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Research on Art Therapy APP Based on SOR-Kano Model

Zixi Zhou

School of Art and Design, Wuhan University of Technology, Wuhan, China
3249133718@qq.com

Abstract. As technology advances, the role of art therapy APPs in emotional intervention has become increasingly prominent, but existing products are mostly limited to basic companionship functions, with problems such as insufficient professionalism, service defects, and weak scientific basis. To this end, this paper carries out targeted research. Using literature analysis, user interviews, questionnaire surveys, and competitor observation, and based on the SOR-Kano model, questionnaire research was carried out to quantify the weight of user needs and clarify the product design scheme. Taking functions such as the forest therapy room and the emotion diary as examples, the feasibility of the SOR-Kano model in the design of art therapy APPs was verified. This method can achieve precise matching between user needs and professional technology, optimize product function design, and provide a reference for similar art therapy APPs.

Keywords: art therapy, interaction design, SOR theory, Kano model

1. Introduction

In contemporary society, the psychological pressure people face is increasing day by day, and art therapy, as a non-drug intervention method of psychological therapy, has gradually attracted attention [1]. As mobile Internet develops, art therapy APPs provide users with a convenient channel for art therapy experience. However, current art therapy APPs still have shortcomings in functional design, user experience and the integration of cultural elements, and it is difficult to fully meet the diverse needs of users [2].

This study tries to combine the SOR and Kano models to understand the needs of art therapy APP users and their experience logic. The Kano model can help us distinguish which category the users' needs for functions belong to, and calculate the weight; the SOR theory helps to analyze the psychological and behavioral path of users from stimulus to response [3]. Putting the two together can build a multi-dimensional analysis framework for the design optimization of art therapy APPs.

In addition, the integration of emotional design and guochao elements is the key to improving the user experience and cultural connotation of art therapy APPs. Emotional design can strengthen the emotional connection between users and the APP [4], while guochao elements can convey cultural value [5] and enrich the connotation of art therapy. Therefore, this study will focus on these aspects and provide new ideas for the innovative development of art therapy APPs.

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2. Research design

This KANO questionnaire survey relies on the KANO demand classification model proposed by Noriaki Kano [6], and this study investigates the satisfaction of users with the core function points of the product. There are three main purposes: one is to distinguish the demand attributes of different functions, the second is to identify the most core demands of users, and the third is to calculate how much these functions affect satisfaction. This is done to provide a data basis for subsequent product iteration, function ranking and resource allocation, to prevent the waste of resources caused by blind function development, and to enable the product to meet the real expectations of users more precisely.

This questionnaire adopts the standard paired question method of the KANO model. For each function to be evaluated, a positive question (the user's feeling when the function is available) and a reverse question (the user's feeling when the function is unavailable) are set respectively, and the options uniformly adopt a five-level scale: I like it this way, it should be so, I do not care, I can tolerate it this way, and I hate it this way.

The questionnaire is divided into three parts: the beginning is the survey instruction (explaining the background, the expected time and privacy protection), then the basic information of users is collected, and the last part is the paired evaluation questions of core functions. This design is intended to make the questionnaire logic smoother and the language more accessible, so that users can fill it in conveniently, thus ensuring that the collected data are valid.

Distribution and collection: 220 questionnaires were distributed in this survey, 207 valid questionnaires were collected, with a valid response rate of 94.1%. The sample size meets the requirements of statistical analysis, and the data are representative.

Sample structure: it covers groups of different ages, genders, usage frequencies and user identities, fits the target user profile of the product, and avoids sample bias.

Data cleaning: invalid questionnaires with excessively short answering time, contradictory options and repeated submission were removed, and valid data with consistent logic and complete filling were retained for subsequent analysis.

3. Research route

The SOR theory was proposed by Mehrabian and Russell and is divided into three stages. The first stage is the collection of user needs. This study combines literature analysis, user interviews, questionnaire surveys and competitor observation to fully excavate the core function demands, user characteristics and usage scenarios of art therapy APPs. The second stage is the analysis of SOR dimensions. The collected needs are classified into the three dimensions of stimulus, organism and response, so as to clarify how the design elements of the APP drive the psychology and behavior of users. The third stage is Kano demand classification. According to the questionnaire data, the demand attributes are clearly classified and the satisfaction coefficient is calculated, so as to determine the priority of function development. Finally, the analysis conclusions of the two models are integrated, and the design optimization scheme and implementation suggestions of the art therapy APP are output.

