

RESEARCH ARTICLE

Empirical analysis and optimization suggestions of Peking Opera audience's use intention of Kuaishou app

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ABSTRACT

To verify the validity of the integrated "UTAUT2-SOR" model constructed in the previous study and reveal the influencing mechanisms of Peking Opera audiences' intention to use Kuaishou APP, this paper adopted the questionnaire survey method (N=516) and Structural Equation Modeling (SEM) to systematically test the functional relationships among external stimulus factors, mediating variables and moderating variables. The results show that effort expectancy, social influence, platform characteristics, cultural identity and social interaction all exert a significant direct effect on Peking Opera audiences' intention to use Kuaishou APP, and meanwhile, usage attitude and user satisfaction also demonstrate a direct driving effect on such intention. The analysis of the mediating mechanism indicates that usage attitude has a significant mediating effect in the paths where effort expectancy and facilitating conditions influence usage intention, while satisfaction shows an obvious mediating effect in the paths where platform characteristics and cultural identity affect usage intention. The test of the moderating effect finds that Peking Opera exposure experience produces a significant moderating effect in all paths where independent variables influence usage intention, while age only exerts a specific moderating effect in the paths of effort expectancy and algorithm recommendation on usage intention. In addition, users' usage habits show an important moderating effect in the paths of 8 types of independent variables (such as performance expectancy and platform characteristics) on usage intention, whereas gender has no significant moderating effect in all paths. Based on the above conclusions, 12 practical suggestions are put forward from four dimensions, namely "optimization of operational convenience", "innovation of platform functions", "deepening of cultural identity" and "differentiated operation", with detailed specific implementation measures provided. This study offers empirical support and operable guidance for Kuaishou to improve the communication effect of Peking Opera content and enhance user stickiness.

Keywords: Peking Opera audience; usage intention; empirical analysis; mediating effect; moderating effect; communication optimization

1. Introduction

1.1. Research background and connection

Driven by the global digital wave and the vigorous development of short-video platforms, Peking Opera, as a core carrier of China's excellent traditional culture, has shifted its communication scenarios from

ARTICLE INFO

Received: 23 December 2025 | Accepted: 30 January 2026 | Available online: x x 2026

CITATION

Yang SX, Chelum AA. Empirical analysis and optimization suggestions of Peking Opera audience's use intention of Kuaishou app. *Environment and Social Psychology* 2026; 11(2): 4491 doi:10.59429/esp.v11i2.4491.

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traditional theaters, TV and radio to mobile short-video platforms. As of December 2023, the number of Kuaishou users with a strong interest in intangible cultural heritage has exceeded 95 million, and the daily playback volume of Peking Opera-related content has reached 19,000 times. Relying on its "authentic" user ecology, personalized recommendation algorithm and the "Intangible Cultural Heritage Partner Program", Kuaishou has become a key position for the digital communication of Peking Opera (Jiang, 2023; Deng XiuJun & Liu Lu, 2022). However, the communication of Peking Opera on Kuaishou still faces practical problems such as "misinterpretation of cultural connotation caused by content fragmentation", "information cocoons triggered by algorithm recommendation" and "insufficient participation of young users" (Fan Hong, 2021; Li, 2023). It is urgent to clarify the key mechanisms influencing audiences' usage intention through empirical research and provide a scientific basis for platform operation.

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) was proposed by Venkatesh et al.^[1](2003). This theory integrates eight classic technology acceptance models and extracts core variables such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit, which is widely used to explain users' acceptance behavior of new technologies. The Stimulus-Organism-Response (SOR) theory originates from environmental psychology, emphasizing that external environmental stimuli (S) drive behavioral responses (R) by influencing individuals' emotional and cognitive states (O), and is suitable for analyzing the impact of short-video platform characteristics on users' psychology and behavior. The integration of the two theories can fully cover technology acceptance factors and psychological mechanisms, providing a comprehensive perspective for explaining Peking Opera short-video audiences' usage intention. It not only retains the mature variables of UTAUT2 in the field of technology adoption, but also introduces Peking Opera-specific situational factors such as platform characteristics, content quality and cultural identity through the SOR framework, constructing a complete path of "external stimulus → organism psychology → usage intention".

The previous study (Construction of the Influencing Factor Model of Peking Opera Audiences' Intention to Use Kuaishou APP — Based on UTAUT2 and SOR Theories) identified 10 types of core external stimulus factors (including UTAUT2 variables and Peking Opera-specific factors) affecting Peking Opera audiences' usage intention through in-depth interviews (25 users meeting the "21-day viewing standard") and three-level coding of grounded theory, integrating the UTAUT2 theory (core variables such as performance expectancy and effort expectancy) and the SOR (Stimulus-Organism-Response) theoretical framework. It constructed a theoretical model of "stimulus layer (10 variables) → organism layer (usage attitude, satisfaction) → response layer (usage intention)" and put forward 30 hypotheses on direct effects and 10 hypotheses on mediating effects. However, this model is only constructed based on qualitative research, and the strength of causal relationships between variables and the validity of mediating and moderating effects have not been verified by quantitative data, making it impossible to directly provide practical guidance for the platform on "which factors have a stronger impact" and "how to optimize in a targeted manner". Based on this, this study conducts an empirical test through large-sample questionnaire survey and statistical analysis on the basis of this theoretical model, filling the key link of "theoretical model → empirical verification → practical implementation" and promoting the sustainable communication of Peking Opera on short-video platforms.

1.2. Research questions and significance

Centering on the core goal of "verifying model hypotheses and revealing influencing mechanisms", this study systematically puts forward three key research questions. First, the study will test the 30 hypotheses on direct effects proposed in the theoretical model constructed in the early stage, focusing on analyzing the intensity and significance of the direct impact of ten types of external stimulus factors such as performance

expectancy, effort expectancy and cultural identity on users' usage intention, and further exploring the differences in the impact of different types of factors (such as technical and functional factors and cultural and emotional factors) and their internal logic. Second, the study will verify the mediating mechanism of usage attitude and satisfaction in the S-O-R framework, which not only needs to confirm whether these two types of organism variables play a mediating role between external stimuli and usage intention, but also compare and analyze the differences in the intensity of mediating effects in different paths to reveal the specific paths through which various influencing factors affect users' behavior through psychological mechanisms. Third, the study will further explore the roles of four moderating variables: age, gender, Peking Opera exposure experience and Kuaishou usage habits, and systematically analyze how these demographic and behavioral variables regulate the full-path relationship of "stimulus-organism-response", so as to discover the differentiated characteristics of behavioral mechanisms among different user groups.

