User Requirements of Audio and Video Products with Pan-Knowledge Based on Kano Model

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Abstract: With the in-depth development of Internet information technology, the knowledge payment market has been booming since 2016 in China. The pan-knowledge audio and video products with a wider range than traditional online education products are popular among users. Pan-knowledge learning has also become a new learning mode with the rise of the Internet. Based on the pan-knowledge audio and video products as the research object, by using the Kano model to analyze the user requirements of this kind of products, we find the audio and video products of pan-knowledge with the following features can be more competitive: unusual theme, summary of the products, providing graphic pages and annotations. The products with editing professionally improve let the user satisfaction.

1 INTRODUCTION

According to the "China Sharing Economy Development Report (2022)", the market transaction scale of China's sharing economy reached 3 trillion yuan in 2021. The sharing economy in the knowledge and skill sector developed rapidly, with the transaction scale growing by 13.2% year on year. With the slowdown in the growth of the scale of Internet users, high-quality content resources such as knowledge and skills have become a new focus of commercial competition, as it can stimulate the degree of activity and conversion rate of existing users. Internet digital content in the field of knowledge and skills is called pan-knowledge content, which is different from traditional online education because it has a broader scope. In addition to knowledge products such as online education, it also includes knowledge sharing products to improve personal literacy, such as career experience, life skills, philosophy and literature. Pan-knowledge learning has also become a new learning model with the rise of online knowledge sharing. Pan-knowledge audio and video products have become an important part of digital content products. Audio and video platform enterprises hope to have high-quality original content products. Therefore, it is of practical significance to study the user requirements of pan-knowledge audio and video products.

2 LITERATURE REVIEW

2.1 Pan-Knowledge

Pan-knowledge learning is usually mediated by platforms such as TikTok, Iget and Himalaya. Users select the audio or video products that they are interested in on these platforms. Knowledge bloggers produce pan-knowledge-themed audio and video content on Internet platforms, and gain attention or profits by sharing and disseminating these digital content products. The high-quality original digital content attracts users who have knowledge needs to make payment for knowledge, which is called knowledge payment. After comparing and analyzing the three existing business models of knowledge payment, Jinzhuo Ma put forward that richer content services and cost-effective pan-knowledge payment will be the new trend (Ma 2018).

2.2 Kano Model

Under the influence of Herzberg's two-factor theory, Professor Noriaki Kano, a Japanese scholar, proposed the Kano model in the 1980s, which introduced the criteria of satisfaction and dissatisfaction into the field of product quality management for the first time. It is an analytical method to distinguish and rank user requirements. As shown in Table 1, the model divides

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the elements of product or service into five features, namely, the essential feature M, the desired feature O, the attractive feature A, the indifference feature I and the reverse feature R. For different features, the research aims to improve their satisfaction, so as to provide reference and suggestions for product research.

Table 1: Product features of Kano model

Features	Code	Meaning
Attractive feature	A	If such features are not provided, user satisfaction will not be reduced, but when such features are provided, satisfaction will be greatly improved, sometimes as a guarantee that the product is competitive.
Expected feature	O	User satisfaction increases when such features are provided and decreases when they are not.
Essential feature	M	When such functions are provided, user satisfaction will not be significantly improved, but when such functions are not provided, the satisfaction will be greatly reduced, which is a basic requirement that must be guaranteed.
Indifference Feature	I	That is, there is no significant change in user satisfaction with or without such functionality. Under limited conditions, such functionality may not be provided as a priority.
Reverse Feature	R	That is, users do not have this function, if provided, it will lead to a decline in satisfaction.

In general, the priority of product features is: required feature M> desired feature O> attractive feature A> indifference feature I, and reverse feature R is not necessary to develop.

The Kano model measures different features through the scales in the structured questionnaire. In the scale, each feature is asked by positive and negative questions, and the options are set according to whether it is satisfied or not. The respondents have five options to choose, specifically: dislike, tolerable, whatever, necessary and like. Each option was given a corresponding score from 1 to 5 to explore the responses of respondents with and without the five features (Table 2).

