

Survey on Factors Influencing College Students' Willingness to Pay for Audio-based Knowledge

—Based on TPB Theory

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Abstract: Knowledge payment products are becoming more and more popular among the public, among which audio-based knowledge payment products have a greater potential to develop as an emerging form. But they are still receiving less attention and recognition at present. Based on TPB theory, this study explores 15 factors that may influence Chinese college students' willingness to purchase audio-based knowledge payment products from three aspects: behavioral attitude, subjective norms, and perceived behavioral control, and through logistic regression analysis of 427 valid questionnaires, we conclude that behavioral attitude has a significant positive influence on college students' willingness to pay for audio-based knowledge, and propose suggestions for this study. The findings of this study suggest that the producers of paid audio knowledge products should pay more attention to the quality and connotation of the products themselves, and appropriately shorten the playing time of individual contents to meet the fragmented needs of college students. At the same time, universities can also try to cooperate with audio platforms to reduce the purchase cost of students and regulate the content of products.

Keywords: Audio-based knowledge payment, College students, Consumption behavior, TPB, Logistic regression analysis

1. Introduction

With the continuous development of Internet technology, "online knowledge payment products" has emerged as a new form of knowledge payment products and gradually gained the recognition and favor of the public, especially young people [1]. As one of the large audiences of knowledge payment, college students are generally optimistic about the prospect of knowledge payment, but their usage and utilization rate of knowledge payment products are relatively average, and the payment amount is small. In terms of product type selection, college students mostly choose text-based and video-based products, and pay less attention to audio-based products, and their willingness to pay is relatively low [2].

But in fact, audio products are more able to meet the audience's demand for leisure and entertainment or knowledge acquisition in fragmented time, such as in the process of driving and walking, watching videos and reading text is not convenient, but it does not affect the audio listening;

on the other hand, with the technical support of mobile intelligence, the operation of audio payment is more convenient and richer in functions. In addition, with the development of the network, college students spend more and more time in front of electronic display screens, which is extremely harmful to their health, and the development and improvement of audio-based knowledge payment products can reduce the time in front of screens of college students, which is beneficial to the health of young people.

And it can be found through past related studies that although there are more and more comprehensive studies on knowledge payment, researchers generally pay more attention to overall knowledge payment products and text-based knowledge payment products, and a large part of them focus on the issue of intellectual property rights, while there are relatively few studies on audio-based knowledge payment products, and even fewer studies on the consumption intention of college students.

Based on TPB theory, this study hopes to improve this theory by adding "policy influence" to investigate the factors that affect college students' willingness to pay for audio knowledge and make suggestions based on the improvement of audio knowledge payment products, so that audio knowledge payment products can be further developed, and also broaden the channels for college students' knowledge acquisition. This will enable the further development of audio knowledge payment products and broaden the channels for college students' knowledge acquisition.

This study plans to formulate hypotheses based on TPB improvement theory, collect data through questionnaires, and analyze the data using SPSS 26 to verify the hypotheses and finally draw conclusions and make recommendations based on the conclusions.

2. Literature Review

After the static knowledge platform and free Q&A community interactive platform, knowledge sharing has shifted from free mode to paid mode, establishing a business model of realizing knowledge cash by using users' fragmented learning time in the form of paid Q&A and knowledge subscription. Nowadays, knowledge payment is becoming more and more common, and mobile Internet, mobile social, mobile payment and self-media are also developing, meanwhile, new forms of knowledge products and services are emerging. At the same time, new forms of knowledge products and services are emerging, such as Zhihu Live, Thousand Chat, One Listen, Himalaya FM, Dragonfly FM and other major platforms have launched audio payment forms, mainly including audio on demand, online audio lectures and voice quizzes, and these knowledge type audio programs are also highly sought after by investors.