In recent years, scholars have conducted an increasing number of studies on the communication of traditional culture on short-video platforms (Chen J J, Liu Y M, Xie Y Q, 2022; Shi Y F, 2022; Zhao Y, 2024)^[2-4], but quantitative empirical research on Peking Opera as a specific opera genre is still insufficient. In terms of theoretical contributions, by integrating and applying the UTAUT2 model and the SOR theory to the emerging field of Peking Opera short videos, this study not only verifies the applicability of the integrated model in the scenario of digital communication of traditional culture, but more importantly, clarifies the scope of action of various influencing factors and the transmission mechanism of mediating effects, enriching the theoretical system of user behavior research on "traditional opera + short videos". The research results will provide a reusable empirical research paradigm and theoretical analysis framework for subsequent research on the short-video communication of other traditional operas such as Kunqu Opera and Qin Opera, promoting the improvement and development of the theoretical construction of digital communication of traditional culture. In terms of practical value, through rigorous quantitative analysis, this study clarifies the impact intensity and action paths of key factors such as "effort expectancy", "platform characteristics" and "cultural identity", providing a scientific decision-making basis for Kuaishou to optimize the communication of Peking Opera content. Based on the research finding that "effort expectancy has the strongest impact", the platform can prioritize resource investment to optimize operational convenience and interface friendliness; in view of the conclusion that "the moderating effect of experience is significant", it can design differentiated content recommendation strategies and user operation schemes; and according to the result that "cultural identity significantly drives satisfaction", it should strengthen the excavation of cultural connotation and the construction of emotional connection, so as to systematically improve the user experience and communication effect of Peking Opera content and realize the innovative communication and sustainable development of traditional culture in the modern media environment.

1.3. Research framework

This study follows the logical path of "theoretical model → questionnaire design → data collection → empirical test → strategy proposal", with the specific process as follows:

Theoretical basis: Taking the integrated UTAUT2-SOR model as the core framework, clarify the hypotheses on direct effects, mediating effects and moderating effects to be verified;

Questionnaire design: Design the measurement items of each variable with reference to mature scales and the conclusions of previous interviews, and test the reliability and validity through a pre-survey (100 users) to optimize the questionnaire;

Data collection: Distribute questionnaires to Kuaishou Peking Opera users who meet the "21-day viewing standard + at least one interactive behavior" through Kuaishou private messages and Peking Opera

interest communities (Weibo Super Topic, Douban Group, WeChat Group), collect and clean the data (516 valid samples finally obtained), and see **Table 4-6** (descriptive statistical analysis) for sample characteristics;

Empirical test: Use SPSS26.0 and AMOS24.0 to carry out analysis, including reliability and validity test (Cronbach’s Alpha coefficient, confirmatory factor analysis), model fit test, path analysis (direct effect), Bootstrap mediating effect test and hierarchical regression moderating effect test in turn;

Strategy proposal: Based on the empirical conclusions and combined with the actual operation of Kuaishou, put forward targeted optimization suggestions from three dimensions: "enhancing key influencing factors, optimizing mediating paths and adapting to moderating differences".

2. Study design and data collection

2.1. Questionnaire design

2.1.1. Scale development

The design of the scale items in this study follows the principle of "referring to mature scales + combining the conclusions of previous interviews". All variables are measured by a 5-point Likert scale (1=strongly disagree, 5=strongly agree), and each variable is set with no less than 3 items to ensure reliability and validity. The measurement examples of some core variables are shown in **Table 2-1**:

Table 2-1. Basis for scale design.

Dimension	Items	Basis for Scale Design
1. Performance Expectancy	1. Kuaishou helps me quickly understand the basic knowledge of Peking Opera 2. Learning Peking Opera through Kuaishou is more efficient than traditional methods (e.g., books/offline courses) 3. Peking Opera short videos on the platform have improved my opera appreciation ability 4. Watching such content helps improve my cultural literacy 5. I will collect or forward useful Peking Opera videos to others	Venkatesh et al. (2003) Xue Ke & Lu Xiaotian (2020)
2. Effort Expectancy	1. I can easily find the content tag of "Peking Opera" 2. Kuaishou's operation interface is simple and intuitive 3. The operation process of watching Peking Opera short videos is smooth 4. Video loading speed is fast 5. The platform's search function can accurately identify Peking Opera professional terms	Venkatesh et al. (2003) Wang Yao (2024)
3. Social Influence	1. The opera actors I follow recommend using Kuaishou to watch Peking Opera 2. Family/friends often share Peking Opera short videos with me 3. The Kuaishou accounts of Peking Opera masters will influence my viewing choices 4. I think spreading Peking Opera on Kuaishou is worthy of encouragement 5. I am more willing to watch Peking Opera videos liked by others	Venkatesh et al. (2003) Li Yanan (2022)
4. Facilitating Conditions	1. My mobile phone configuration can play high-definition Peking Opera videos smoothly 2. The update	Venkatesh et al. (2003) Li Yunzi (2024)

Dimension	Items	Basis for Scale Design
5. Platform Characteristics	<p>frequency of Peking Opera content recommended by the platform meets my expectations
3. The network connection is stable when watching
4. The Wi-Fi/traffic reminder function provided by the platform is practical
5. I can easily share Peking Opera videos through WeChat</p> <p>1. The vertical screen format is more suitable for showing Peking Opera makeup and postures
2. The bullet comment function allows me to see the real reactions of other audiences
3. The live playback function is convenient for me to repeatedly learn classic clips
4. The platform's "face-changing" special effects increase the fun of interaction
5. Kuaishou's distribution mechanism makes niche Peking Opera actors gain attention</p>	Chen Jianjian (2022) Ge Xiaoping (2024)
6. Content Quality	<p>1. The image quality of Peking Opera videos usually reaches the high-definition standard
2. The professional level of performers is trustworthy
3. Videos usually mark the opera name and actor information
4. Content arrangement (e.g., clip length) conforms to mobile viewing habits
5. Video titles can accurately reflect the content</p>	Shi Yanfang (2022) Liu Yunjie (2025)
7. Algorithm Recommendation	<p>1. The Peking Opera content recommended by the system meets my interests
2. I will discover new Peking Opera actors because of the recommendation mechanism
3. The "You May Also Like" section often shows the content I want to watch
4. The platform can distinguish my preferences for different Peking Opera schools (e.g., Mei School/Cheng School)
5. The recommended content is diverse</p>	Zhong Chun & Li Liang'anqi (2022) Yu Chenruo (2024)
8. Social Interaction	<p>1. I often like/comment on Peking Opera short videos
2. I will communicate with Peking Opera creators through private messages
3. I will interact with actors in real time when watching live broadcasts
4. I like to browse other people's comments on Peking Opera videos
5. I will follow the "experts" who understand Peking Opera in the comment area</p>	Zhao Yang (2024) Pan Jing (2024)
9. Hedonic Motivation	<p>1. Watching Peking Opera short videos makes me feel relaxed and happy
2. Scrolling Peking Opera videos is one of my ways of leisure and entertainment
3. Interesting secondary creations of Peking Opera (e.g., montages) attract me
4. I often have an "eye-opening" experience when watching
5. I can enjoy the viewing</p>	Xu Tengyue (2021) Zhou Ye (2022)

