Research on the Requirements of Mobile Radio APP for the Elderly Based on Kano Model

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Abstract. The Kano model is used to explore the needs of the elderly for mobile station APP. First of all, through user research and analysis of the elderly users of the use process of the requirements. Secondly, we use the method of Kano model questionnaire to screen and classify the demand items, convert the user’s demand into design elements, calculate the weight of attractive demand items by entropy method, rank the importance, and determine the key design elements. Finally, the interactive prototype of mobile station APP is proposed. The application research of mobile station APP for the aged integrated with Kano model not only provides good user experience for the aged users, but also provides theoretical basis and objective data for the design of similar products.

Overview and Application of Kano Model

Kano model theory was proposed by Noriaki Kano, a professor at Tokyo Polytechnic University in 1984[2]. The Kano model divides the user’s demand attribute into five types: (1) Necessary demand, The pain point in the design, if there is no such demand or such demand is not good, the user’s dissatisfaction will rise sharply. After such demands are satisfied, the dissatisfaction of users can be eliminated, but the satisfaction of users cannot be increased; (2) Expected demand, also called univariate quality, is the itch point in the design, what the user needs most is this kind of demand. When this kind of demand gets very good satisfaction, the user’s satisfaction will also increase significantly, otherwise, the user’s satisfaction will gradually decrease; (3) The charm demand, also called the subconscious demand, is difficult to excavate. Once satisfied, the user’s satisfaction will rise sharply. Similarly, if the demand is not met, the user will not be dissatisfied. (4) There is no differential demand, and the presence or absence of such demand has no influence on the user experience; (5) Reverse demand, that is, the higher the degree of implementation, the user’s satisfaction will continue to decline.
Pre-user Research Based on Kano Model

The author analyzes and summarizes the data obtained from the survey, and finally summarizes the initial demand items closer to the actual ideas of the elderly users, as shown in Table 1.

Table 1. Initial requirements of app for senior radio.

| Code | Requirement description | Code | Requirement description | Code | Requirement description |
|------|--------------------------|------|--------------------------|------|--------------------------|
| 1    | Automatically adjust the sound size according to the distance from you | 9    | Capture and save the sound clips in the program | 17   | Can automatically classify the collected program list |
| 2    | Large font interface | 10   | Bind the family account to jointly purchase the paid program | 18   | Set up the function of private radio station to play randomly according to your preference |
| 3    | Simple user interface | 11   | In case of misoperation (such as downloading by mistake), pop-up window reminder can be provided. | 19   | Set up a social platform and share your favorite programs on it |
| 4    | Variety of program cover styles | 12   | Adjustable radio program speed | 20   | Set up the function of reporting bad information |
| 5    | Click the icon with a tone or vibration prompt | 13   | Set alarm function | 21   | Sign up for offline activities of interest (such as storytelling, cross talk and concerts) |
| 6    | First time entering app, you can select the program category of interest | 14   | Identify and push local dialect programs | 22   | Push ads according to users’ interests |
| 7    | Voice search program | 15   | Mark the programs you have listened to | 23   | Can comment on the program |
| 8    | One click sharing to WeChat and other social software | 16   | When collecting a program, you can sound or text to indicate that the program is successfully collected. |
Analysis of User Requirements Based on Kano Model

Design and Test of Kano Questionnaire

After determining the needs of elderly users, Kano questionnaire was designed to set up two-way analysis for each demand item. In Kano questionnaire, Likert scale was used to divide the satisfaction of users into five levels, namely "dissatisfied", "tolerable", "indifferent", "reasonable" and "very satisfied". Some forms of questionnaire are shown in Table 2.

| Requirement item | problem | Dissatisfied | Tolerable | Indifferent | Ought to be right | Very satisfied |
|------------------|---------|--------------|-----------|-------------|------------------|----------------|
| App interface is large font interface | App has this feature | ○ | ○ | ○ | ○ | ○ |
|                   | App does not have this feature | ○ | ○ | ○ | ○ | ○ |

The form of this questionnaire is a combination of online questionnaire and paper questionnaire, in which the address of the paper questionnaire is at Xiamen University of the Elderly. 186 questionnaires were distributed. A total of 162 valid questionnaires were collected.

