Transforming Chinese Cultural Features into Modern Product Design

Yukun Hu[1(✉)], Suihuai Yu[1], Yafang Ju[1], Dengkai Chen[1], Weiwei Wang[2], Yanpu Yang[3], and Chen Chen[1]

[1] Northwestern Polytechnical University, Xi'an, People's Republic of China
huyukun0315@163.com
[2] Shaanxi University of Science and Technology, Xi'an, People's Republic of China
wangjiarui1202@163.com
[3] Chang'an University, Xi'an, People's Republic of China

Abstract. With the advent of experience economy, people are more pursuing the cultural meaning of products and spiritual satisfaction brought to them. The combination of design and culture is a trend of economic development. In this context, products with cultural characteristics have started hitting the market. Chinese traditional culture, with its beautiful and primitive visual arts and crafts, provides great potential for improving design value and gaining recognition in the global market. There is evidence that Chinese traditional culture is likely to become an important cultural element in future design applications. The purpose of this paper is to explore the connotation of Chinese traditional culture and explore its cultural characteristics. This article attempts to describe how to transform Chinese cultural features into modern product design to provide a good user experience and meet the users' needs.

Keywords: Experience economy · Cultural experience · Cultural product design · Cultural application · Chinese traditional culture

1 Introduction

Experience economy is gradually developing into the fourth stage of human economic life [1, 2]. Under the this background, customers are no longer satisfied with the basic material enjoyment brought by products, but pay more attention to the cultural connotation and artistic value of products to experience the emotional satisfaction. The emotional change of users is the most direct manifestation of user experience [3]. In order to meet this new demand, it is more and more important to improve the cultural connotation of products. Through the development and redesign of cultural resources, the product can be endowed with cultural attributes and the connotation of design can be enriched to meet the requirements.

At the same time, designers recognize the importance of linking products with cultural characteristics to provide unique value, and incorporate local culture into the design in order to create product identification strategies in the global market [4, 5]. Industrial

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design plays an important role in this process, embedding cultural elements into products and enhancing their cultural value in a competitive global product market. Therefore, it can be said that designing products with local characteristics to emphasize their cultural value has become a key issue in the design process [6, 7].

Therefore, this paper proposes a method to integrate culture into products. Starting from user experience, this method conceives how to transform cultural elements into product design elements based on the three levels of user experience, and carries out cultural design of products according to the conception. We perform a user study to evaluate our method. The evaluation and results confirm the convenience of our method for cultural product design.

In the remainder of the paper, Sect. 2 reviews the way how the culture is integrated into the product. Section 3 explains the motivation of proposing the method of this paper. Section 4 explains the implementation process. Section 5 presents a case study to demonstrate its effectiveness. We conclude and describe the future work in Sect. 6.

A central idea of our work is trying to find a way to transform cultural elements into product design elements according to the three levels of user experience, and assist designers to design cultural products, so as to create a good cultural experience for users. We hope the methods and steps mentioned in this paper can help designers interpret and sort out culture elements, and put it into the design practice. The method can not only provide reference for the design of cultural products, but also enhance the cultural attribute of products. Moreover, products designed in this way would provide users with multi-dimensional cultural experience.

2 Related Works

Culture plays an important role in the field of design, and it will become a design trend in the global market to incorporate more cultural elements into products. We need to better understand our own culture, not only to participate in global markets, but also to develop local designs [8–14]. The importance of cultural research has been repeatedly demonstrated in various fields of technical design and researchers have also made many explorations. Wu et al. put forward a design process, which includes collecting related materials, analyzing materials, brainstorming, hand drawing, printing a 3-D model, confirming the final design, based on the proposed appearance–behavior–culture (ABC) theory. And the effectiveness is verified through the design case of glass teapot, proving that the process can be used to enhance cultural factors in product design [15]. Huang et al. emphasized the impact of "benevolence" and "propriety" on kids' home products design and proposed some suggestions, which explored how to apply the essence of traditional Chinese cultural values in user experience design of kids' home products [16]. According to the characteristics of the development of creative museum cultural products, Song's article discussed the whole development process of the "Ceramics and Wood" hanger series of Nanjing museum. The development process included product issues, concept visualization, and design commercialization as well as exploring the product lifecycle [17]. Designers [18] obtain important cultural elements from collecting and analyzing native cultural information and then design their products after brainstorming for the correlation between cultural elements and popular daily products.