Dimension	Items	Basis for Scale Design
10. Cultural Identity	process even if I don't have professional knowledge 1. Spreading Peking Opera through Kuaishou is conducive to cultural inheritance 2. I will have a sense of national pride when watching 3. I will deliberately support the works of young Peking Opera actors 4. I am pleased to see traditional art radiate vitality in the new era 5. I am willing to let my children contact Peking Opera through Kuaishou	Zhao Yang (2024) Wei Yinuo (2023)
11. Attitude Toward Using	1. I think using Kuaishou to watch Peking Opera is a good idea 2. Kuaishou is more suitable for spreading Peking Opera than other platforms 3. I will actively recommend Kuaishou to opera lovers 4. I think it is worthwhile to spend time watching Peking Opera on Kuaishou 5. The platform makes me more interested in Peking Opera	Yu Zitong (2024) Lin Meizhong (2023)
12. User Satisfaction	1. Generally satisfied with the Peking Opera content on Kuaishou 2. The platform meets my needs for learning Peking Opera 3. The usage experience exceeds the initial expectations 4. I will continue to use it if there are new functions 5. I prefer to watch Peking Opera videos over other entertainment methods	Zhao Yang (2024) Wang Xu (2022)
13. Intention to Use	1. I will continue to use Kuaishou to watch Peking Opera 2. I am willing to open a membership for high-quality Peking Opera content 3. I plan to follow more Peking Opera accounts 4. I will increase the viewing time in the future 5. I will take time to watch the updates even if I am busy	Wang Yao (2024) Shen Yushan & Jiao Zipan (2023)

Table 2-1. (Continued)

2.1.2. Structure of the questionnaire

The questionnaire is divided into 4 parts with a total of 50 items, and the specific composition is as follows:

1. Demographic characteristics (6 items): Including gender, age, occupation, education level, degree of exposure to Peking Opera and frequency of Kuaishou use, used for subsequent moderating effect analysis and sample characteristic description;

2. Measurement of stimulus layer variables (35 items): Corresponding to 10 types of external stimulus factors, with 3-5 items set for each type of factor;

3. Measurement of organism layer variables (10 items): 5 items each for "Attitude Toward Using" and "User Satisfaction";

4. Measurement of response layer variables (5 items): 5 items for "Intention to Use".

2.1.3. Optimization of the preliminary investigation

To improve the quality of the questionnaire, a pre-survey was conducted before the formal survey:

Pre-survey subjects: 100 Kuaishou users meeting the "21-day viewing standard" (cumulative viewing of Peking Opera short videos ≥ 21 days, ≥ 2 hours per day), covering different age and occupational groups;

Data collection and cleaning: A total of 98 questionnaires were collected, and 2 invalid questionnaires with excessively short filling time (< 120 seconds) and logical contradictions (e.g., "never watched Peking Opera" but checked "2 hours of daily viewing") were excluded, with 96 valid questionnaires finally obtained;

Reliability and validity test and optimization: Tests via SPSS26.0 showed that the Cronbach's Alpha coefficient of each dimension was > 0.8 (e.g., hedonic motivation $\alpha = 0.908$, content quality $\alpha = 0.890$), and the KMO value was > 0.7 (e.g., effort expectancy KMO = 0.83, social interaction KMO = 0.857), indicating good reliability and validity of the scale; semantic adjustments were made to the ambiguous items in the "Algorithm Recommendation" dimension (e.g., the original "accurate recommendation" was optimized to "the Peking Opera content recommended by the system meets my interests") to form the final questionnaire.

2.2. Formal investigation and data collection

2.2.1. Sample screening criteria

To ensure that the samples are "active Peking Opera audiences with real experience", this study sets dual screening criteria:

1. Behavioral criterion: Meet the "21-day viewing standard", i.e., the cumulative effective viewing time of Peking Opera short videos is no less than 21 days, and the daily viewing time is not less than 2 hours;

2. Interactive criterion: Have participated in at least one interaction with Peking Opera content (e.g., liking, commenting, collecting, sharing), excluding users who only "browse passively".

2.2.2. Data collection process

Survey time: May-June 2025, avoiding peak holidays (e.g., Dragon Boat Festival) to reduce external interference;

Collection channels: A combination of "precision targeting + community diffusion" was adopted:

1. Targeted invitation on Kuaishou: Send questionnaire links to users with a historical viewing time of Peking Opera content ≥ 30 hours through Kuaishou APP private messages;

2. Diffusion in interest communities: Publish questionnaires in Peking Opera interest communities (Weibo Super Topic "Peking Opera Super Topic", Douban Group "Peking Opera Lovers Group", WeChat Peking Opera Exchange Group) with a "filling instruction" to clarify sample requirements;

3. Snowball sampling: Invite the subjects of previous interviews (25 users in the previous study) to recommend eligible peers to participate, improving the authenticity of the samples;

Data cleaning: A total of 550 questionnaires were collected, and 34 invalid samples were excluded according to the following criteria:

1. Logical contradictions: e.g., "occupation is student" but checked "retired person", "never contacted Peking Opera" but filled in "often participate in offline Peking Opera activities";

2. Duplicate submission: Identify and exclude duplicate questionnaires through IP addresses and device numbers;

3.Perfunctory answering: Questionnaires with filling time <180 seconds and all items selected the same option (e.g., all selected "5").

Finally, 516 valid questionnaires were obtained with an effective rate of 93.82%. The sample size meets the requirement of "sample size ≥ 5 times the number of variables" for structural equation modeling analysis (13 variables in the model, $516 > 65$).

2.2.3. Sample characteristics

The demographic and behavioral characteristics of the valid samples are detailed in **Table 4-6** (descriptive statistical analysis), and the core characteristics are summarized as follows:

The sample has a balanced gender distribution, with slightly more females than males; the age structure shows a younger trend, with the youth group aged 18-35 accounting for nearly 70%; the occupational distribution is mainly students, enterprise employees and freelancers, accounting for 69.38% in total; in terms of the degree of exposure to Peking Opera, more than half are "occasional contactors", while "Peking Opera lovers/practitioners" account for less than 10%; in terms of platform usage habits, high-frequency Kuaishou users (at least once a day) account for more than 55% of the total samples. Overall, the samples are mainly characterized by young people, moderate Peking Opera exposure experience and active platform users.

Table 2-2. Descriptive statistical analysis.

Category	Options	Frequency N=516	Percentage (%)
Gender	Female	278	53.88
	Male	238	46.12
Age	18-25 years old	175	33.91
	Under 18 years old	44	8.53
	26-35 years old	178	34.50
	36-45 years old	70	13.57
	46 years old and above	49	9.50
Occupation	Enterprise employee	139	26.94
	Others	50	9.69
	Student	134	25.97
	Cultural/art practitioner	51	9.88
	Freelancer	85	16.47
	Retired person	57	11.05
Education Level	Junior high school and below	59	11.43
	College/undergraduate	271	52.52
	Master's degree and above	67	12.98
	Senior high school/technical secondary school	119	23.06
Degree of Peking Opera Exposure	Peking Opera lover/practitioner	50	9.69
	Never contacted	97	18.80
	Occasionally contacted	264	51.16
	Frequently contacted	105	20.35
Frequency of Kuaishou Use	Rarely use	54	10.47
	Several times a week	102	19.77
	Once a day	125	24.22

Category	Options	Frequency N=516	Percentage (%)
Viewing Time of Peking Opera	Several times a day	160	31.01
	Several times a month	75	14.53
	10-30 minutes	205	39.73
	Less than 10 minutes	103	19.96
	More than 1 hour	39	7.56
	30 minutes-1 hour	169	32.75
Follow Peking Opera Accounts	No	299	57.95
	Yes	217	42.05
Participate in Peking Opera Activities	No	364	70.54
	Yes	152	29.46
Total	Total	516	100.00

Table 2-2. (Continued)

It should be noted that the samples in this study are limited to domestic users of the Kuaishou platform, and the proportion of users in first-tier and new first-tier cities is relatively high (more than 80%), with fewer samples of users in the central and western regions and overseas, which limits the cross-platform and cross-cultural generalizability of the conclusions. Subsequent research should expand to other platforms such as Douyin and Bilibili, and include users with a wider geographical and cultural background to verify the robustness of the model.

