

Analysis of Factors Affecting User Willingness to Use Virtual Online Education Platforms

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Abstract—With the growing recognition and acceptance of virtual online education, more and more educational institutions are switching from offline business to online business. However, users differ in their willingness to use virtual online education platforms. This paper explores the factors affecting user willingness to use such platforms, laying a theoretical basis for promoting virtual online education. The main findings are as follows: college students are positive and in favor of extracurricular learning; the students' demand for online learning contents varies with gender, grade, and major; the long-term willingness to use depends on perceived usefulness, satisfaction, and perceived switching cost, of which the last factor is the key contributor to increasing user resistance; the long-term willingness to use online education platforms is influenced by perceived usefulness, expected confirmation, content quality, service quality, system quality, satisfaction, and perceived switching cost, etc.

Keywords—online education, user willingness, perceived switching cost, perceived usefulness, satisfaction

1 Introduction

The teacher-centered offline teaching mode in traditional education can no longer meet the demand of modern people to acquire knowledge anytime and anywhere [1, 2]. The online teaching and learning mode breaks through the limitations of time and space, which has well made up for the shortcomings of traditional education in this aspect [3]. Now, the online education industry has received strong support from government, and the online education platforms have shown bright prospects in terms of customer demand, science and technology development, and policy support [4, 5].

At present, online education platforms have emerged and developed rapidly in response to the proper time and conditions, and the various online education platforms represented by MOOC have been favored by scholars and students [6]. By analyzing the data of online behavior logs of users on the online education platforms, researchers in the computer industry can find out the reasons why users like a type of class or not, and figure out the decisive factors affecting the learning preferences of users, then, the educational resources could be recommended to platform users in a more targeted manner and help them improve learning efficiency [7, 8]. The online educa-

tion industry has a good outlook, the user number and industry scale both grow fast, attracting widespread attention from various industries [9, 10]. However, accompanying the increasing number of users, platforms, and institutions, a few problems have arisen as well, such as the poor user experience, the low user stickiness, and the mismatch between user demand and existing courses, etc. [11, 12]. Then, how to break through these development dilemmas of the industry, and how to improve user experience, satisfaction, and stickiness have become issues that the operators of these online education platforms should consider [13]. There are many factors that can affect the online education platforms, after research, scholars pointed out that, if the online education platforms want to stand out from the crowd, they must start from the online education products and have a thorough understanding of the actual requirements and behavior characteristics of the users, only in this way can they design products that can meet the expectations of users, thereby offering satisfactory and quality service for their users [14, 15].

Viewing from the perspective of the development of virtual online education industry, after a few years of fast development, now this industry has entered a stable development stage, operators of the platforms can also propose optimization strategies for improving user experience, helping the online education industry to break through the development bottleneck, and ultimately achieving the goals of optimizing education mode, improving education level, and realizing education equity [16, 17]. Some scholars found that "perceived openness" and "perceived interest" are the two core factors affecting users' willingness to continue their using behavior. Only two variables, pleasure and ease of use, have a significant impact on behavior willingness; however, the impact of perceived goals, content, and equipment conditions on behavior willingness hasn't been proved yet [18, 19]. Taking virtual online education platforms as subjects, this paper attempts to explore factors affecting the user willingness, in the hopes of providing theoretical evidences for better developing the virtual online education platforms and the online education industry.

2 A theoretical study of the acceptance behavior of online education

The devices of online learning can be divided into mobile terminals, computer terminals and TV terminals, generally, college students have personal computers and mobile phones [20]. The mobile terminals can surpass the restrictions of time and space; as long as the mobile devices can access the wireless network or have cached online courses, they can meet the learning requirements of college students to study anytime and anywhere [21, 22]. Only when the learning requirements of college students have transformed into education demand, can they conduct the behaviors of searching for educational resources and related services and then using these resources [23, 24]. Figure 1 gives a diagram of the Theory of Planned Behavior (TPB). By adding control variables, the objectivity of the model could be improved, thereby obtaining the theory of planned behavior. First, the control beliefs of the resources

and opportunities required to take actions have been increased; Second, the variable of perceptual behavior control has been increased [25, 26].