Instead of directly applying cultural into design practice, some researchers [19] first translate cultural knowledge into useful design information and then apply it in the three steps of modern product design. They design the incense burner based on the image of Mazu.

In recent years, researchers have been gradually considering the experience aspect of the design of cultural creative products. Yang's article introduces the perspective of emotion reflection to design experience based Museum Cultural creative products. From the cultural emotion connotation of cultural creative products in museums, this paper discussed the value and application of emotional reflection in the design process [20]. Sun et al. introduced a design method to optimize products from the perspective of user experience. Based on the experience design theory, traditional culture is applied to modern product design, taking cultural creative product design of Chinese Museum for example. But the interaction of three levels, aesthetic level, behavior level and reflective level, is not considered [21]. In fact, all levels of user experience often do not exist in a single product. Meanwhile, from the perspective of user experience, the exploration of integrating culture into products is relatively small.

Based on previous studies, this paper offers a method of integrating culture with products. First, literature review is used to collect and sort out elements of a chosen culture. Secondly, brainstorm and visualize the results in the form of brainstorm map. Affinity Diagram [22] is used to summarize the results of brainstorming and sort out more useful information. Then, the product culture design is conceived based on the three levels of user experience. Finally, cultural products are designed according to the concept to create multi-dimensional cultural experience for users.

3 Motivation

3.1 Assisting Designers to Design Cultural Products

Effective creative design strategy of cultural products can help designers to make traditional cultural images and modern design complement each other. This research can assist the designer to choose the appropriate design means and methods in the more concrete process. By selecting cultural image elements at different levels and aiming at different types of consumers, it will help develop products with Chinese cultural characteristics in an all-round way and promote the vigorous development of related cultural industries.

3.2 Inheriting and Enriching the Forms and Connotations of Traditional Culture

The use of traditional cultural images in the design process can enable designers to understand and reflect on traditional culture. The cultural products designed in this way contain the designer's own thinking and act as a bridge between designers and users, helping them communicate with each other and giving users chances to experience the unique cultural image connotation. Through the continuous communication between people and products, the traditional culture can be well inherited.

4 Proposed Method

The paper presents a method that integrates culture identity into products design to provide effective references for designers. The flowchart is shown in Fig. 1. First, a specific culture is sorted out and interpreted. Second, based on the three levels of user experience, the conception of cultural design are sorted out, and then the conceptual design is carried out according to the conception of cultural design, which involves the cultural design of product form elements, the cultural design of product function interaction so as to evoke the emotional experience including memories or thoughts of users. Our approach consists of three main steps as follows.

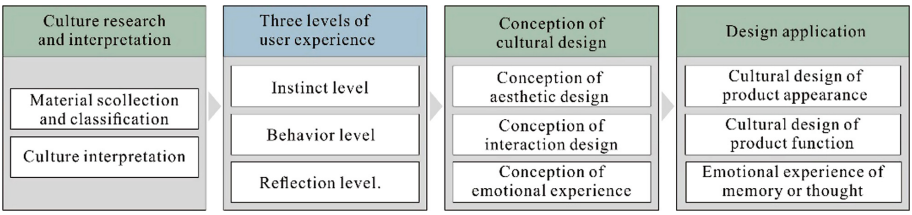


Fig. 1. Flowchart

4.1 Research and Interpretation of Culture

Cultural research needs to be based on huge data and information. First of all, the cultural materials are collected and classified through books, papers, journals, etc., then the specific culture is analyzed and interpreted by brainstorming, the brainstorm map is also drawn in a visual way to record brainstorming results in detail. By thoroughly interpreting culture connotation, we can get as many usable design elements as possible.