3. Results of empirical analysis

3.1. Validity and reliability testing

3.1.1. Reliability analysis

The reliability analysis employed Cronbach's α coefficient to evaluate the scale's internal consistency. Results showed that all variable dimensions achieved Cronbach's α coefficients exceeding 0.9, with the overall scale's coefficient reaching 0.963—significantly surpassing the 0.7 threshold and demonstrating excellent internal consistency reliability. Core variables including usage attitude ($\alpha=0.957$), satisfaction ($\alpha=0.959$), and willingness to use ($\alpha=0.954$) exhibited particularly strong reliability. Detailed findings are presented in **Table 3-1**, which contains the reliability analysis of the formal survey.

Table 3-1. Reliability analysis of formal survey.

dimension	Cronbach'sAlpha	number of terms
performance expectation	0.942	5
Striving for expectations	0.955	5
social influence	0.953	5
Convenience	0.946	5
Platform features	0.951	5
Content Quality	0.95	5
Algorithm recommendations	0.95	5
Social Interaction	0.954	5
pleasure motive	0.944	5

dimension	Cronbach'sAlpha	number of terms
cultural identity	0.952	5
adoption attitude	0.957	5
degree of satisfaction	0.959	5
Willingness to use	0.954	5

Table 3-1. (Continued)

3.1.2. Validity analysis

(1) Content validity: The scale items of this study all refer to mature domestic and foreign studies (e.g., Venkatesh's UTAUT2 scale^[1], Zhao Yang's Peking Opera communication-related scale^[4]), and semantic adaptation adjustments are made in combination with the conclusions of previous in-depth interviews; at the same time, 2 professors in the field of cultural communication and 3 active Kuaishou Peking Opera users were invited to review the rationality of the items, and the questionnaire was finally formed, ensuring good content validity of the scale.

(2) Construct validity: Confirmatory Factor Analysis (CFA) was used to test the construct validity, including convergent validity and discriminant validity:

Convergent validity: The Average Variance Extracted (AVE) of each variable is greater than 0.7 (e.g., performance expectancy AVE=0.787, cultural identity AVE=0.789), and the Composite Reliability (CR) is greater than 0.9 (e.g., social interaction CR=0.952, hedonic motivation CR=0.953), all meeting the standards of "AVE≥0.5, CR≥0.7", indicating excellent convergent validity of the scale. For specific results, see **Table 3-2** (Analysis Results of Variable Convergent Validity).

Table 3-2. Analysis results of variable convergent validity.

Variable Type	Factor	Average Variance Extracted (AVE)	Composite Reliability (CR)
Independent Variable	Performance Expectancy	0.787	0.949
	Effort Expectancy	0.810	0.955
	Social Influence	0.792	0.950
	Facilitating Conditions	0.807	0.954
	Platform Characteristics	0.788	0.949
	Content Quality	0.795	0.951
	Algorithm Recommendation	0.811	0.955
	Social Interaction	0.799	0.952
	Hedonic Motivation	0.803	0.953
	Cultural Identity	0.789	0.949
Mediating and Dependent Variable	Attitude Toward Using	0.833	0.962
	User Satisfaction	0.794	0.951
	Intention to Use	0.832	0.961

Discriminant validity: The square root of AVE of each variable is greater than the Pearson correlation coefficient between the variable and all other variables (e.g., the square root of AVE of Attitude Toward Using=0.913, and its correlation coefficient with User Satisfaction is 0.306), indicating good independence among variables and meeting the discriminant validity standard. For specific results, see **Table 3-3** (Test Results of Independent Variable Discriminant Validity) and **Table 3-4** (Analysis Results of Mediating and Dependent Variable Discriminant Validity).

Table 3-3. Test results of independent variable discriminant validity.

	Performance Expectancy	Effort Expectancy	Social Influence	Facilitating Conditions	Platform Characteristics	Content Quality	Algorithm Recommendation	Social Interaction	Hedonic Motivation	Cultural Identity
Performance Expectancy	0.887									
Effort Expectancy	0.499	0.900								
Social Influence	0.483	0.388	0.890							
Facilitating Conditions	0.476	0.328	0.524	0.898						
Platform Characteristics	0.247	0.354	0.272	0.315	0.887					
Content Quality	0.467	0.421	0.361	0.391	0.307	0.892				
Algorithm Recommendation	0.335	0.453	0.309	0.463	0.345	0.285	0.900			
Social Interaction	0.231	0.350	0.230	0.452	0.293	0.300	0.162	0.894		
Hedonic Motivation	0.329	0.338	0.422	0.320	0.215	0.289	0.434	0.228	0.896	
Cultural Identity	0.236	0.427	0.506	0.481	0.373	0.440	0.181	0.324	0.334	0.889
Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE

Table 3-4. Analysis results of mediating and dependent variable discriminant validity.

	Attitude Toward Using	User Satisfaction	Intention to Use
Attitude Toward Using	0.913		
User Satisfaction	0.306	0.891	
Intention to Use	0.206	0.262	0.912
Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	Note: The blue numbers on the diagonal are the square root values of AVE	

3.2. Model fitting and path analysis

3.2.1. Model fit test

UTAUT2-SOR model. The model fit indices show that the theoretical model constructed in this study fits well with the data. Among them, the chi-square to degree of freedom ratio (χ^2/df) is 1.142, less than the ideal standard of 3; the Root Mean Square Error of Approximation (RMSEA) is 0.017, lower than the critical value of 0.08; the Comparative Fit Index (CFI) is 0.994 and the Normed Fit Index (NFI) is 0.955, both better than the ideal standard of 0.9; the Adjusted Goodness of Fit Index (AGFI) is 0.900, reaching the ideal threshold; the Standardized Root Mean Square Residual (SRMR) is 0.023, lower than the standard of 0.05. All fit indices meet or exceed the ideal level, indicating that the model has good construct validity and can effectively reflect the theoretical relationships between variables. The core fit indices all meet the ideal standards, and the model is well adapted to the data. The specific indices are as follows:

Table 3-5. Model fit indices.

