



Research on UI Design of Folk Arts and Crafts Commercial Application Software based on KANO model

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Abstract. With the continuous development of Internet technology, mobile terminal software, as an essential tool of online products in modern life, has brought changes to the production and development mode of employees in all walks of life. It has become a market-oriented trend for a large number of online applications to introduce profit models. With the process of industrialization, traditional folk handicrafts gradually withdraw from the civil field and become semi-artistic or pure artistic intangible cultural heritage. By virtue of the concept of empowering traditional culture with Internet + design and analyzing user preferences with KANO model, an online application UI and architecture for the public are designed, aiming at helping traditional handicrafts to carry out better publicity and protection and injecting vitality into their commercialization.

Keywords: traditional handicrafts; UI design; KANO model

1 Introduction

As an important part of the world cultural and artistic heritage, traditional handicraft is the cultural treasure of every civilization and ethnic group. We make use of design concepts such as interactive design and universal design, combined with the communication form of Internet application, to publicize, commercialize, develop and transform. To find the future outlet of traditional handicrafts and folk customs. In combination with KANO model's demand preference for folk handicraft products and production

process of today's public, the control of in-app functional mode is formed, and UI design of an online application for protection, publicity and commercialization of traditional handicrafts is carried out.

2 Research Background

This chapter will analyze the feasibility background of online application of handicraft products and users' pain points from three aspects: current situation, difficulties and potential user mining.

2.1 Current situation of Chinese traditional handicrafts

China has a long history. In the process of production and life of the working people, a large number of handicrafts were born. They are widely distributed, various and have a long history, and different regions present different handicrafts and artistic styles. However, since the 20th century, along with the gradual upsurge of modernization, marketization and globalization, Chinese traditional handicrafts have gradually declined. Especially in terms of skill inheritance, there are serious problems of weak protection and no successor, and they are faced with serious survival crisis.[1]

2.2 Difficulties facing the inheritance and development of handicrafts

The inheritance and development of Chinese traditional handicrafts are faced with two difficulties. First, there is no clear commercial mode of handicrafts. Second, the inheritance of handicrafts is blocked. According to the survey of the status quo of Chinese traditional handicrafts, 86% of practitioners of traditional handicrafts are distributed in rural areas; Among the vast majority of traditional handicraft practitioners, nearly 70 percent have an adult income of less than 20,000 yuan, and 55 percent are over 50 years old. The difficult economic situation directly affects the situation that the traditional handicraft has no successor. [2]However, most of the groups who are in demand or interested in buying handicrafts mostly buy traditional handicrafts through private workshops, street stalls and other offline small-scale self-employed stores, failing to have a large-scale, modern and extensive product market. Some traditional craftsmen in remote areas do not know enough about protection and support policies. There are still many difficulties in the development of traditional handicraft in education, culture, protection and other aspects.

2.3 Potential users of traditional handicrafts

The development of traditional handicraft needs to meet the needs of contemporary people based on the mining of new markets, and then find a stable business model, so as to realize the development of the whole industry chain.

According to the research content, questionnaires were set up and released publicly on the network platform. The data results show that the vast majority of the public have

a positive attitude towards handicrafts and are interested in well-made handicrafts and folk handicraft industry, and there is a potential market for handicrafts consumption among the population. The result is shown in Figure 1.

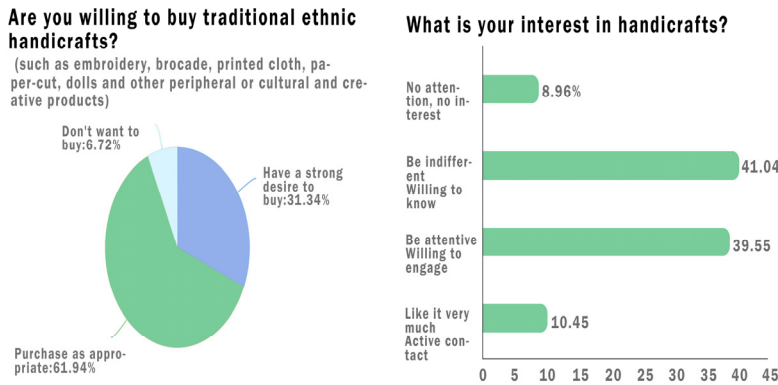


Fig. 1. Excerpts from questionnaire results

3 Research Methods and Design Concepts

3.1 Design process review

Through KANO model, reasonable functional requirement table is established, and combined with the interaction design principles such as hick's law and the golden rule of user interface design, the UI functional architecture, interactive logic and visual representation of the application program are constructed. The flow chart is shown in Figure 2.

