took approximately 90 class hours within 45 days in Year 3, Design Project: Cultural Creative Product Design at the Chengdu Academy of Fine Arts. A total of 51 students from this grade worked in groups, sharing research and analysis and making group and individual presentations, resulting in a total of 51 pieces (sets) designs in five design directions and five dimensions and traditional cultural integration (different students integrate more or less categories), which showed a variety of cultural elements in the modern design transformation of the Yingjing Black Sand culture (in Table 6).

Table 6. The results of the course design work analysis.

Type of Design Direction	Categorisation	Number of Students	Proportion
Integration of Traditional Heritage Cultural Elements	• Local natural modelling elements	12	24%
	• Black sand material elements	51	100%
	• Traditional black sand vessels form development	24	48%
	• Modern lifestyle home appliances innovation	8	16%
	• Traditional thought collides with new trends	4	8%
Product Type Design Direction	• Tea-drinking & tableware	15	29%
	• Cooking pots & pans	9	17%
	• Home life small products	12	24%
	• Decorative art	10	20%
	• Internet elements cultural creative products	5	10%

In summary, the final design work reflects the teaching goal of cultural integration of modern design, especially for the integration of the local characteristics of the material Yingjing Black Sands to achieve a high degree of coverage in the design of the teaching strategy of the group work effectively will be the selection of students' design direction to play a balanced and diversified role in the selection of the direction of each of the programme of the differentiation and in-depth degree of depth, according to the differences between different groups and the ability of students.

Student ability. For the tea-drinking and tableware group, which has the most significant number of students in the design direction, because of the closest proximity to the traditional black sand products and the consistency of the materials used, the degree of creativity is relatively low. The expression of the design concepts is mainly obtained through optimising the shapes.

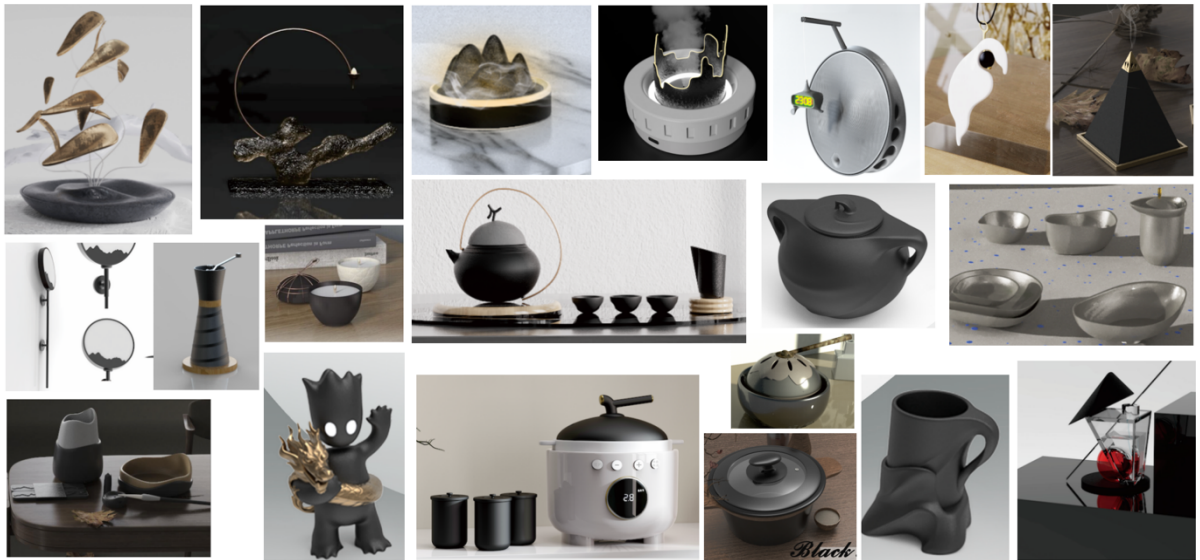


Figure 8. Some design works from different directions

DISCUSSION

Firstly, analysing design projects that aim to infuse local culture into creative endeavours reveals the importance of active engagement by both teachers and students in on-site field research. Unfortunately, due to the constraints imposed by the COVID-19 pandemic in China, the course had to cancel the off-campus field research workshop. The absence of direct, hands-on experiences significantly impacted students' ability to grasp and relate to the culture, resulting in limited depth in their design projects. Consequently, this limitation also affected the level of creativity demonstrated in the students' work.

Secondly, the Nominal Group Technique (NGT) has significantly enhanced teaching design and group work within the entire project-based course. However, it is essential to acknowledge that the participants, primarily modern design teachers, possess certain limitations in their perspectives, especially when addressing projects related to traditional culture. Scholars (Tu, et al., 2021) have pointed out that involving professionals from diverse backgrounds can be instrumental in achieving the common objectives of design education and social impact. For future research endeavours focused on integrating traditional culture into teaching, it is advisable to diversify the NGT participants by including individuals from various backgrounds. Specifically, incorporating relevant artisans and designers from the industry into the discussions can offer a more comprehensive and enriched perspective.

Finally, this design project did not result in the realisation of a commercial product in collaboration with the company due to specific difficulties encountered during the sub-process. Consequently, the design work could have contributed more to social impact. However, an in-depth exploration of creating a social collaboration platform could help connect the design

program with society, providing more opportunities to incorporate culture into interactions with product companies, public presentations, and commercial opportunities (Manzini, 2014; Elsbach, 2018; Wrigley, 2020). Through a more open pedagogical process, the public could better understand design and cultural heritage, thereby enhancing the social impact of design education (Xuemin et al., 2024).

SUGGESTIONS

Generally, this course met the teaching objectives for the "Yingjing Black Sand" product redesign project. Throughout the educational design process, students demonstrated varying degrees of reimagining cultural connotations and expanding traditional forms. The integration of Chinese traditional culture enriched the value of their designs, gaining recognition from contemporary consumers by infusing internal emotional resonance, combining local materials, incorporating creative functions, and enhancing the external aesthetics of modern products.

Implementing the Nominal Group Technique (NGT) in designing the teaching program significantly contributed to exploring how the course model can effectively enable students to transform intangible cultural resources into innovative and vibrant designs. Future courses should continue to leverage this technique to foster collaborative and inclusive educational environments. The teaching design combined Design Development Research (DDR) and NGT, creating a robust, sustainable framework for the project-based cultural creative product design course and development. Field research should be adopted as an essential section for further design courses to enhance students' understanding and innovative application of cultural elements.

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