Common Indices	χ^2	df	p	χ^2/df	GFI	RMSEA	RMR	CFI	NFI	NNFI
Judgment Standard	-	-	>0.05	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
Value	1290.565	1130	0.001	1.142	0.912	0.017	0.012	0.994	0.955	0.994
Other Indices	TLI	AGFI	IFI	PGFI	PNFI	PCFI	SRMR	RMSEA 90%CI		
Judgment Standard	>0.9	>0.9	>0.9	>0.5	>0.5	>0.5	<0.1	-		
Value	0.994	0.900	0.994	0.808	0.881	0.917	0.023	0.011~0.021		
Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683	Note: $\chi^2(1225)=28760$.453, p=1.000 for Default Model AIC=28 4.998, BIC=90 0.683

3.2.2. Direct effect test (Path analysis)

SEM was used to analyze the direct effects between variables. The results show that among the 30 hypotheses on direct effects, 15 are supported ($p < 0.05$) and 15 are not supported ($p \geq 0.05$). The specific path coefficients and significance are as follows (see Table 3-6 Model Path Verification Table and Figure 3-1 Path Coefficient Chart for details):

(Facilitating Conditions → User Satisfaction: -0.087; Social Influence → User Satisfaction: 0.148; Platform Characteristics → User Satisfaction: 0.161*; Effort Expectancy → Attitude Toward Using: 0.242*; Facilitating Conditions → Attitude Toward Using: 0.214**; Social Interaction → Attitude Toward Using:

0.146; Cultural Identity→User Satisfaction: 0.171***; Algorithm Recommendation→User Satisfaction: 0.140*; Content Quality→User Satisfaction: 0.090; Performance Expectancy→User Satisfaction: 0.097; Hedonic Motivation→Attitude Toward Using: 0.075; Social Influence→Intention to Use: 0.166**; Effort Expectancy→Intention to Use: 0.239**; Platform Characteristics→Intention to Use: 0.204; Cultural Identity→Intention to Use: 0.166**; Social Interaction→Intention to Use: 0.197**; Attitude Toward Using→Intention to Use: 0.256**; User Satisfaction→Intention to Use: 0.259; others are not significant)

Table 3-6. Model path verification table.

X	→	Y	Unstandardized Path Coefficient	SE	z(CR Value)	p	Standardized Path Coefficient
Facilitating Conditions	→	Intention to Use	0.006	0.008	0.786	0.432	0.011
Social Influence	→	Intention to Use	0.104	0.008	13.758	0.000	0.166
Effort Expectancy	→	Intention to Use	0.141	0.007	19.146	0.000	0.239
Performance Expectancy	→	Intention to Use	-0.007	0.008	-0.965	0.335	-0.012
User Satisfaction	→	Intention to Use	0.167	0.007	24.309	0.000	0.259
Attitude Toward Using	→	Intention to Use	0.149	0.006	24.065	0.000	0.256
Cultural Identity	→	Intention to Use	0.114	0.009	13.253	0.000	0.166
Hedonic Motivation	→	Intention to Use	0.001	0.007	0.188	0.851	0.002
Social Interaction	→	Intention to Use	0.117	0.006	18.290	0.000	0.197
Algorithm Recommendation	→	Intention to Use	-0.013	0.007	-1.840	0.066	-0.022
Content Quality	→	Intention to Use	-0.003	0.006	-0.443	0.658	-0.005
Platform Characteristics	→	Intention to Use	0.129	0.007	19.777	0.000	0.204
Facilitating Conditions	→	User Satisfaction	-0.082	0.052	-1.580	0.114	-0.087
Social Influence	→	User Satisfaction	0.144	0.048	3.012	0.003	0.148
Effort Expectancy	→	User Satisfaction	-0.029	0.046	-0.629	0.530	-0.032
Performance Expectancy	→	User Satisfaction	0.095	0.049	1.930	0.054	0.097
Cultural Identity	→	User Satisfaction	0.182	0.054	3.341	0.001	0.171
Hedonic Motivation	→	User Satisfaction	0.057	0.043	1.334	0.182	0.059
Social Interaction	→	User Satisfaction	0.129	0.040	3.222	0.001	0.141
Algorithm	→	User	0.131	0.046	2.839	0.005	0.140

X	→	Y	Unstandardized Path Coefficient	SE	z(CR Value)	p	Standardized Path Coefficient
Recommendation		Satisfaction					
Content Quality	→	User Satisfaction	0.078	0.040	1.979	0.048	0.090
Platform Characteristics	→	User Satisfaction	0.158	0.041	3.829	0.000	0.161
Facilitating Conditions	→	Attitude Toward Using	0.222	0.057	3.880	0.000	0.214
Social Influence	→	Attitude Toward Using	0.095	0.053	1.790	0.073	0.088
Effort Expectancy	→	Attitude Toward Using	0.244	0.051	4.766	0.000	0.242
Performance Expectancy	→	Attitude Toward Using	0.040	0.055	0.731	0.465	0.037
Cultural Identity	→	Attitude Toward Using	-0.013	0.060	-0.212	0.832	-0.011
Hedonic Motivation	→	Attitude Toward Using	0.081	0.048	1.694	0.090	0.075
Social Interaction	→	Attitude Toward Using	0.148	0.045	3.332	0.001	0.146
Algorithm Recommendation	→	Attitude Toward Using	-0.009	0.051	-0.181	0.856	-0.009
Content Quality	→	Attitude Toward Using	0.009	0.044	0.207	0.836	0.009
Platform Characteristics	→	Attitude Toward Using	0.001	0.046	0.020	0.984	0.001
Note: → indicates the path influence relationship	Note: → indicates the path influence relationship	Note: → indicates the path influence relationship	Note: → indicates the path influence relationship	Note: → indicates the path influence relationship	Note: → indicates the path influence relationship	Note: → indicates the path influence relationship	Note: → indicates the path influence relationship

Table 3-6. (Continued)

Table 3-7. Significant positive direct effects (p<0.001).

Variable Category	Independent Variable	Dependent Variable	β Value	z Value	p Value
UTAUT2 Core Variables	Effort Expectancy	Intention to Use	0.239	19.146	<0.001
	Effort Expectancy	Attitude Toward Using	0.242	4.766	<0.001
	Social Influence	Intention to Use	0.166	13.758	<0.001
	Social Influence	User Satisfaction	0.148	3.012	0.003

Variable Category	Independent Variable	Dependent Variable	β Value	z Value	p Value
Peking Opera-specific Factors	Platform Characteristics	Intention to Use	0.204	19.777	<0.001
	Platform Characteristics	User Satisfaction	0.161	3.829	<0.001
	Cultural Identity	Intention to Use	0.166	13.253	<0.001
	Cultural Identity	User Satisfaction	0.171	3.341	<0.001
	Social Interaction	Intention to Use	0.197	18.290	<0.001
	Social Interaction	User Satisfaction	0.141	3.222	0.001
	Social Interaction	Attitude Toward Using	0.146	3.332	<0.001
Organism Layer Variables	Algorithm Recommendation	User Satisfaction	0.140	2.839	0.005
	Content Quality	User Satisfaction	0.090	1.979	0.048
	Attitude Toward Using	Intention to Use	0.256	24.065	<0.001
	User Satisfaction	Intention to Use	0.259	24.309	<0.001
	Facilitating Conditions	Attitude Toward Using	0.214	3.880	<0.001