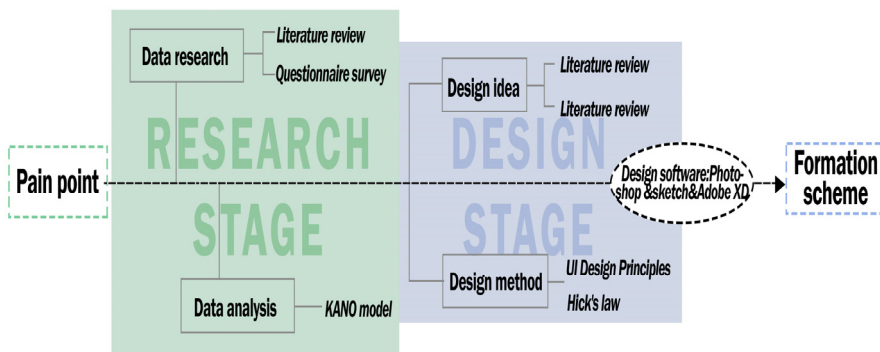


Fig. 2. Design Flow Chart

3.2 Hick's law

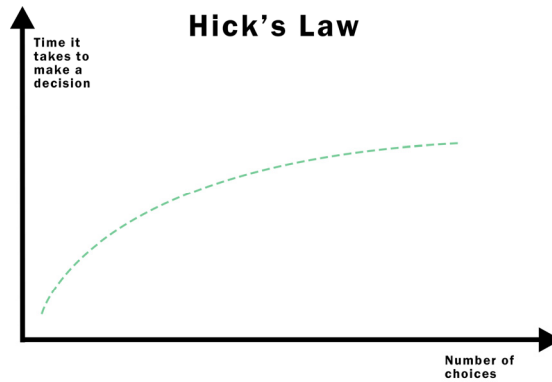


Fig. 3. Hick's law

Hick's law is a psychological rule discovered by the English psychologist William Edmund Hick. [3] As shown in Figure 3. The more choices (n) a person has, the longer (T) it takes to make a decision. Its rule conforms to the mathematical formula:

$$RT = a + b \log_2(n) \quad (1)$$

RT = reaction time; a = total time unrelated to decision making (pre-cognition and observation time); b = Processing time based on knowledge of options (a constant derived from experience, about 0.155s for humans).

It can be seen from this formula that the user's information processing time is affected by several values, including the time to understand the information, the time to process the information according to the understanding and the number of options. Both values " a " and " b " are constants, and the user's reaction time usually depends on the value of " n ".

This often requires the designer to consider the number and grouping of tabbed interfaces when designing the UI. The right sequence of objects will make the user feel rich in options, but not too difficult to make a choice. If it is too rich, the user may lose patience and backfire.

3.3 The protection concept of handicrafts

Since UNESCO issued the Charter on Preservation of Digital Heritage in 2003, the Charter clearly states that the preservation and maintenance of World heritage sites such as books, works of art and historical and scientific artifacts should be guaranteed.[4] The digital protection of intangible cultural heritage not only plays a role in the inheritance and development of culture, but also is a necessary means for future people to learn and study the retained skills through video and technological means.

4 Functional requirement analysis based on KANO model

4.1 Introduction to the KANO model

KANO model is a useful tool for classifying and prioritizing user needs, optimized and invented by Professor Noriaki Kano according to Herzberg's two-factor theory. The model can effectively analyze the impact of user needs on user satisfaction and reflect the relationship between product performance and user satisfaction. It divides the attributes of user needs into five categories: Attractive Quality (A), One-dimensional Quality (O), Must-be Quality (M), Indifferent Quality (I) and Reverse Quality (R).[5]