A large part of the current research on audio-based knowledge payment products focuses on the importance of the copyright issue: Guo Yu et al. analyzed the evolutionary process of copyright protection behavior of audio-based knowledge payment platforms from the perspective of evolutionary game in their paper [3]. Such a research approach is relatively rare in the literature, but provides a good suggestion for the solution of the copyright problem of audio-based knowledge payment products. There are also many studies on the factors influencing the consumption of paid knowledge products in the existing literature: Tian Weigang et al. proposed that user experience, perceived value during product use, and copyright protection have significant effects on consumption intention based on the "2CM" theory [4]; Liu Yunjie et al. used an empirical study to investigate that content quality, author's professionalism, and cost effectiveness are the most important factors influencing the consumption intention of college students. Liu, Yunjie et al. used empirical research to investigate that content quality, author's professionalism and cost effectiveness are the three main factors affecting college students' satisfaction with audio knowledge products, and the interaction between them is significant [5].

Generally speaking, there is no lack of research and discussion on knowledge payment products in recent years, but due to the late development of audio-based knowledge payment products, there are few relevant studies, and there is no research specifically targeting "college students" or based on TPB theory.

Theory of Planned Behavior (TPB) is a mature social psychology theory and has been widely used in management, nursing, marketing and other fields [6]. In his paper, Jingxi Zhu systematically described the formation process and current research status of TPB, pointing out that the TPB model is based on the Theory of Reasonable Behavior (TRA) of American psychologists M. Fishbein and I. Ajzen with the addition of new elements - perceived behavioral control, thus constituting the Theory of Planned Behavior (TPB) [7]. The TPB model has been studied mainly from internal conditions, and there is a need to add external conditions to complement the TPB study.

In Tsa's paper it is also shown that behavioral intention in the theory of planned behavior is influenced not only by three factors: attitude, subjective norm and perceived behavioral control, but also by other factors [8]. Moreover, Tongkai Zhang also illustrated that the effect of age on behavioral intention was different but not significant, while higher education was significantly related to behavior and behavioral intention [9].

In summary, the variables in this paper are behavioral intentions, attitudes, subjective norms, perceived behavioral control and age, and education. The following hypotheses were made about the relationship between the variables.

H1. positive effect of attitude on college students' willingness to pay for audio-based knowledge.

H2. subjective norms have a positive effect on college students' willingness to pay for audio-based knowledge.

H3. positive effect of perceived behavioral control on college students' willingness to pay for audio-based knowledge.

3. Research Methodology

3.1. Sample and Collection Process

Internet survey method is an emerging survey method born with the Internet information communication channel, which is gradually popularized with the development of Internet business and widely used because of its advantages of fast, convenient, low cost and high efficiency. The survey was mainly conducted by means of online questionnaires, i.e., questionnaires were designed and distributed on the Questionnaire Star platform, and disseminated through various social platforms such as WeChat, Tencent QQ, Weibo and Xiaohongshu, and friends were asked to forward and spread the survey in order to maximize the coverage of college students.

A total of 436 questionnaires were distributed, and after excluding those that were not fully answered and those with problems of authenticity, a total of 427 valid questionnaires were collected, with a valid recovery rate of 97.9%.

3.2. Variable Design

The questionnaire was designed with two main sections: test scale, and basic information about the respondents. The basic information section was designed based on demographic classification criteria, including gender, age, education, and monthly living expenses transformed by income level. The test scale mainly refers to the widely used and validated research scales in the existing literature and combines communication and interviews with students in nearby colleges and universities to design the measurement questions of each variable. The Likert scale is an accurate measure of individual opinions, attitudes, beliefs, and behavioral intentions, etc. It is one of the most commonly used methods in social surveys because of its wide range of measurement, simple design, and ease of use,

and can be used to measure or evaluate individuals or groups. The Likert scale is generally appropriate on a 5-9 level, and this questionnaire was selected as a 5-level scale, with 15 questions designed to measure a total of three variables: behavioral attitudes (5), subjective norms (5), and perceived behavioral control (5).