Table 3-7. (Continued)

Table 3-8. Insignificant direct effects ($p \geq 0.05$)

Independent Variable	Dependent Variable	β Value	z Value	p Value
Performance Expectancy	Intention to Use	-0.012	-0.965	0.335
Performance Expectancy	Attitude Toward Using	0.037	0.731	0.465
Content Quality	Intention to Use	-0.005	-0.443	0.658
Content Quality	Attitude Toward Using	0.009	0.207	0.836
Algorithm Recommendation	Intention to Use	-0.022	-1.840	0.066
Algorithm Recommendation	Attitude Toward Using	-0.009	-0.181	0.856
Hedonic Motivation	Intention to Use	0.002	0.188	0.851
Hedonic Motivation	User Satisfaction	0.059	1.334	0.182
Facilitating Conditions	Intention to Use	0.011	0.786	0.432
Facilitating Conditions	User Satisfaction	-0.087	-1.580	0.114

3.3. Testing for the mediating effect

The Bootstrap method (5000 repeated samplings, 95% confidence interval) was used to test the mediating effects of usage attitude and satisfaction. If the confidence interval (BootLLCI-BootULCI) does not contain 0, the mediating effect is significant. The results show that among the 20 hypotheses on mediating effects, 8 are supported, as follows (see Table 3-7 Mediating Effect Test for details):

Table 3-9. Mediating effect test.

Item	Effect	BootSE	BootLLCI	BootULCI	z	p
Performance Expectancy → Usage Attitude → Usage Intention	0.006	0.014	-0.020	0.036	0.430	0.667
Performance Expectancy → Satisfaction → Usage Intention	0.016	0.012	-0.002	0.050	1.264	0.206
Performance Expectancy → Usage Attitude → Satisfaction → Usage Intention	0.000	0.001	-0.001	0.004	0.290	0.772
Effort Expectancy → Usage Attitude → Usage Intention	0.036	0.013	0.034	0.088	2.734	0.006
Effort Expectancy → Satisfaction → Usage Intention	-0.007	0.013	-0.036	0.014	-0.511	0.610
Effort Expectancy → Usage Attitude → Satisfaction → Usage Intention	0.002	0.003	-0.002	0.009	0.686	0.492
Social Influence → Usage Attitude → Usage Intention	0.014	0.013	-0.003	0.047	1.114	0.265
Social Influence → Satisfaction → Usage Intention	0.023	0.013	0.013	0.063	1.832	0.067
Social Influence → Usage Attitude → Satisfaction → Usage Intention	0.001	0.001	-0.001	0.004	0.571	0.568
Facilitating Conditions → Usage Attitude → Usage Intention	0.033	0.015	0.025	0.084	2.222	0.026
Facilitating Conditions → Satisfaction → Usage Intention	-0.015	0.015	-0.057	0.003	-1.008	0.314

Item	Effect	BootSE	BootLLCI	BootULCI	z	p
Facilitating Conditions → Usage Attitude → Satisfaction → Usage Intention	0.002	0.003	-0.002	0.008	0.683	0.494
Platform Characteristics → Usage Attitude → Usage Intention	0.000	0.011	-0.021	0.023	0.012	0.991
Platform Characteristics → Satisfaction → Usage Intention	0.026	0.011	0.019	0.063	2.365	0.018
Platform Characteristics → Usage Attitude → Satisfaction → Usage Intention	0.000	0.001	-0.002	0.002	0.009	0.993
Content Quality → Usage Attitude → Usage Intention	0.001	0.011	-0.020	0.025	0.117	0.907
Content Quality → Satisfaction → Usage Intention	0.013	0.011	0.001	0.046	1.140	0.254
Content Quality → Usage Attitude → Satisfaction → Usage Intention	0.000	0.001	-0.001	0.002	0.090	0.928
Algorithm Recommendati on → Usage Attitude → Usage Intention	-0.001	0.012	-0.025	0.020	-0.113	0.910
Algorithm Recommendati on → Satisfaction → Usage Intention	0.022	0.013	0.011	0.062	1.719	0.086
Algorithm Recommendati on → Usage Attitude → Satisfaction → Usage Intention	-0.000	0.001	-0.002	0.002	-0.088	0.930

Item	Effect	BootSE	BootLLCI	BootULCI	z	p
Social Interaction → Usage Attitude → Usage Intention	0.022	0.012	0.014	0.062	1.824	0.068
Social Interaction → Satisfaction → Usage Intention	0.020	0.011	0.015	0.056	1.939	0.053
Social Interaction → Usage Attitude → Satisfaction → Usage Intention	0.001	0.002	-0.001	0.006	0.647	0.518
Hedonic Motivation → Usage Attitude → Usage Intention	0.012	0.010	-0.002	0.038	1.201	0.230
Hedonic Motivation → Satisfaction → Usage Intention	0.009	0.011	-0.009	0.036	0.794	0.427
Hedonic Motivation → Usage Attitude → Satisfaction → Usage Intention	0.001	0.001	-0.001	0.003	0.611	0.541
Cultural Identity → Usage Attitude → Usage Intention	-0.002	0.013	-0.030	0.022	-0.139	0.889
Cultural Identity → Satisfaction → Usage Intention	0.030	0.013	0.020	0.070	2.295	0.022
Cultural Identity → Usage Attitude → Satisfaction → Usage Intention	-0.000	0.001	-0.002	0.002	-0.114	0.909

Table 3-9. (Continued)

Note: BootLLCI refers to the lower limit of the 95% confidence interval for Bootstrap sampling, and BootULCI refers to the upper limit of the 95% confidence interval for Bootstrap sampling. Bootstrap method: percentile Bootstrap method.

3.3.3. Chain mediation effect

All chain mediation paths of independent variable → Attitude Toward Using → User Satisfaction → Intention to Use are not significant ($p > 0.05$), indicating that Attitude Toward Using and User Satisfaction mainly play a role of parallel mediation rather than chain mediation.

3.4. Testing for the adjustment effect

Hierarchical regression analysis was adopted to test the effects of four moderating variables: age, gender, Peking Opera exposure experience, and Kuaishou usage habits. The significance of the moderating effect was judged by introducing the interaction term of independent variable \times moderating variable ($p < 0.05$). The results in Table 3-10 show that gender has no significant moderating effect, while age, Peking Opera exposure experience and Kuaishou usage habits have significant moderating effects, with the specific results as follows:

3.4.1. The moderating effect of age

Age exerts a significant moderating effect on two paths:

Effort Expectancy \rightarrow Intention to Use: The moderating effect is stronger in the older age group (age $>$ mean + 1 standard deviation) ($\beta = 0.32$, $p = 0.0013$), and weaker in the younger age group (age $<$ mean - 1 standard deviation) ($\beta = 0.15$, $p = 0.12$), indicating that older users are more sensitive to operational convenience (see Figure 4-4 for details).

Algorithm Recommendation \rightarrow Intention to Use: The moderating effect is significant in the older age group ($\beta = 0.28$, $p = 0.0324$) but not in the younger age group ($\beta = 0.08$, $p = 0.35$), reflecting that older users rely more on personalized recommendations (see Figure 4-5 for details).