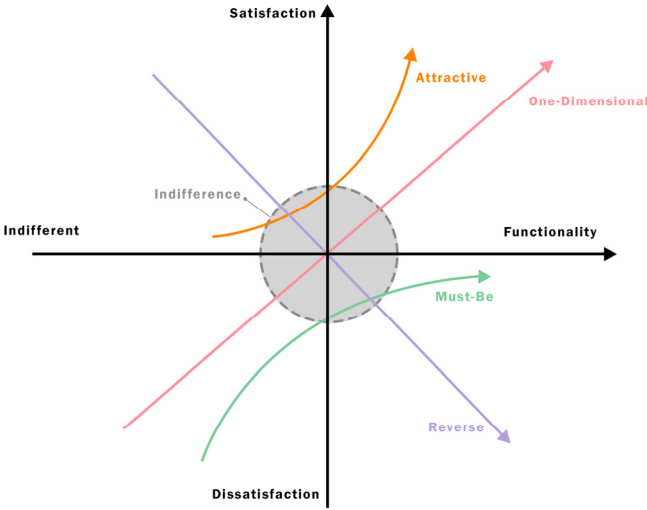


Fig. 4. KANO model

The Attractive Quality means that user satisfaction does not decrease when the product has this element; On the contrary, user satisfaction increased significantly. One-dimensional Quality represent elements that increase user satisfaction when the product has them; On the contrary, customer satisfaction decreased; Indifferent Quality mean that customer satisfaction does not change when the product has or does not have these elements; Must-be Quality are that user satisfaction does not increase when the product has these elements; On the contrary, user satisfaction decreased significantly; A Reverse Quality is a negative attribute.

4.2 Survey object

A total of 141 questionnaire results were collected through online survey, and 134 valid data were obtained by excluding some data items with obvious errors or inconformity. It covers 26 provinces, municipalities and autonomous regions in China. The age distribution of the respondents is wide, and most of them are between 15 and 50 years old. The result has a certain universality in the population.

4.3 Questionnaire setting

In addition to the basic understanding of the respondents' cognition of handicraft products, the questionnaire was designed bidirectional according to the requirements of the KANO model to determine the attributes of the function. In order to distinguish the bidirectional scores, 1-5 was used to represent "dislike" to "very like" for the forward questions, and the capital letter "A-E" was used for the reverse questions. For example, if a respondent chooses the forward question As it should be, but Reluctantly accepted the reverse question, the test result is represented by (4-D). Shown as Table 1:

Table 1. Rule of Score coefficient

Question	Dis-like	Reluctantly accepted	No matter	As it should be	Really like
Have commercial content	(1)	(2)	(3)	(4)	(5)
No commercial content	(E)	(D)	(C)	(B)	(A)

4.4 Data analysis

According to the functional attribute division table, the bidirectional question responses of each subject were calculated as attribute data. As shown in table 2:

Table 2. A bidirectional question about whether commercial-related features appear in the APP

		(Reverse)No commercial content				
User Needs		Really like(A)	As it should be(B)	No matter(C)	Reluctantly accepted(D)	Dis-like(E)
(Positive)	Really like (5)	Q(5-A)	A(5-B)	A(5-C)	A(5-D)	Q(5-E)
	As it should be (4)	R(4-A)	I(4-B)	I(4-C)	I(4-D)	M(4-E)
	No matter (3)	R(3-A)	I(3-B)	I(3-C)	I(3-D)	M(3-E)
	Reluctantly accepted (2)	R(2-A)	I(2-B)	I(2-C)	I(2-D)	M(2-E)
	Dislike (1)	R(1-A)	R(1-B)	R(1-C)	R(1-D)	Q(1-E)

The Better and Worse coefficients of KANO model are calculated as follows:

$$\text{Better} = \frac{O+A}{M+O+A+I} \quad (2)$$

$$\text{Worse} = \frac{O+M}{M+O+A+I} \times (-1) \quad (3)$$

The Better coefficient represents user satisfaction; The Worse coefficient represents the level of dissatisfaction. The user's requirements can be defined accurately by calculating formulas. In combination with the collected survey data, the Better-Worse values

of each function were obtained. After two decimal places, the demand points for the application UI interface were summarized, and the results were shown in Table 3:

Table 3. APP Better-Worse Values and Attributes Classification Table

Type	Specific Point	A	O	M	I	R	Q	Bet- ter	Worse
Function	1.Science popularization & protection	4	23	86	18	2	1	0.21	-0.83
	2.Current affairs news of handicraft	28	9	5	90	2	0	0.28	-0.11
	3.Commercialization	22	5	2	102	3	0	0.21	-0.05
	4.Video & Live streaming	35	8	5	83	3	0	0.33	-0.10
	5.Disclosure of funds	22	2	2	102	6	0	0.19	-0.03
	6.Social function	19	6	9	97	3	0	0.19	-0.11
	7.Business cooperation and Investment	19	6	3	96	6	0	0.20	-0.07
Vision	8.Unified visual style	4	12	85	31	2	0	0.12	-0.73
	9.Custom appearance	28	7	13	81	4	1	0.27	-0.16
	10.Traditional cultural element	27	9	15	82	1	0	0.27	-0.18
	11.Flat style	21	2	8	97	3	1	0.18	-0.08
	12.Panel partition	29	1	1	100	3	0	0.23	-0.02

Based on the results of the survey, the B-W coefficients of people's preferences for content features and visual styles of craft-related applications were obtained. Various demand points of the current population for the application program were found, and a four-quadrant diagram was developed according to the range of B-W coefficient values. The horizontal axis represented B coefficient, ranging from 0 to 0.4. The vertical axis is the W coefficient, ranging from 0 to 1. The origin coefficient is set as (0.2,0.5). Shown as Table 4.

Table 4. The division of value quadrants

The Quad- rant	Better Value	Absolute Value of Worse Value	Degree of Demand
First	>0.2	>0.5	Desired demand (O)
Second	<0.2	>0.5	Attractive demand (A)
Third	<0.2	<0.5	Undifferentiated demand (I)
Fourth	>0.2	<0.5	Essential demand (M)

4.5 Quadrant diagram

According to the above data analysis, the four-quadrant diagram is made, as shown in Figure 5:

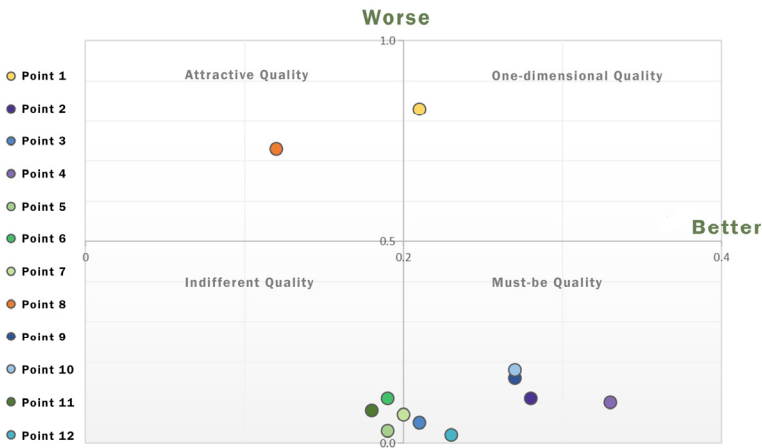


Fig. 5. Four quadrant diagram

By comparing the KANO model requirement definition table, the final attributes of each requirement point are obtained:

Point 1 is the expected attribute. Therefore, handicraft popularization and protection module should be given priority in the design of UI interface. Point 8 belongs to the charm demand attribute, therefore, a unified visual style should be paid attention to in the design. Point 5, point 6, and point 11 are three undifferentiated attributes. As a result, the UI of the application can choose whether or not to require these on a case-by-case basis. 2, 3, 4, 9, 10, 12 are necessary attributes. Therefore, these six points are necessary in the design. Point 7 is somewhere between indifferent and necessary, and can be considered as appropriate if necessary needs are met.

When planning UI interface elements, in order of importance: necessary requirement M> expectation requirement O> charm requirement A> undifferentiated I. According to the requirements of these four levels, the design elements of the product are planned and analyzed.

5 UI design of the APP

5.1 Design specification

“Chuan Yi” APP takes the meaning of inheriting and spreading handicraft. It is a light-weight mobile application software product that creates a platform connecting craftsmen and the public for the communication, development, education and commercial promotion of traditional handicrafts. At the user level, it advocates to stimulate users' interest in handicrafts through more concise operation process and more focused handicraft related content, and to cooperate with handicraft practitioners to develop handicraft products in line with current people's aesthetic appreciation. Besides, it actively encourages users to participate in and discuss spontaneously through lightweight forums and video platforms that are simple and easy to operate.