Table 2: Schematic design of Kano model questionnaire

		Negative question				
		Like (5)	necessary (4)	Whatever (3)	Tolerable (2)	Dislike (1)
Positive question	Like (5)	Q	A	A	A	O
	necessary (4)	R	I	I	I	M
	Whatever (3)	R	I	I	I	M
	Tolerable (2)	R	I	I	I	M
	Dislike (1)	R	R	R	R	Q

A stand for attractive feature; O for desired characteristic; M for required feature; I for indifference feature; R is for the reverse characteristic; Q is for question results, which means respondents do not understand or answered incorrectly.

The Kano model tells us: Firstly, not all of product features are related to user satisfaction, and some features are not. Secondly, the required features cannot improve user satisfaction, which is just the basic needs of users. If the basic needs are not met, the satisfaction will be reduced. Thirdly, the improvement of desired features and attractive features can effectively improve user satisfaction, which is also a key attribute to optimize the user experience of a product.

3 RESEARCH DESIGN

3.1 KANO Questionnaire Design

In the questionnaire, the features of universal knowledge audio and video products were used as variable indexes, and the positive and negative aspects of each feature were questioned (Table 3).The actual questionnaire consists of two parts: one is the

basic information of the respondents, including four basic questions: gender, age, education background and occupation; the second part is the core part of Kano questionnaire, which contains 4 screening questions and 26 positive/negative questions.

Table 3: Examples of forward and reverse questions

How would you feel if a pan-knowledge audio and video product had the following features?	
Positive question Providing references Background music	Answer options (points) Like (5 points) Necessary (4 points) Whatever (3 points) Tolerable (2 points) Dislike (1 point)
Negative question No references are provided No background music	

3.2 Kano Scale Design

Referring to the research of many scholars, this paper proposes four first-level indicators of content feature, presentation feature, interaction feature and service feature, and 13 second-level indicators (Table 4).

Table 4：Variable indicators of the characteristics

First Level indicators	Second level indicators	Index sign	Index source
content	unusual theme summary references graphic pages 5 minutes or less	A1 A2 A3 A4 A5	Qian-min Wang 2018 Dai-li Wang 2021
presentation	background music visual effects editing professionally	B1 B2 B3	Duan 2021
interaction	annotation tool notes interactive discuss	C1 C2 C3	Liu 2019
service	ratings share	D1 D2	Bai el. 2019

4 DATA ANALYSIS

4.1 Descriptive Statistical Analysis

In order to ensure the accuracy and objectivity of the data, we distributed questionnaires to people who used and had access to the knowledge sharing platform, such as students and employees, and finally 171 valid questionnaires were collected. As shown in Table 5, data such as age, occupation and educational background were consistent with the user portrait of the knowledge share platform.

Table 5：Demographic characteristics of respondents

Variable	Category	Percentage
gender	male	38.60%
	female	61.40%
educational background	high school and below	1.17%
	college degree	1.75%
	bachelor degree	89.47%
	master's degree or above	7.60%
age	18 ~ 24	56.73%
	25 to 30 years old	34.50%
	31 ~ 40 years old	4.09%
	41 to 50 years old	4.09%
	Age 51 and older	0.58%
profession	student	27.49%
	government civil servants/institute staff	4.68%
	enterprise employees	48.53%
	professional (such as doctors/teachers, etc.)	7.02%
	freelancer	12.28%