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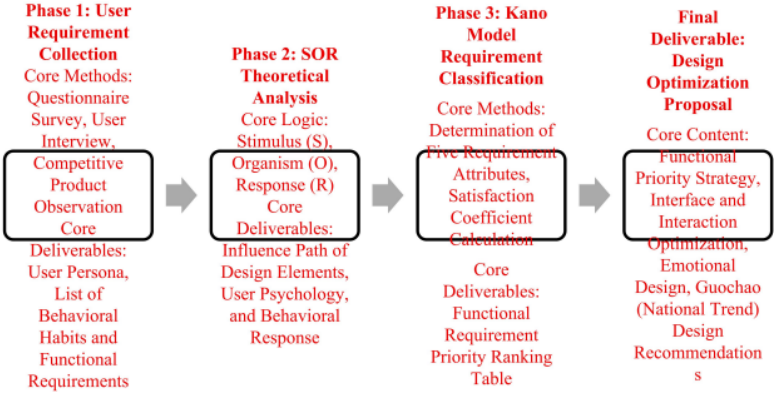

Figure 1. Product design research process

4. User research based on SOR-Kano

4.1. Collection of user needs

At this stage, this study uses literature analysis, user interviews, questionnaire surveys and market competition observation in combination, so as to sort out the user characteristics, usage scenarios, function demands and emotional preferences of art therapy APPs as fully as possible. Specifically, literature analysis is mainly used to clarify the research basis of art therapy and mobile applications; user interviews target real users who have needs for emotional regulation and experience of psychological therapy, with the purpose of excavating their deep usage pain points; questionnaire surveys are responsible for large-scale quantitative needs; and market competition observation is used to summarize the strengths and weaknesses of existing products. Integrating the information from these aspects provides relatively solid material for subsequent analysis.

4.2. Overview of sample collection and data cleaning

A total of 220 KANO questionnaires were distributed in this survey. By removing invalid questionnaires with excessively short answering time (less than 60 seconds), contradictory logic between positive and reverse options, missing answers to core questions and repeated submission, 207 valid questionnaires were finally collected, with a valid response rate as high as 94.09%. The sample size far exceeds the minimum threshold of Kano model analysis, the data cover the whole target user group, and the sample is highly representative and credible, which can support the subsequent accurate demand classification and coefficient calculation.

For the 207 valid data, the Kano standard paired judgment rules were adopted to calculate the combination of positive and reverse answers for each function one by one. After removing suspicious results (questionable data of category Q), the classification was completed according to the five major demand attributes, and the Better improvement coefficient and the Worse decay coefficient were calculated to quantify the influence of functions on user satisfaction.

4.3. Statistics of the overall answer distribution

The answer options of the positive questions (function available) and the reverse questions (function unavailable) of all valid questionnaires are summarized, and the overall distribution of the five-level scale is shown in Table 1 below:

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Table 1. Overall distribution of the five-level scale of the Kano questionnaire

No.	Proportion of positive questions (function available)	Proportion of reverse questions (function unavailable)	Corresponding user attitude
I like it this way	28.74%	8.21%	high recognition / extreme rejection
It should be so	35.27%	41.55%	basic rigid demand, taken for granted
I do not care	22.46%	29.95%	no obvious preference, no attention
I can tolerate it this way	8.21%	12.56%	barely acceptable, average experience
I hate it this way	5.31%	7.73%	extreme dissatisfaction, unacceptable

From the overall answer trend, users have a strong awareness of the rigid demand for basic functions (the proportion of the "it should be so" option is high), their expectation for differentiated functions is moderate, there is no large-area extreme negative feedback, and the logic consistency of the questionnaire answers is good.