4.2 Conception of Cultural Design Based on User Experience

Before being applied to practice, the determined cultural elements are still scattered and unrelated to each other. The construction of design conception is an effective way to integrate and reorganize these cultural elements to the product design and provide users with cultural experience in an optimized way, which provides guiding information for the design and implementation of cultural and product integration. Conception of cultural design links culture and design practice.

Conception of Aesthetic Design. The conception of aesthetic design is the basis of the cultural design of product appearance, which creates the instinctive experience under particular cultural background for users. In other words, cultural elements are applied to product design by using the form elements of design, and aesthetic innovation is realized in the aspects of modeling, color and material quality by following the laws of formal beauty.

Conception of Interaction Design. It is cleared that how to let users experience culture when using products, get surprised by culture elements under the products meeting the availability, applicability and usability. In addition, to be based on ergonomics, it is supposed to pay attention to the cultural elements which can be used for enhancing users' experience. What's more, the details occurred in the communication and interaction between users and the product are also should be valued, so that users can feel the comfort and the cultural features of the product at the same time.

Conception of Emotional Experience. Conception of emotional experience provides the basis for the reflection layer design of product culture. Emotional experience is an abstract feeling, to some extent, it comes from user's perception of the appearance and using feelings of the product, which can enable users to reflect on the culture contained in the product after using the product, and arouse the deep memory or emotional resonance of users.

4.3 Design Application

Corresponding to the level of user experience, the application level of traditional culture in product design can also be divided into three levels.

Cultural Design of Product Appearance. The cultural design of the product's appearance refers to the application of visual elements peculiar to cultural elements, including color, texture, shape, decoration, line, detail processing, construction and composition, on the product, which contains both a detailed decoration on the surface of the product and an overall application of elements.

Cultural Design of Product Function. Take an in-depth understanding of the skill, function, operability, convenience of use, safety, combination relationship and other attributes contained in cultural elements, then realize them in the product application.

Emotional Experience of Memory and Thought. The traditional spiritual emotion is placed in the design expression and the spiritual connotation contained in the cultural elements is conveyed through the product design. In results, cultural creative products at the reflective level can easily arouse people's inner cultural identity.

5 Case Study and Evaluation

To verify the validity of the proposed method, the smart watch design project was introduced for verification. At present, the phenomenon of market homogeneity of wearable products is becoming common, especially in the field of smart watches. Through the exploration of Chinese traditional culture, the combination of cultural concept and wearable products endue products with cultural meaning and the competitiveness of differentiated products.

Five participants were recruited to design the wristwatch. The test results show that the method achieves a satisfactory interpretation. The evaluation suggests that the scheme designed by this method contains cultural connotation and can satisfy the users' requirements of culture.

5.1 Research and Interpretation of Kungfu

Literature review was used to obtain information about Kungfu through books, papers, journals, academic websites and other means. After the collection and arrangement of related materials of Kungfu, the author analyzed and interpreted Kungfu culture, and combined personal thoughts and opinions to the brainstorm map, visualizing the results in detail. Figure 2 shows the brainstorm map of one participant (participant number P3). See English translated version in Appendix A.

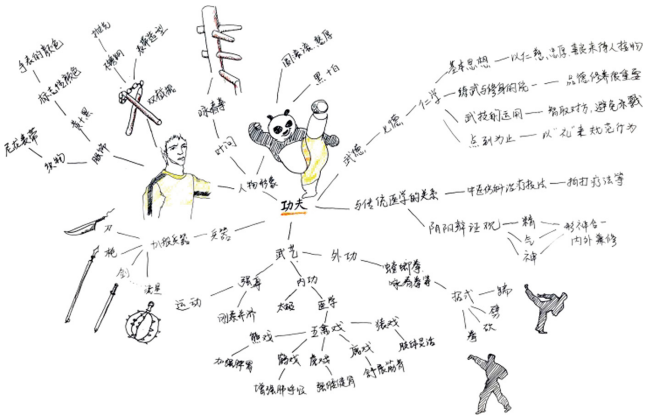


Fig. 2. Brainstorm map of Kungfu

5.2 Design Conception

Affinity Diagram was used to summarize and group the products of brainstorming according to the three aspects of aesthetic experience, interaction experience and cultural emotion experience, as shown in Fig. 3. Then, based on the three levels of user experience, the product culture design is conceived. See English translated version in Appendix B.