4.2 Data Reliability and Validity Analysis

The reliability and internal consistency of the questionnaire can be judged only after reliability and validity analysis of the questionnaire data. The reliability index is generally tested by Cronbach Alpha coefficient. When the Cronbach Alpha coefficient is greater than 0.6, the reliability of the questionnaire can be judged to be reliable. The KMO value is generally used as the validity index, and a KMO value greater than 0.7 indicates that the validity of the questionnaire is qualified. The online data analysis platform SPSSPRO is used to analyze the reliability and validity of the data. As shown in Table 6, Table 7 and Table 8, the Cronbach Alpha coefficient of positive questions is 0.799, the Cronbach Alpha coefficient of negative questions is 0.877, and the overall Cronbach Alpha coefficient of the questionnaire is 0.784, indicating that the internal consistency of the questionnaire is good. The data are reliable. As shown in Table 9, Table 10, and Table 11,

the KMO value of the positive question is 0.756, the KMO value of the negative question is 0.874, and the overall KMO value of the questionnaire is 0.753. The Bartlett spherical test reaches the significant level (P <0.001), which meets the requirements of statistical validity test. This indicates that the reliability and validity of the Kano questionnaire are good, and the data can be further analyzed.

Table 6: Reliability analysis of positive questions

Cronbach's alpha coefficient	Standardized Cronbach's α coefficients	Item	Samples
0.799	0.803	13	171

Table 7: Reliability analysis of negative questions

Cronbach's alpha coefficient	Standardized Cronbach's α coefficients	Item	Samples
0.877	0.880	13	171

Table 8: Reliability analysis of the questionnaire

Cronbach's alpha coefficient	Standardized Cronbach's α coefficients	Item	Samples
0.784	0.781	26	171

Table 9: Validity tests for positive questions

KMO test and Bartlett's test		
KMO value		0.756
Bartlett's test for sphericity	The approximate chi-square	597.313
	df	78.000
	p	0.000 * * *
Note: ***represents the 1% level of significance		

Table 10: Validity tests for negative questions

KMO test and Bartlett's test		
KMO value		0.874
Bartlett's test for sphericity	The approximate chi-square	977.824
	df	78.000
	p	0.000 * * *

Table 11: Overall validity test of the questionnaire

KMO test and Bartlett test		
KMO value		0.753
Bartlett's test for sphericity	The approximate chi-square	1944.270
	df	325.000
	p	0.000 * * *

4.3 Kano Model Analysis

According to the analysis of Kano tool provided by SPSSPRO (Table 12), 10 of the 13 variable indicators in the questionnaire belong to the indifference characteristic, two indicators belong to the expected characteristic, and one indicator belongs to the attractive characteristic.

Table 12：KANO evaluation Table

indicators	Characteristics					
	A	O	M	I	R	Q
A1	33.918%	2.924%	1.754%	25.731%	4.678%	30.994%
A2	23.392%	15.789%	16.374%	38.596%	1.17%	4.678%
A3	29.24%	21.053%	9.942%	35.088%	0.585%	4.094%
A4	26.901%	30.409%	11.111%	28.07%	0.0%	3.509%
A5	28.655%	10.526%	5.848%	45.614%	5.263%	4.094%
B1	26.901%	7.018%	2.339%	52.047%	5.848%	5.848%
B2	21.637%	14.035%	8.187%	49.123%	4.094%	2.924%
B3	19.298%	31.579%	20.468%	25.731%	0.585%	2.339%
C1	30.994%	15.789%	5.848%	42.105%	1.17%	4.094%
C2	35.673%	17.544%	3.509%	40.351%	0.585%	2.339%
C3	24.561%	12.281%	2.924%	52.632%	5.263%	2.339%
D1	9.942%	4.094%	5.263%	70.76%	5.848%	4.094%
D2	26.901%	14.62%	9.942%	45.029%	0.585%	2.924%

4.4 Better - Worse Coefficient

Satisfaction coefficient (Better coefficient) =(A+O)/(A+O+M+I) ①

Dissatisfaction coefficient (Worse coefficient) = -1*(O+M)/(A+O+M+I) ②

The Better-worse values of each indicator are calculated by equations ① and ② as shown in Table 13. The value of the better coefficient is usually positive. The larger the positive value or the closer it is to 1, the stronger the effect of improving user satisfaction will be, and the faster the satisfaction will

rise. The worse coefficient is usually negative, with a smaller negative value or closer to -1 indicating the greatest impact on user dissatisfaction. The stronger the effect of decreasing satisfaction, the faster the decline.