After various preliminary research methods, the user needs are summarized as shown in Table 2:

4.4. Analysis of user needs based on SOR

Table 2. Table of user function demands of the art therapy APP

No.	Demand	Description
1	No advertising interference	No pop-ups or implanted advertising throughout the process, ensuring a focused and smooth therapy process
2	Extremely simple operation	The operation steps of core functions are no more than 3 steps, adapting to fragmented therapy scenarios
3	Precise therapy matching	Automatically matching suitable art therapy content according to user emotions and preferences
4	Anonymous emotional community	Supporting anonymous posting of emotions and exchange of feelings to obtain emotional resonance
5	Emotion check-in record	Recording emotional changes daily, generating visualized data, and perceiving the therapy effect
6	AI-customized therapy scheme	Intelligently generating personalized art therapy plans to improve the pertinence of therapy
7	Immersive therapy space	Providing virtual scenes such as therapy rooms to strengthen the immersion of therapy
8	Emotion diary	Supporting text, picture and audio recording of emotions, and preserving the therapy process
9	Low-price membership service	Providing exclusive content for paid members, with affordable and flexible pricing

Based on the three-dimensional framework of the SOR theory, this study classifies the user needs and organizes them into a three-line table, as shown in Table 3 below:

Table 3. Demand classification table of the art therapy APP based on SOR

SOR dimension	Stimulus (S): external design / function stimulus of the APP	Organism (O): internal psychological / cognitive state of the user	Response (R): user behavior / usage feedback
Demand element	No advertising interference	Need for emotional soothing	Emotion check-in record

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Table 3. (continued)

Demand element	Extremely simple operation	Need for emotional resonance	Anonymous community interaction
	Immersive therapy space	Personalized therapy cognition	Continuous use of the APP
	Interface visual design	Need for psychological security	Sharing therapy experience

4.5. Attribute classification and quantitative analysis of user needs based on the Kano model

Using the Kano model as a tool, this study conducts a systematic analysis of the user needs of art therapy APPs through the complete process of "two-way question design, attribute judgment, coefficient calculation and priority ranking", so as to clarify the attribute types of different needs and their influence on user satisfaction, and provide a quantitative basis for subsequent design optimization.

4.5.1. Design of the Kano questionnaire and data collection

Referring to the standard research paradigm of the Kano model, this study designs a structured questionnaire containing positive and reverse questions for the nine core user needs sorted out in the earlier stage:

Positive question: if the APP has a certain function, what is your feeling?

Reverse question: if the APP does not have a certain function, what is your feeling?

Both types of questions are answered with a five-level Likert scale, and the options are: "dislike", "can tolerate", "do not care", "should be so" and "like".

A total of 220 questionnaires were distributed in this survey, and 207 valid questionnaires were collected, with a valid response rate of 94.09%. The respondents cover the target user groups of different genders and usage habits aged 18-35, and the data are statistically representative and can be used for subsequent attribute judgment and coefficient analysis.

4.5.2. Quality assessment of the Kano model and judgment of demand attributes

According to the quality assessment rules of the Kano model, this study puts together the answer combinations of users to the positive and reverse questions, and finally divides the nine needs into six attribute categories. The specific judgment logic and definitions can be seen in Table 4:

Table 4. Classification criteria and judgment logic of demand attributes under the Kano model

Attribute type	Symbol	Definition
Must-be demand	M	The basic function that users believe the product should have. Its absence will cause strong dissatisfaction, and its presence will not significantly improve satisfaction
Expectation demand	O	The direct expectation of users for the product. The more complete the function, the higher the user satisfaction; otherwise, the satisfaction decreases significantly
Attractive demand	A	The potential needs that users have not explicitly put forward. Its presence will greatly improve user satisfaction, and its absence will not cause dissatisfaction
Indifferent demand	I	The function that has no obvious influence on user satisfaction. Its presence or absence will not change the feelings of users

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Table 4. (continued)

Reverse demand	R	Meeting this demand will reduce user satisfaction; it belongs to the function that users dislike
Questionable result	Q	Invalid data with contradictory answer logic, which should be removed

According to the above rules, this study conducted a cross-analysis of the data of the 207 valid questionnaires, and finally obtained the attribute distribution of each demand.