5.2 Visual effect and Program performance

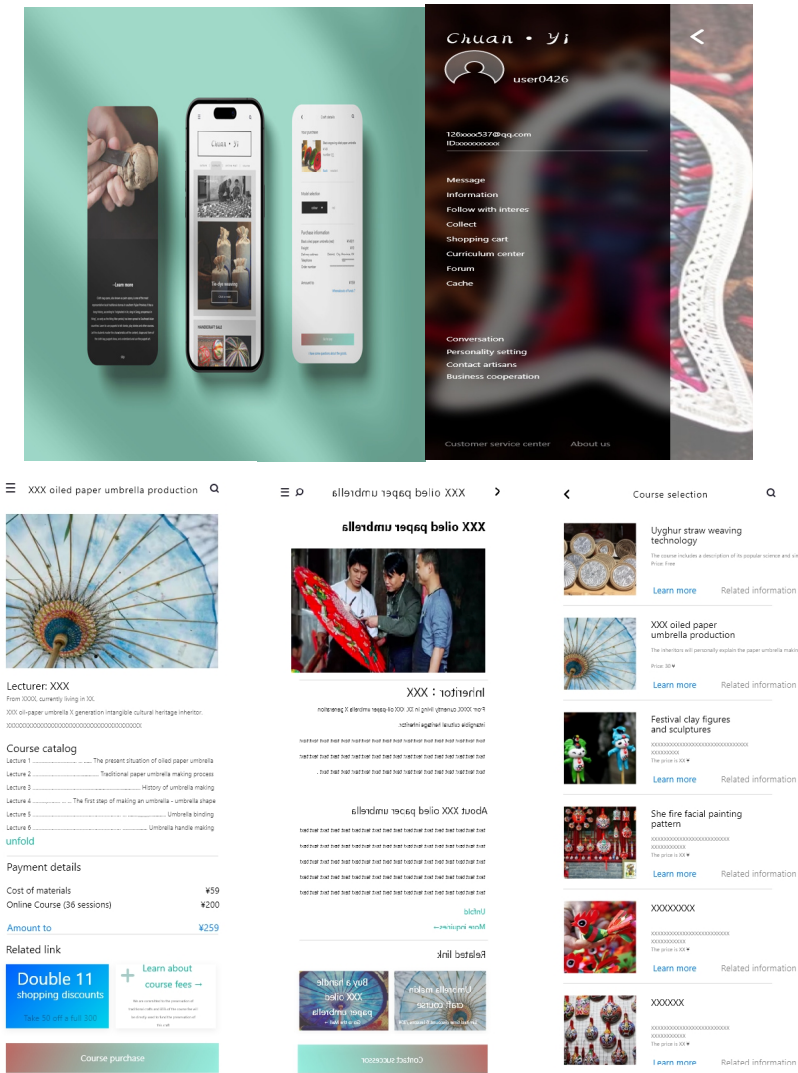


Fig. 6. UI Rendering of “Chuan Yi” APP

5.3 Function setting

According to the conclusion of KANO's analysis, select the plate favored by the user group in the survey to set the homepage, so as to facilitate the interface jump. The functions of the APP are designed in general modules. For the initial positioning of the APP, two parts will become the core payment section of the APP: the sale of handicraft products and peripheral products, the popularization and sale of handicraft courses;

Other core sections: Communication platform, media live broadcast, lightweight technology forum, simple social functions, etc.

5.4 Interface design

In the UI design, the main interface is divided into reasonable areas, the preference card is simplified, and the button color matching is carried out using the traditional ink dizzy dyeing effect. Through Hick's law analysis, sub-options in each category are grouped, and the number of options in each group is controlled within 5. The number of cards occupying each interface is no more than 8. According to Shneiderman Ben, who describes the golden Rule of UI design in his book "Designing User Interfaces", it makes the process of using an application smoother. A high feedback rate also improves the user experience, increasing RR (retention rate), DAU (daily active users), etc. [6]

6 Conclusion

The UI design of "Chuan Yi" APP is a comprehensive application software based on KANO analysis, which integrates online promotion, sales and development of folk handicrafts. The UI design is controlled through the analysis of functions, interfaces, colors and other design elements based on data, aiming to provide a good development platform for folk handicrafts and practitioners, and provide users with a simple and efficient window to understand handicrafts.

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