Based on the three levels of user experience, the cultural design conception referring to some ideas in the affinity graph was completed. Figure 4 and Fig. 5 show the conception of the two participants (participant number P3, P5).

5.3 Design Application

In this part, participants should pay attention to how to integrate the design elements of Kungfu culture into the product according to the design conception, when drawing sketches, and realize the user's three levels of experience on the basis of integration. Concrete sketches are able to iterate quickly, refine ideas and generate new ideas, and also help designers to refine the shape, color, material and pattern of design objects quickly.

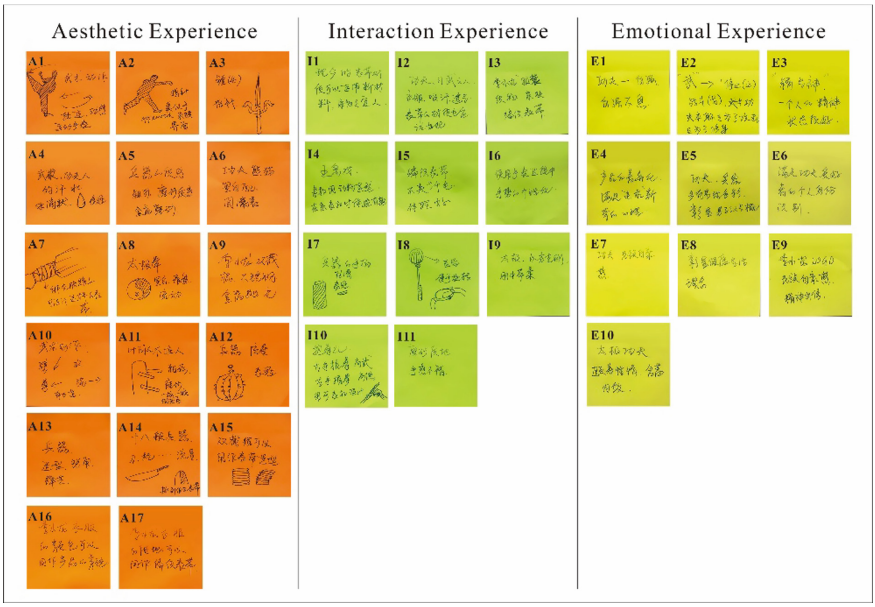


Fig. 3. Affinity diagram

Fig. 4. Conception of P3

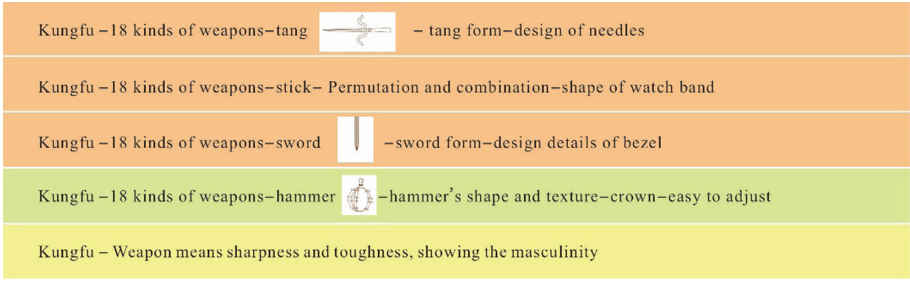


Fig. 5. Conception of P5

Sketch according to P3 design conception, is showed in Fig. 6. Nunchaku has become the symbol of Bruce Lee because of his excellent technique of it. In this scheme, the rough

wooden property of the Nunchaku is used for the surface treatment of the watchcase, and the metallic frosted texture is used to show the masculinity. The clothes for martial artists are mostly made of sweat absorbing and ventilating materials. The watch strap is made of nylon cloth, referring to this feature, which is more skin friendly and comfortable. Black and yellow, Bruce Lee's classic clothing colors, are chosen to complete the color matching of the watch band. Generally, it satisfies the personal identification of sports enthusiasts and people who are interested in Kungfu, showing a healthy life style.