Determine Kano Category of User Requirements

The questionnaire results are compared with the evaluation table of Kano model, see Table 3, where M indicates the necessary demand, O indicates the expected demand, A indicates the attractive demand, I indicate the non-differential demand, R indicates the reverse demand, and Q indicates the suspicious result. Statistic the number of five levels in each requirement item in the questionnaire, and take the quality attribute with the largest value to classify the requirement item as the Kano type. the attribute distribution of some questionnaire evaluations is shown in Table 4, where the number of Table 4 corresponds to Table 1.

| user demand | Reverse problem (no requirement) |
|-------------|----------------------------------|
| Positive question (with this requirement) | like | Taken for granted | Indifferent | Tolerable | Dislike |
| like | Q | A | A | A | O |
| Taken for granted | R | I | I | I | M |
| Indifferent | R | I | I | I | M |
| Tolerable | R | I | I | I | M |
| Dislike | R | R | R | R | Q |

User Requirements Sorting Based on Kano Model

Remove the above-mentioned I, R and Q requirements and recode the remaining requirements. The sorting results are shown in Table 5.
Table 5. Collation results of user requirement items.

| Type A demand                                                                 | Type O demand                                                | Type M demand                                                                                             |
|-------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 1.Variety of program cover styles                                            | 9.Simple user interface                                      | 14.Large font interface                                                                                  |
| 2.First time entering app, you can select the program category of interest    | 10.Voice search program                                      | 15.Click the icon with a tone or vibration prompt                                                       |
| 3.Capture and save the sound clips in the program                            | 11.In case of misoperation (such as downloading by mistake), pop-up window reminder can be provided. | 16.One click sharing to WeChat and other social software                                               |
| 4.Adjustable radio program speed                                              | 12.Automatic classification of collected programs            |                                                                                                          |
| 5.Set alarm function                                                          | 13.Set up the function of reporting bad information           | 17.Mark the programs you have listened to                                                                |
| 6.Identify and push local dialect programs                                    |                                                              |                                                                                                          |
| 7.Set up the function of private radio station to play randomly according to your preference |                                                              |                                                                                                          |
| 8.Sign up for offline activities of interest (such as storytelling, cross talk and concerts) |                                                              |                                                                                                          |

Calculation of the Weight of Charm Demand

The Steps of Demand Weight Calculation by Entropy Method

On the basis of providing the necessary demand and the expected demand of the product, if the user can selectively meet the attractive demand of the user, the satisfaction of the user will be significantly increased [3]. Due to the high demand of the elderly mobile station APP for charm, the user’s potential excitement point can be more clearly understood through the weight calculation of the charm demand, so as to preferentially meet the charm demand with the largest weight. In this paper, entropy method is used to calculate the weight ratio of each charm demand.

Calculation Results of Charming Demand Weight

Uses 1-5 evaluation scale to evaluate each charming demand item, and uses 1, 2, 3, 4, 5 to successively represent very important, relatively important, general, not very important, very unimportant. At last, 87 valid questionnaires were collected, and the weight value of each charm demand was calculated by entropy method and sorted, as shown in Table 6.

Table 6. Weight of user charming demand items.
Design of App for Mobile Radio for the Elderly

According to the calculation of the importance of glamour demand, the mobile radio app for the elderly can focus on the following three points:

(1) The design of a private radio station. In the age of information surplus, the elderly users face various recommended programs in the radio app, resulting in such behaviors as difficulty in selection, impatience and random click, compared with the old people’s habit of using the radio, Elderly people prefer to tune the radio after the channel, lie still to enjoy.

(2) Clip the sound from the program and save it. Older users like to share information, prefer short-term important information, save and share important sound segments in the program or segments of their own interest, which is a demand point for older users to deepen memory, improve efficiency and facilitate sharing.

(3) Set alarm clock alert function. Setting the alarm clock reminder function can effectively grasp the time of using the radio APP, and remind the elderly users to pay attention to the time of using the mobile phone.

Conclusion

In this paper, Kano model is applied to the development and design of mobile station APP dedicated to the elderly, which is of great significance to improve the quality of life and the user experience of the elderly. Through user investigation and mining the specific requirements of users, the Kano model is used to classify the requirements attributes, and the necessary requirements, expectation requirements and charm requirements are obtained after screening. Among them, satisfying the charm demand is the main competitive factor of the product, if the product realizes this kind of function, it will attract a large number of users. By using the entropy method to calculate the weight of the attractive demand item, the designer can choose the function with high priority to design, so that the product with high user experience can be developed quickly and effectively.

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