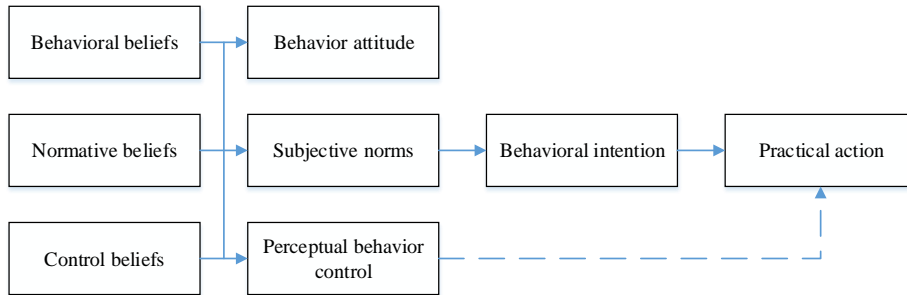


Fig. 1. Theory of planned behavior

The virtual online education has been promoted based on three things: idle educational resources, online education platforms, and user participation. Without online education platforms, online education mode couldn't be implemented [27]. The availability of the use rights of online education products, and the usefulness of online education products are two things most concerned by online education platform users [28]. The advantages of online education have well satisfied the users' concerns about the access to use rights [29]. Figure 2 shows the initial hypothesis model of educational resource acquisition. The users' willingness to use online education is determined by perceived ease of use, perceived usefulness, access convenience, individual innovation, and social influence. Control variables include gender, age, education, and spending limit, etc. When an individual finds that people around him/her are using online education products and have achieved their personal goals via the behavior of using online education, he/she will have a positive attitude towards these products [30]. Researchers found that both the perceived ease of use and perceived usefulness have a positive influence on users' willingness to use online education products, and the perceived ease of use has a positive influence on perceived usefulness [31]. Social influence has a positive impact on users' willingness to use online education and on the perceived usefulness [32]. Individual innovation and access convenience both have a positive influence on users' willingness to use online education, and on the perceived ease of use and perceived usefulness [33, 34].

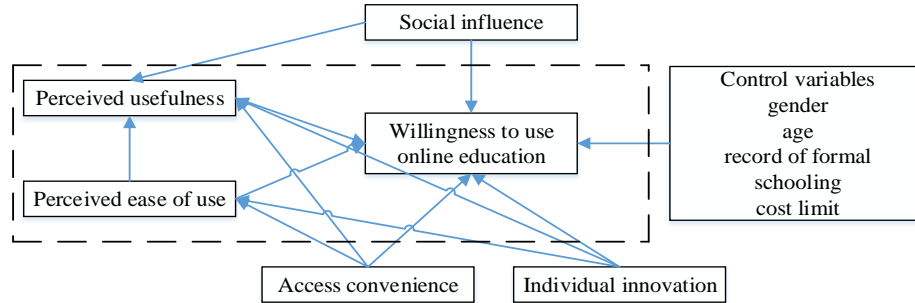


Fig. 2. Initial hypothesis model of educational resource acquisition

3 Current state of college students' online learning

3.1 Survey objects and methods

The advances in Internet technology have given online education a great opportunity for development. Figure 3 shows the statistics on the market scale of China's virtual online education industry in recent years. Last year, the total market size of online education in China reached 300 billion yuan, the growth rates of each year all exceeded 10%, the trend is very good. In order to figure out the current state of college students' online learning, our research team conducted a survey Hebei province. The survey objects are college students of all grades. Information such as their gender, age, and major were collected through the survey. A total of 450 questionnaires were distributed and 415 valid questionnaires were returned. The questionnaire was designed to find out the respondents' basic information, and their cognition and current state of extracurricular learning and online learning (Table 1).