Fig. 6. Sketch of P3

Sketch according to P5 design conception, is showed in Fig. 7. The idea of this scheme mainly comes from the weapons related to Kungfu. Eighteen kinds of weapons are symbols of Chinese martial arts and weapons, which has a long history, and each of them has its own characteristics. The surrounding of the watchcase is decorated with the shape of "sword" and the surface is polished to imitating the texture of sword. The strap form is made of many arranged and combined cylinders like the shape of a stick. The crown is designed in the shape of "hammer", which is convenient for users to adjust. Overall, the whole watch has the characteristics of sharpness and firmness, showing the masculinity.

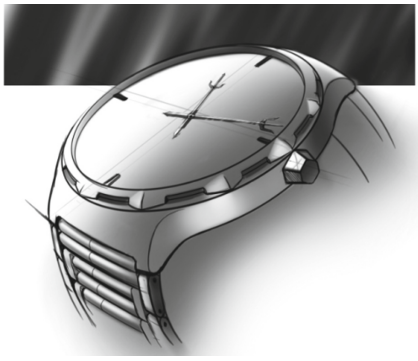


Fig. 7. Sketch of P5

5.4 Design Evaluation

8 users evaluated the schemes (23–34, 4 female). Liker scale method was used to score whether the scheme conforms to the cultural image of Kungfu. The 7-level attitude is: very consistent/3, consistent/2, fairly consistent/1, general/0, hardly consistent/- 1, inconsistent/- 2, very inconsistent/- 3. The evaluation results are shown in Figure n. More than 60% of participants thought that these two design schemes are fairly consistent, or consistent, or very consistent with cultural images (Table 1).

Table 1. Evaluation results

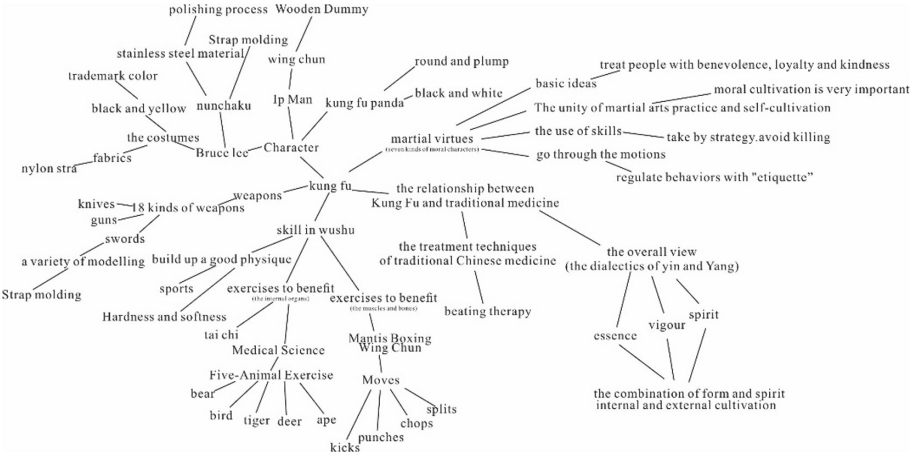
	U1	U2	U3	U4	U5	U6	U7	U8
	3	2	-1	3	2	1	0	2
	2	2	1	0	-1	0	3	1