In addition, the path of social influence is close to a significant level ($p = 0.0656$), where younger users are slightly more sensitive to social influence, but the result does not meet the statistical significance standard.

Figure 3-4 Simple Slope Analysis: The Moderating Effect of Age on Effort Expectancy and Intention to Use

Figure 3-5 Simple Slope Analysis: The Moderating Effect of Age on Algorithm Recommendation and Intention to Use

3.4.2. The Moderating Effect of Experience of Peking Opera Exposure

Peking Opera exposure experience has a significant positive moderating effect on all paths of stimulus layer variables \rightarrow Intention to Use ($p < 0.001$), showing an amplifier effect. Users with high exposure experience (frequently exposed to Peking Opera) are more sensitive to various influencing factors. For example, the impact intensity of performance expectancy ($\beta = 0.21$ for high-experience users, $\beta = 0.07$ for low-experience users) and cultural identity ($\beta = 0.25$ for high-experience users, $\beta = 0.09$ for low-experience users) on high-experience users is significantly higher than that on low-experience users.

3.4.3. The adjustment effect of Kuaishou's usage habits

Kuaishou usage habits show a significant moderating effect on 8 paths ($p < 0.05$), with the effect being particularly prominent among high-frequency users (using the platform several times a day). The paths include the influence of performance expectancy, facilitating conditions, platform characteristics, content quality, algorithm recommendation, social interaction, hedonic motivation and cultural identity on intention to use.

However, the moderating effect is not significant on the two paths of effort expectancy and social influence ($p > 0.05$), indicating that users' perception of operational complexity and others' evaluations is relatively stable across different usage frequencies.

3.4.4. The moderating effect of gender

Gender has no significant moderating effect on all paths ($p > 0.05$), which means there is no significant difference in the influencing mechanisms of Peking Opera content usage intention between male and female users. Thus, there is no need to formulate gender-specific differentiated communication strategies.

Table 3-10. Summary of moderating effect analysis results.

Independent Variable	Age Moderation (p-value of interaction term)	Gender Moderation (p-value of interaction term)	Peking Opera Exposure Experience Moderation (p-value of interaction term)	Kuaishou Usage Habit Moderation (p-value of interaction term)
Performance Expectancy	0.1686	0.7803	0.0001	0.0050
Effort Expectancy	0.0013	0.2208	0.0001	0.1158
Social Influence	0.0656	0.1660	0.0001	0.2234
Facilitating Conditions	0.0801	0.4256	0.0000	0.0061
Platform Characteristics	0.2958	0.6155	0.0000	0.0004
Content Quality	0.3602	0.6732	0.0000	0.0000
Algorithm Recommendation	0.0324	0.8086	0.0019	0.0444
Social Interaction	0.2586	0.2967	0.0002	0.0095
Hedonic Motivation	0.9997	0.3163	0.0004	0.0109
Cultural Identity	0.8315	0.8832	0.0000	0.0020

Note: Significance standard: $p < 0.05$ for significant, $p \geq 0.05$ for non-significant

4. Research conclusions and optimization suggestions

Based on the empirical test of the integrated UTAUT2-SOR model (structural equation modeling, Bootstrap mediating effect test, and hierarchical regression moderating effect test), this study systematically reveals the key influencing factors and action mechanisms of Peking Opera short video communication through empirical analysis of 516 valid samples.

The study finds that among external stimulus factors, effort expectancy ($\beta = 0.239$), platform characteristics ($\beta = 0.204$), social interaction ($\beta = 0.197$), cultural identity ($\beta = 0.166$) and social influence ($\beta = 0.166$) have a significant positive impact on users' intention to use the platform, with operational convenience and complete platform functions being the core driving factors. In contrast, the direct impacts of performance expectancy, content quality and algorithm recommendation are not significant, reflecting the complexity of current user demands and the diminishing marginal effect of content supply.

The study further verifies the key mediating role of Attitude Toward Using and User Satisfaction in the stimulus-response process: Attitude Toward Using exerts a significant mediating effect in the paths where effort expectancy, facilitating conditions and social interaction influence intention to use, while User Satisfaction acts as a key bridge in the paths where platform characteristics, cultural identity and algorithm recommendation affect intention to use. This finding confirms the applicability of the SOR theory in the scenario of digital cultural communication, suggesting that the platform needs to focus on both functional optimization and the improvement of users' psychological experience.

The analysis of moderating effects shows that user characteristics have significant differentiated impacts:

- 1.Age has a moderating effect on the paths of effort expectancy and algorithm recommendation on intention to use, with older users showing higher sensitivity;
- 2.Peking Opera exposure experience has an "amplifier effect" on all influencing paths, and high-experience users have a significantly stronger perception of various factors than low-experience users;
- 3.Kuaishou usage habits exhibit a significant moderating effect on eight influencing paths.

Notably, gender has no significant moderating effect on all paths.

4.1. Result discussion

The findings of this study deepen the understanding of the formation mechanism of Peking Opera short video audiences' usage intention. It is worth noting that some hypotheses are not supported: the direct effects of performance expectancy, content quality and algorithm recommendation on usage intention are not significant, which may be attributed to the structural mismatch between the supply characteristics of Peking Opera content on Kuaishou and user demands.

The non-significance of performance expectancy may reflect that users watch Peking Opera on Kuaishou more for entertainment and leisure purposes rather than knowledge acquisition or skill improvement, which is consistent with Xu T Y's(2021)^[5] research on the cultural consumption psychology of young audiences.

The non-significance of content quality may be due to the fact that Peking Opera short videos on the platform generally reach a high professional level, leading to small differences in user perception and thus a reduced marginal contribution to usage intention.

The non-significance of algorithm recommendation may be related to users' "unconscious" acceptance of the recommendation mechanism; most users do not clearly perceive the impact of algorithms, or believe that the matching degree between recommended content and their own interests still needs to be improved (Zhong C, Li L A Q, 2022)^[6].

In addition, hedonic motivation has no significant direct impact on usage intention but exerts an indirect impact through user satisfaction, suggesting that a pleasant experience needs to be transformed into a satisfactory evaluation to drive continuous usage. These non-significant results provide reverse enlightenment for platform optimization: simply increasing the number of content or the accuracy of algorithms may not directly enhance user stickiness, and comprehensive measures need to be taken in combination with user psychological mechanisms.

Compared with existing studies, the effect of effort expectancy in this study is stronger than that of performance expectancy, which is partially consistent with the research conclusions of Xue Ke and Lu Xiaotian (2020)^[7] on shadow puppetry short videos, but there are differences in the role of performance expectancy. This may be because the aesthetic preference of Peking Opera audiences focuses more on process experience rather than practical value. The significant effects of platform characteristics, social interaction and cultural identity echo Zhao Yang's (2024)^[4] research on the emotional communication of Peking Opera short videos on Douyin, emphasizing the importance of platform functions and emotional connection.

4.2. Optimization suggestions

Based on the above research findings, this study puts forward systematic optimization suggestions from a practical perspective and details specific implementation measures.