Among them, the five test questions on attitudes toward the consumption behavior of audio-based knowledge products are based on the studies of Yeon Ho Shin et al. and Wang Jing et al. [10], and combined with the characteristics of audio-based knowledge products [11], the content involves whether purchasing audio products is "beneficial, enjoyable, convenient, interactive, and attractive".[12] "The five test questions on subjective norms are based on the studies of Deng Xinming and Li Luyun et al. , and cover the influence of family, friends, school, teachers and other surrounding groups on the respondents and the influence of others' evaluation of the product and the presenter on the respondents [13]; the five test questions on perceived behavioral control are based on the studies of Qi Yuan, Li Luyun et al. , and Li Luyun et al. scholars, the content mainly involves the confidence and control ability held by the actors on their own economic base and time allocation, as well as the influence of product richness [14].

The specific variable design is shown in the following table 1.

Table 1: Variable design table.

		Variable definition and description
Key explanatory variables	BA1.Do you think that buying audio-based paid knowledge products	1=not beneficial, 2=basically not beneficial, 3=fair, 4=more beneficial, 5=beneficial
	BA2.Do you think that buying audio-based paid knowledge products	1=annoying, 2=more annoying, 3=fair, 4=more pleasant, 5=pleasant
	BA3. What do you think about audio-based paid knowledge products?	1=complicated, 2=somewhat complicated, 3=average, 4=more convenient, 5=convenient
	BA4.Do you think that buying audio-based paid knowledge products	1=poor interaction, 2=poor interaction, 3=general interaction, 4=good interaction, 5=good interaction
	BA5. What do you think is the attraction of buying audio-based paid knowledge products for you?	1=weak, 2=weaker, 3=fair, 4=stronger, 5=strong
	SN1. Your family approves of your purchase of audio-based paid knowledge products	1=Very unconforming, 2=Less conforming, 3=General, 4=More conforming, 5=Fully conforming
	SN2. Your classmates praise you for buying paid audio knowledge products	
	SN3. Your school or teacher often calls on you to buy paid audio knowledge products	
	SN4. You are willing to buy well-reviewed audio-based paid knowledge products	

Table 1: (continued).

	SN5. will be willing to buy audio-based knowledge payment products from knowledge providers with high visibility and expertise	
	PBC1. You can afford to pay for most of the audio-based knowledge products	1=Very unconfirming, 2=Less conforming, 3=General, 4=More conforming, 5=Fully conforming
	PBC2. You have plenty of time to listen to paid audio knowledge products	
	PBC3. You have plenty of time to select audio-based paid knowledge products	
	PBC4. You can listen to paid audio knowledge products in your spare time (e.g. walking, driving, etc.)	
	PBC5. Willing to buy paid audio-based knowledge products if there is enough variety to choose from	
Respondents' basic information variables	Gender	
	Age	1=18-20 years old, 2=21-22 years old, 3=23-25 years old, 4=26-30 years old, 5=other
	Academic qualifications	1=specialist, 2=bachelor's degree, 3=master's degree, 4=doctoral degree
	Monthly living expenses	1=1500 yuan or less (including 1500 yuan), 2=1500-2500 yuan (excluding 1500 yuan, including 2500 yuan), 3=2500-3500 yuan (excluding 2500 yuan, including 3500 yuan), 4=3500 yuan-5000 yuan (excluding 3500 yuan, including 5000 yuan), 5=5000 yuan or more (excluding 5000 yuan)
Explained variables	Whether they are willing to buy audio-based paid knowledge products	1=unwilling, 2=willing

3.3. Analysis Method

There are only two responses for whether respondents are willing to buy audio-based knowledge products, "unwilling" and "willing". For such cases where the explanatory variables are dichotomous nominal variables, a binary logistic regression model is suitable for analysis, with formula is.

$$\ln \left(\frac{P_i}{1-P_i} \right) = b \sum_{j=1}^n \beta_j X_{ij} + \varepsilon_i \quad (1)$$

P_i is the probability of being willing to purchase audio-based knowledge payment products, j is the j th influencing factor, n is the total number of influencing factors, and X_{ij} denotes the j th influencing

factor for consumer i , b is a constant term, and β_j denotes the regression coefficient of the j th variable of consumer i , and ε_i is the error term.