6 Conclusions and Future Work

Taking user experience as the core, this paper proposes a method of cultural products design. It deeply excavates the needs of user's experience and satisfies their deeper needs for culture when defining the cultural connotation of products, Cultural design clues are constructed from aesthetics, using experience and feelings. It shows how to attract users by the external cultural features of products so that users desire further contact with the product. At the same time, it makes users feel the culture characteristics when interacting with the product and cause emotional resonance and value identification of users, creating a physiological, psychological and other multi-dimensional spiritual and cultural experience for users. The integration of culture and products is an effective method to enrich the cultural connotation and increase value to products, which realizes the organic unity of cultural value and practical value of products, providing valuable reference for designers to design successful cross-cultural products.

In the future research, in addition to extensive literature review, field investigation and interviews are suggested to accurately understand the Kungfu culture and avoid incorrect interpretation when transforming cultural characteristics into modern product design.

Appendix A



Brainstorm map of Kungfu

Appendix B

Aesthetic Experience	Interaction Experience	Emotional Experience
A1.Wushu movements, watch in dynamic style A2.Using the silhouette of martial arts practitioners to design hands A3.boring, pointer A4.The sweat of the martial artist, a drop of water, crown A5.The texture of the weapon, rough, Metal frosted A6.Kung Fu Panda, black and white, round and rolling A7.The cloth strip is tied to the arm, so the watchband can be designed this way A8.Tai Chi ,black and white A9.Bruce lee' nunchaku, stainless steel, metal polishing A10.Wushu Moves splits, chops, punches kicks A11.Ip Man' Wooden Dummy, rough, frosted, well-behaved A12.weapon--an ancient weapon, composed of two iron balls fixed on a long iron chain--crown A13.Weapon shape, sharp angle, spearhead A14.18 kinds of weapons A15.The shape of the double stick can be used for the shape of the watch band A16.The color of Bruce Lee's clothes can be used A17.The texture of Bruce Lee's clothes, woven watch band	I1.The strap can be made of new materials I2.Clothes of martial artists , absorb sweat, breathe air, and the strap material should be the same I3.Bruce Lee's clothes , fabric, skin friendly, Nylon Watch Band I4.Five-Animal Exercise, the buckle of watch in animals shape, interesting to tie I5.Nylon strap, avoid the fine hairs on the wrist being caught, good experience I6.in the use of watches, Personalization of hand gestures I7.Weapon handle, antiskid, watch crown I8.watch crown, Easy to rotate I9.Tai Chi, conquering the unyielding with the yielding I10.Palm and Fist Salute , posture, buckle design I11.frosted texture, good feel	E1.Kung Fu - exert oneself constantly E2.Martial arts - "stop fighting", Kungfu itself is not for attack, but for self-cultivation E3."Spirit", have a good mental state E4.Product differentiation, Satisfy the psychology of seeking novelty E5.Weapon, masculine , show masculinity E6.Personal identification for Kung Fu fans E7.National pride E8.Highlight healthy life concept E9.Bruce Lee, national pride, cultural confidence E10.Tai Chi, Keep in good temper, implicit and introverted

Affinity Diagram

References

1. Yu, J.: Product design in the era of experience economy (2011)
2. Cao, X.-D., Su, X.-P.: Analysis of product design in the age of experience economy. Packag. Eng. 242–244 (2018)
3. Klinger, K: Encyclopedia of multimedia technology and networking. Choice Rev Online **43**, 43:3770 (2006)