4.5.3. Calculation of better-worse coefficients and analysis of demand priority

In order to quantify the influence of each demand on user satisfaction, this study introduces the Better-Worse coefficients (user satisfaction coefficient / dissatisfaction coefficient) for calculation, and the formulas are as follows:

Better coefficient (SI, user satisfaction coefficient): it measures the positive improvement effect of meeting this demand on user satisfaction. The higher the value, the more significant the improvement effect. $SI = \frac{A+O}{A+O+M+I}$

Worse coefficient (DSI, user dissatisfaction coefficient): it measures the negative influence of not meeting this demand on user satisfaction. The higher the absolute value, the more significant the negative influence. $DSI = -\frac{O+M}{A+O+M+I}$ In the formulas, A is the number of people choosing attractive demands, O is the number of people choosing expectation demands, M is the number of people choosing must-be demands, and I is the number of people choosing indifferent demands.

Combined with the data in Table 5 and the calculation of the formulas, we obtained the Better and Worse coefficients of each demand. In order to divide the priority more clearly, we set the Better coefficient as the vertical axis and the absolute value of the Worse coefficient as the horizontal axis, and constructed a four-quadrant diagram. In this diagram, different quadrants represent different demand strategies: expectation demands (high Better and high Worse) are located in the first quadrant and need to be optimized emphatically; attractive demands (high Better and low Worse) are in the second quadrant and are the core of building differentiation; indifferent demands (double low) are in the third quadrant and investment can be appropriately reduced; while must-be demands (low Better and high Worse) are located in the fourth quadrant and constitute the basic bottom line of the product. In this way, the primary and secondary order of demands is clear at a glance.

4.5.4. Interpretation of Kano analysis results and design implications

Combined with the analysis results in Table 5, the attribute types and priorities of each demand can be clarified as:

From the data results, the three items of no advertising interference, extremely simple operation and precise therapy matching belong to must-be demands (the fourth quadrant). The absolute values of the Worse coefficients of this type of demand all exceed 80%, which means that if they are not met, users will be very dissatisfied. This is the core bottom line of the product and must be guaranteed first in design. In contrast, the anonymous emotional community and the emotion check-in record fall into expectation demands (the first quadrant). Their Better and Worse coefficients are both high, which shows that users are sensitive to the completeness of functions, and satisfaction needs to be improved by optimizing the experience. What can really bring surprise is the AI-customized therapy scheme, the immersive therapy space and the emotion diary. They belong to

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attractive demands (the second quadrant), and their Better coefficients all exceed 80%. They are the key to improving the competitiveness of the product and should be designed as the focus of differentiation. As for the low-price membership service, it belongs to indifferent demands (the third quadrant). Its Better and Worse coefficients are both low, and its influence on satisfaction is limited, so there is no need to invest too many resources in design.

Based on the above results, the design of the art therapy APP needs to follow the priority logic of "basic guarantee first, experience optimization second, and innovation breakthrough last", give priority to strengthening the bottom line of must-be demands, focus on strengthening the experience of expectation demands, creatively build the bright spots of attractive demands, allocate resources reasonably, and maximize user satisfaction.

Table 5. Analysis results of the user demands of the art therapy APP by the Kano model

No.	Function / service	A (attractive)	O (expectation)	M (must-be)	I (indifferent)	R (reverse)	Q (questionable)	Attribute classification	Is (%)	IDs (%)
1	No advertising interference	12	21	67	0	0	0	Must-be	33.65	-89.22
2	Extremely simple operation	15	18	65	2	0	0	Must-be	36.41	-87.64
3	Precise therapy matching	18	23	59	0	0	0	Must-be	41.27	-82.35
4	Anonymous emotional community	22	50	18	10	0	0	Expectation	72.18	-68.49
5	Emotion check-in record	20	48	22	10	0	0	Expectation	68.96	-65.28
6	AI-customized therapy scheme	62	23	10	5	0	0	Attractive	85.71	-32.16
7	Immersive therapy space	58	25	12	5	0	0	Attractive	83.22	-35.47
8	Emotion diary	55	28	11	6	0	0	Attractive	81.03	-38.61
9	Low-price membership service	10	15	20	55	0	0	Indifferent	29.87	-22.15

5. Design suggestions

Combined with the three dimensions of the SOR theory and the Kano demand classification results, it can be seen that the immersive therapy space in the stimulus (S) dimension is an attractive demand, the organism (O) dimension covers must-be and expectation demands, and the response (R) dimension is driven by core functions. Product design should give priority to ensuring must-be demands, strengthen expectation demands, innovate attractive demands, and weaken the investment in indifferent demands.