4. Results

4.1. Reliability and Validity Tests

To verify the internal consistency of the measurement questions for all latent variables, the scale was tested for reliability and validity. As shown in Table 2, the overall reliability of the scale was 0.965, the latent variables' values ranged from 0.917-0.921, and the combined reliability CR ranged from 0.938-0.941, indicating that the scale has high reliability.

In terms of validity testing, the scale designed in this study drew on existing research results and scale contents at home and abroad, and consulted experts and conducted pre-research, so that the measurement items are highly representative and can effectively reflect the latent variables, and the scale contents have good validity. To further test the validity of the data, KMO and Bartlett's spherical test were first conducted on the scale, and the test result of KMO was 0.951, which is greater than 0.7, indicating that the independent variables designed in the questionnaire have certain connections with each other and the questionnaire is valid; the significance Sig value was 0.000, which is less than 0.001, indicating that it is suitable for factor analysis. 15 measurement items were concentrated in 3 factors, whose cumulative explained variance was 74.531%, which was greater than 0.7, passed the validity test.

In conclusion, the reliability and validity of this scale are good for follow-up analysis.

Table 2: Questionnaire reliability test table.

latent variable	Number	Standardized factor loadings	Cronbach's α	Cumulative explained variance	CR	AVE
Behavioral attitude (BA)	BA1	0.853	0.917	75.311%	0.938	0.753
	BA2	0.906				
	BA3	0.895				
	BA4	0.886				
	BA5	0.796				
Subjective Specification (SN)	SN1	0.887	0.921	76.203%	0.941	0.762
	SN2	0.888				
	SN3	0.845				
	SN4	0.880				
	SN5	0.864				
Perceptual Behavior Control (PBC)	PBC1	0.884	0.921	76.408%	0.941	0.764
	PBC2	0.929				
	PBC3	0.905				

Table 2: (continued).

	PBC4	0.889				
	PBC5	0.752				

4.2. Descriptive Statistical Analysis

In the qualified sample, the ratio of female respondents to male respondents is relatively close, with 57.4% female and 42.6% male, which meets the requirements of the sample; the age of respondents is mostly concentrated in 18-20 years old, accounting for 35.4% of the total sample, showing a relatively young trend; the respondents are mainly undergraduate students, accounting for 54.1% of the total sample, accounting for more than half of the sample; from the perspective of monthly living expenses, the Respondents' monthly living expenses are mostly less than 2,500 yuan, which is relatively not rich. The specific analysis results are shown in the following table 3.

Table 3: Table of descriptive statistics results.

Projects	Category	Quantity	Proportion
Gender	Male	182	42.6%
	Female	245	52.4%
Age	18-20 years old	151	35.4%
	21-22 years old	92	21.5%
	23-25 years old	98	23%
	26-30 years old	75	17.6%
	Other	11	2.6%
Academic qualifications	Specialty	147	34.4%
	Undergraduate	231	54.1%
	Master's Degree	33	7.7%
	Doctoral students	16	3.7%
Monthly living expenses	Less than 1500 yuan (including 1500 yuan)	157	36.8%
	1500-2500 yuan (not including 1500 yuan, including 2500 yuan)	155	36.3%
	2500-3500 yuan (not including 2500 yuan, including 3500 yuan)	73	17.1%
	3500-5000 yuan (not including 3500 yuan, including 5000 yuan)	27	6.3%
	5000 yuan or more (excluding 5000 yuan)	15	3.5%

4.3. Analysis of Regression Results

Binary logistic regression analysis of the variables of interest was performed using SPSS 26.0 according to the settings of the variables.

The 15 question items were first synthesized into 3 variables of behavioral attitudes, supervisor norms, and perceived behavioral control, and then regression analysis was conducted, and the regression results are shown in the following table 4.

Table 4: Table of regression results.