4. He, J., Wang, C.L.: How global brands incorporating local cultural elements increase consumer purchase likelihood. Int. Mark. Rev. **34**, 463–479 (2017)
5. Jiang, J., Kang, Y., Liu, C., Zhang, Y.: Elements analysis of Shaanxi' s cultural tourism products based on the perspective of the whole industry chain, pp. 970–976 (2016)
6. Hsu, C.-H., Lin, C.-L., Lin, R.: A study of framework and process development for cultural product design. In: Rau, P.L.Patrick (ed.) IDGD 2011. LNCS, vol. 6775, pp. 55–64. Springer, Heidelberg (2011). https://doi.org/10.1007/978-3-642-21660-2_7
7. Lin, R.T.: Transforming Taiwan aboriginal cultural features into modern product design: a case study of a cross- cultural product design model. Int. J. Des. **1**, 45–53 (2007)
8. Liu, Y., Zhang, C., Zhou, L.: Adoption of Chinese ink painting elements in modern poster design inspired by innovation research on physical and chemical reactions. Curr. Sci. **108**, 2017–2022 (2015)
9. He, J., Wang, C.L.: How global brands incorporating local cultural elements increase consumer purchase likelihood: an empirical study in China (2017). https://doi.org/10.1108/IMR-08-2014-0272
10. Lin, R., Sun, M.-X., Chang, Y.-P., Chan, Y.-C., Hsieh, Y.-C., Huang, Y.-C.: Designing "culture" into modern product: a case study of cultural product design. In: Aykin, N. (ed.) UI-HCII 2007. LNCS, vol. 4559, pp. 146–153. Springer, Heidelberg (2007). https://doi.org/10.1007/978-3-540-73287-7_19
11. The cultural product: integration and relational approach (2014). https://doi.org/10.4018/978-1-4666-5007-7.ch001
12. Dong, H.: Application of regional cultural elements in the design of wenbo culture product. In: Appl. Reg. Cult. Elem. Des. Wenbo Cult. Prod., 3rd International Conference on Arts, Design and Contemporary Education (ICADCE 2017) Application, pp. 395–397 (2017)
13. Yan, F., Wang, S.: Research on the heritage and development of traditional cultural elements in product design. Bol. Tec./Tech. Bull. **55**, 554–560 (2017)
14. Wu, X., Xie, J., Mao, Y.: The application of Chinese elements in the product design. Asian Soc. Sci. **4**, 109–111 (2008)
15. Wu, T.-Y., Huang, W.-H.: Appearance–behavior–culture in creating consumer products with cultural meaning meant to evoke emotion. In: Rau, P.-L.P. (ed.) CCD 2018. LNCS, vol. 10912, pp. 245–253. Springer, Cham (2018). https://doi.org/10.1007/978-3-319-92252-2_19
16. Rau, P.L.P. (ed.): CCD 2015. LNCS, vol. 9180. Springer, Cham (2015). https://doi.org/10.1007/978-3-319-20907-4
17. Song, Y., Li, M.: Research on cultural and creative product development based on museum resources. In: IOP Conference Series Materials Science Engineering (2018). https://doi.org/10.1088/1757-899X/452/2/022090
18. Lee, Y.: Exploration of local culture elements and design of cultural creativity products products (2013). https://doi.org/10.1080/09720510.2010.10701505
19. Yeh, M.-L., Lin, P.-H.: Applying local culture features into creative craft products design. In: Rau, P.L.Patrick (ed.) IDGD 2011. LNCS, vol. 6775, pp. 114–122. Springer, Heidelberg (2011). https://doi.org/10.1007/978-3-642-21660-2_13
20. Yang, L., Yu, W., Jiang, S., Jia, S.: The Application of "Emotion Retrospection" in the Design of Museum Cultural Creative Products. In: Marcus, A., Wang, W. (eds.) HCII 2019. LNCS, vol. 11583, pp. 547–556. Springer, Cham (2019). https://doi.org/10.1007/978-3-030-23570-3_41

21. Sun, X., Jin, W., Li, C.: Research on the design of Nanjing museum cultural and creative product from the perspective of experience. In: Marcus, A., Wang, W. (eds.) DUXU 2017. LNCS, vol. 10290, pp. 529–539. Springer, Cham (2017). https://doi.org/10.1007/978-3-319-58640-3_38
22. Walny, J., Carpendale, S., Riche, N.H., Venolia, G., Fawcett, P.: Visual thinking in action: Visualizations as used on whiteboards. IEEE Trans. Vis. Comput. Graph. **17**, 2508–2517 (2011)