(1) Optimization of Operational Convenience

1. Develop a Peking Opera Elderly Mode: Targeting the high sensitivity of older users to operational convenience, design an exclusive mode including font enlargement, interface simplification, one-click access to the Peking Opera section, voice search function, and remote assistance function for children to lower the usage threshold.

2. Optimize the intelligent retrieval system: Support accurate retrieval of opera names, actor names and school names, and recognize Pinyin initials and homophones to help users of different age groups quickly find interesting content; add classification tags such as "Masters", "Classic Arias" and "Behind-the-Scenes Stories" to improve retrieval efficiency.

3. Realize multi-device synchronous experience: Develop a multi-terminal synchronization function for mobile phones, tablets, TVs and other devices, allowing users to seamlessly continue playing on different devices to meet the continuous viewing needs of family and mobile scenarios.

(2) Innovation of Platform Functions

1. Enhance social interaction tools: On the basis of the existing like and comment functions, add a "Watch Together" live broadcast function to support users to invite friends to watch synchronously and conduct real-time voice discussions; develop a "Peking Opera Fans" community section for users to share experiences and launch fan activities.

2. Enrich the application of platform characteristics: Combine the characteristics of vertical screens to develop Peking Opera makeup filters and posture imitation special effects to increase fun; optimize the bullet comment function to allow users to mark and comment on specific arias or postures, forming knowledge-based interaction.

3. Improve live playback and editing functions: Provide segmented marking of live playbacks for users to repeatedly learn classic clips; allow users to conduct secondary creation of wonderful clips and share them with one click to stimulate the vitality of UGC (User Generated Content).

(3) Deepening of Cultural Identity

1. Construct a Peking Opera cultural knowledge graph: Integrate content such as opera backgrounds, school inheritance and master anecdotes, and present it in the form of cards below videos to help users understand cultural connotations; launch special planning combined with solar terms and memorial days, such as "Qingming · Ode to the Pear Blossom" and "Commemoration of Mei Lanfang's Birthday", to strengthen the sense of cultural ritual.

2. Support young actors and new plays: Establish a "New Star Program" to provide traffic support for young Peking Opera actors and encourage the creation of short videos of new plays; set up a "New Voices of the Opera Circle" column to enhance users' sense of participation in Peking Opera inheritance.

3. Link with offline activities: Cooperate with theaters and opera schools to launch the "Watch Opera Online, Experience Offline" activity, where users can sign up for offline activities such as backstage visits and facial makeup painting through Kuaishou to deepen cultural identity.

(4) Differentiated Operation

1. Content push based on exposure experience: Push interesting and introductory content (such as Peking Opera montages and interesting popular science) to low-experience users (occasionally exposed to Peking Opera); push in-depth appreciation, classic full operas and master interviews to high-experience users (frequently exposed to Peking Opera) to meet the needs of different levels.

2. Incentive strategies based on usage habits: Provide exclusive medals, priority to participate in offline activities and other benefits for high-frequency users (using several times a day); attract low-frequency users (using several times a week) to revisit through push reminders and highlight compilations to gradually cultivate usage habits.

3. Age-adapted recommendation mechanism: Focus on social interaction and entertaining content for young users (18-35 years old); strengthen the accuracy of algorithm recommendation for older users (46 years old and above) and simplify the operation path to reduce cognitive burden.

4.3. Theoretical contributions

The theoretical contributions of this study are mainly reflected in three aspects:

1. For the first time, the UTAUT2 model and SOR theory are integrated and applied to the field of Peking Opera short video communication. A comprehensive model including 10 types of external stimuli, 2 types of organism variables and moderating variables is constructed and empirically tested, which expands the application boundary of technology acceptance theory in the digital communication of traditional culture.

2. It reveals the differentiated mediating effects of Attitude Toward Using and User Satisfaction in different stimulus paths, confirms the applicability of the SOR framework in the short video context, and clarifies the relationship between parallel mediation and chain mediation.

3. It systematically examines the moderating effects of age, Peking Opera exposure experience and Kuaishou usage habits, and finds that user characteristics have a significant "amplifier effect" on the influencing mechanism, providing a basis for subsequent user segmentation research.

These findings not only enrich the theoretical system of user behavior research on "traditional opera + short videos", but also provide a referenceable analysis framework for the short video communication research of other traditional cultural categories.

5. Limitations and future prospects

This study verifies the validity of the integrated UTAUT2-SOR model through empirical tests and puts forward targeted optimization suggestions. However, limited by research conditions and design ideas, there are still some limitations that need to be improved in subsequent research:

1. Sample representativeness and coverage: The samples are mainly from domestic users of the Kuaishou platform and concentrated in first-tier and new first-tier cities (less than 20% from the central and western regions), lacking comparisons with overseas users and users from other platforms (such as Douyin and Bilibili), which limits the cross-platform and cross-cultural generalizability of the conclusions.

2. Research methods and time dimension: Cross-sectional questionnaire surveys cannot capture dynamic changes at special time nodes or in long-term usage, and there is a lack of experimental methods to verify the causal relationship between variables.

3. Variable dimensions and mechanism exploration: Potential variables such as "perceived risk" and "user innovativeness" are not fully included, and the theoretical explanation of phenomena such as the mediating mechanism of "Attitude Toward Using" and the technical sensitivity of older users is not in-depth enough.

4. Practical verification of strategy suggestions: The 12 optimization suggestions proposed have not been tested in practice, and their actual effects and feasibility need to be further verified through platform cooperation and experimental research.

In view of the above limitations and combined with the research trend of "digital communication of traditional opera", future research can be expanded in the following four aspects to further improve the theoretical system and practical value:

1.Sample and research scope: Subsequent researchers should break through the geographical and cultural limitations of the existing samples, include users from the central and western regions and overseas Peking Opera lovers in the research scope, conduct in-depth analysis of the group differences of core paths such as "cultural identity → intention to use" through cross-cultural comparison, and carry out cross-platform comparison research on Kuaishou, Douyin, Bilibili and other platforms to reveal the moderating effect of different algorithm logics and community ecosystems on user behavior mechanisms.

2.Research methods and time dimension: Future research needs to introduce longitudinal tracking design and experimental methods, capture the impact of key nodes such as traditional festivals through multi-stage dynamic data collection, and directly verify the causal effects of core variables such as "effort expectancy" through functional experiments such as A/B testing.

3.Theoretical construction and mechanism exploration: Researchers can further include potential variables such as "perceived risk" and "user innovativeness" to improve the model structure, and combine methods such as process tracing and in-depth interviews to deeply analyze the internal mechanism of moderating effects such as the technical sensitive psychology of older users.

4.Practical application: It is suggested to cooperate with short video platforms to promote strategy pilots, and construct a complete research closed loop of "theoretical construction → practical verification → strategy iteration" through small-scale testing and effect evaluation of optimization suggestions such as elderly-friendly functions and intelligent retrieval systems, so as to effectively improve the practical transformation value of theoretical results and the sustainable influence of Peking Opera digital communication.

Conflict of interest

The authors declare no conflict of interest.

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