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Second, some design suggestions are given:

First, must-be demands are the bottom line of the product and must be guaranteed first. Specifically, functions such as no advertising interference, no more than three operation steps, and precise therapy matching must be strictly implemented. We can ensure this by optimizing the content push algorithm and simplifying the operation process, so that users can smoothly enter the therapy state. After laying a good foundation, we should focus on improving the experience of expectation demands. For example, build a safe anonymous emotional community and add a positive emotion guidance mechanism; at the same time, make the emotion check-in function more detailed and generate visualized emotion curves, so that users can intuitively feel their own therapy effect. The next is the key to building differentiation - attractive demands. We can integrate various forms such as painting, music and meditation; build immersive virtual scenes such as the "forest therapy room"; and upgrade the emotion diary so that it supports more media recording methods. In addition, for indifferent demands such as low-price membership, there is no need to invest too many resources, and the energy should be focused on the development of must-be, expectation and attractive functions, so as to achieve precise resource matching. Finally, combined with the stimulus dimension of the SOR theory, guochao elements and emotional design can be added to the visual and interactive design [5, 6], so as to stimulate the positive emotions of users through visual and tactile stimuli and enhance their sense of cultural identity.

6. Conclusion

This study combines the SOR theory and the Kano model. Through 207 valid questionnaires, it completes the collection, analysis and quantification of user needs of art therapy APPs, and can provide reference ideas for similar art therapy APPs [7]. We have constructed a complete process from demand collection, SOR analysis and Kano classification to design optimization, and hope to provide some reference for art therapy APPs of the same type.

The study finds that the core users of art therapy APPs are mainly young people aged 18 to 35. Their demand characteristics are very clear: basic therapy guarantee should come first, the need for emotional interaction is very prominent, and they also like personalized innovative functions very much. Through the combination of the two models, we have effectively solved the problem of the mismatch between user needs and technical professionalism, and finally formed a scientific function priority and design scheme.

The methods and conclusions of this study can provide theoretical reference and practical ideas for the function optimization and user experience improvement of similar art therapy APPs, and promote the development of art therapy APPs in the direction of specialization, personalization and emotionalization.

7. Limitations

This study does have some limitations. The most obvious problem is that the sample is mainly concentrated in the youth group aged 18-35. Although this fits the core user profile, there is a lack of data on middle-aged, elderly and adolescent users, and the applicability of the conclusions needs to be verified in a wider range. In addition, although the nine functional needs included in the Kano model are supported by multiple methods, they still carry some subjective judgment. Marginal needs such as social incentive and the intervention of professional mentors may have been omitted, and subsequent attempts can be made to supplement the excavation from the comments of application stores. Another problem that cannot be ignored is that the Kano model itself is a cross-sectional

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static classification, while user needs change over time (for example, attractive demands may become expectation demands after a period of time), so it is necessary to carry out longitudinal follow-up research in the future. As for the emotional design and guochao elements mentioned in the paper, they currently remain at the level of suggestions and lack quantitative verification by A/B testing or usability testing, so the actual effect remains to be empirically tested. Finally, this study currently only examines the subjective satisfaction of users with functions, and does not introduce psychological scales for pre-test and post-test comparison, so it is difficult to prove the causal relationship between function optimization and the real psychological therapy effect. This is also the aspect that needs to be further strengthened by combining clinical psychological indicators in the future. Overall, future research can go deeper in the aspects of expanding sample diversity, dynamic demand tracking, cultural design verification and therapy effect evaluation, so as to promote the research of art therapy APPs to be more scientific and refined.

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