	B	Standard Error	Wald	Degree of freedom	Significance	Exp(B)
Behavioral attitude	2.228	.315	49.858	1	.000	9.278
Subjective norms	-.214	.338	.399	1	.528	.808
Perceptual behavior control	.383	.260	2.166	1	.141	1.467
Constants	-7.411	.830	79.794	1	.000	.001

The model results show that behavioral attitudes are significantly and positively correlated with college students' willingness to purchase audio-based knowledge products, indicating that behavioral attitudes have positive influence on willingness to purchase and supporting H1; subjective norms are negatively correlated with college students' willingness to purchase audio-based knowledge products, thus concluding that subjective norms do not have positive influence on willingness to purchase and not supporting H2; perceptual behavioral control is positively correlated with college students' willingness to purchase audio-based knowledge Perceptual behavioral control is positively correlated with college students' willingness to purchase audio knowledge products, thus it is concluded that perceptual behavioral control has a positive influence on audio knowledge products, and H3 is supported.

5. Discussion of Results

The purpose of this study is to investigate the factors that influence college students' consumption of audio-based paid knowledge products and to analyze them based on TPB theory.

The study found that behavioral attitudes have a positive influence on college students' willingness to purchase audio-based knowledge products, which is basically consistent with the study of Li Luyun et al. that "behavioral attitudes can significantly and positively influence users' intention to pay for mobile audio".

Subjective norms, on the other hand, do not positively influence college students' audio-based knowledge payment products, indicating that college students are more inclined to make their own choices and are less influenced or restricted by subjective, norms. In a study by Li Luyun et al. , subjective norms can significantly and positively influence users' intention to pay for mobile audio. The present study differs from the conclusions reached in this study to a large extent because of the different respondents involved. In Tong Yifeng's study, it is pointed out that contemporary college students are more independent, innovative, and self-motivated in their thinking, which can also prove that the college student group is more likely to have their own ideas and opinions and are little influenced by subjective norms.

The positive effect of perceived behavioral control on college students' willingness to purchase audio-based paid knowledge products is also consistent with the conclusions drawn from previous studies.

6. Conclusions

Based on TPB theory, this study investigates the factors that influence college students' purchasing behavior of audio-based knowledge payment products. Overall, for college students, behavioral

attitudes and perceived behavioral control have a positive influence on consumption intentions, and subjective norms have an insignificant or even a negative influence on consumption intentions.

This study hopes to lay a foundation for future research on the consumption behavior of audio-based knowledge payment products and promote the future development of the audio-based knowledge payment products market. With the advantages of convenience, easy to fill all kinds of scattered time and relatively low acceptance threshold, audio-based knowledge payment products will have more room for development in the future, and also have important practical significance for college students to broaden their knowledge acquisition channels.

This study has several practical implications as follows.

1) Audio knowledge products should continue to consolidate and improve their quality and connotation, make content that is popular among students in universities, and continue to simplify their operation and reduce unnecessary login and registration.

2) It has changed the stereotype that consumers are more influenced by people around them, especially their families. It has been proved through research that college students have a stronger sense of autonomy and choose audio-based knowledge products more according to their own subjective will, and will follow their own inner judgment very much. This also reminds the output side of the product to pay more attention to the hard power of the product and not to put too much thought on the propaganda.

3) College students attach great importance to the use of scattered fragmented time, which also reminds the producers of audio-based paid knowledge products to shorten the time of each audio and meet the needs of college students to fill their scattered time in order to make audio-based paid knowledge products better promoted among college students.

4) At present, the monthly living expenses of college students are not rich, so colleges and universities can join hands with some more reliable audio platforms to reduce the cost of students to buy related products, and properly regulate the content of related products and improve the quality of content.

This study also has certain limitations that need to be addressed in future research. The first is that the coverage of the influencing factors involved is not comprehensive, and there are still many factors affecting college students' purchase of audio-based knowledge payment products waiting to be explored and studied. In addition, there is no separate research on different audio platforms, but only as a whole. In fact, the situation of different platforms may be different, so there is still a need for more in-depth and detailed research in this regard. Thirdly, this study is less about the influence of external factors on the consumption factors of college students and more about the subjective feelings of the respondents.

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