Table 13: Better-Worse coefficient

indicators	category	Better coefficient	Worse coefficient
A1	A	0.5727	0.0727
A2	I	0.5276	0.3252
A3	I	0.4162	0.3416
A4	O	0.5939	0.4303
A5	I	0.4323	0.1807
B1	I	0.3841	0.1060
B2	I	0.3837	0.2390
B3	O	0.5241	0.5361
C1	I	0.4938	0.2284
C2	I	0.5482	0.2169
C3	I	0.3987	0.1646
D1	I	0.1558	0.1039
D2	I	0.4303	0.2545
total average		0.4509	0.2462

Build a scatter plot corresponding to all the feature coefficients. Using the absolute value of the Worse coefficient as the abscissae and the better coefficient as the ordinate, the scatter plot is divided into four quadrants, expecting the feature to fall in the first quadrant (better>0.5, worse>0.5), Attractive features fall in the second quadrant (better>0.5, worse<0.5), indifference features fall in the third quadrant (better<0.5, worse<0.5), and necessary features fall in the fourth quadrant (better<0.5, worse>0.5), as shown in Figure 1.

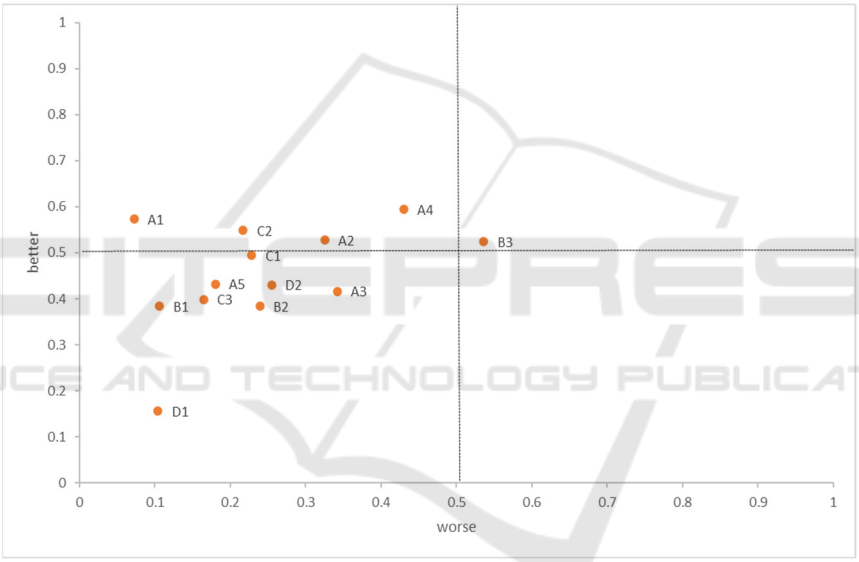

Figure 1: Plot of Better-Worse coefficients

5 CONCLUSIONS

According to the analysis of Kano model, the unusual theme (A1), introduction or summary (A2), graphic page (A4), note function (C2) belong to the attractive feature, and editing professionally(B3) belongs to the desired feature. Providing reference materials (A3), within 5 minutes (A5), background music (B1), visual effects (B2), annotation tools (C1), discussion (C3), rating and evaluation (D1), and sharing (D2) belong to the indifference features.

The research results have the following management implications for audio and video platforms and bloggers:(1) unusual themes can get more page views and attention. The platforms can also recommend products with new themes to users to gain their attention. Products can be attached with profiles or summaries to help users match their needs, enhance user engagement, and improve user loyalty. At the end of the video, the content can be summarized in the form of graphic pages to improve user learning experience. (2) Well-made and vivid pictures can make products more competitive. Platform enterprises should avoid the listing of pan-knowledge audio and video products that are poorly made when reviewing products, because the unprofessional products will bring users a sense of dissatisfaction. (3) The platforms can provide notes

and other learning tools for pan-knowledge video products, which can improve user experience and highlight the characteristics and competitiveness of the platforms.

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