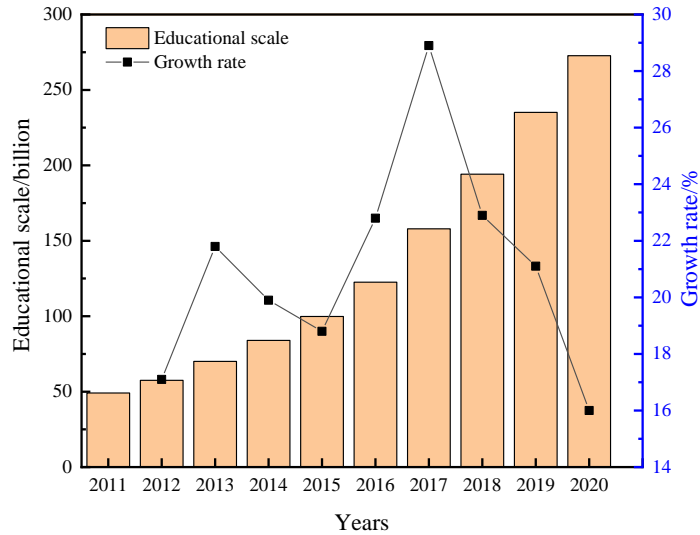


Fig. 3. Statistics on the market scale of China's virtual online education industry in recent years

Table 1. Information of survey objects

Item	Category	Number	Proportion/%
Gender	Male	221	53.25%
	Female	194	46.75%
Grade	Freshman	121	29.16%
	Sophomore	97	23.37%
	Junior year	86	20.72%
	Senior year	111	26.75%
Professional category	Liberal arts	183	44.10%
	Science and engineering	232	55.90%

3.2 Analysis of survey results

Figure 4 shows the survey results of college students' attitudes toward extracurricular learning. According to the figure, we can see that, more than 80% of college students believe that extracurricular learning is very important or important, and only 3.77% of them think it is not important at all; overall, they hold a positive and agreeable attitude towards extracurricular learning.

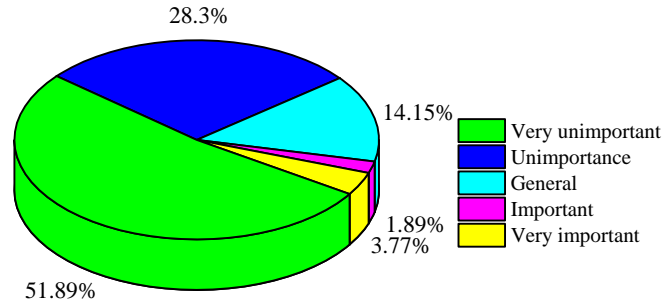


Fig. 4. College students' attitudes toward extracurricular learning

Figure 5 shows the survey results of the current state of college students' extracurricular learning. About 95% of them conduct extracurricular learning every week; most of them spend 1-10 hours on extracurricular learning, accounting for 41.18%; and 32.35% of them spend 10-20 hours on extracurricular learning every week. This indicates that college students approve of extracurricular learning with their real actions. Figure 6 shows ways for users to know of the online education platforms. The many ways include friend recommendation, network recommendation, comparison of their own use experience, advertisement, and third-party application store recommendation, etc.

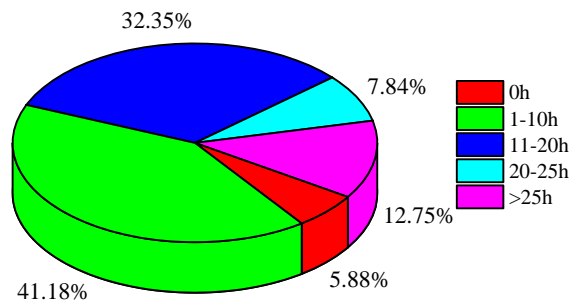


Fig. 5. Current state of college students' extracurricular learning

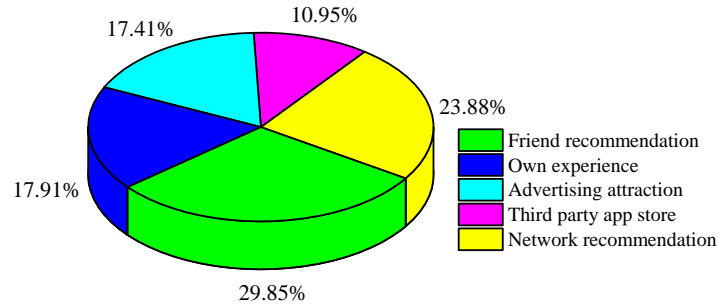


Fig. 6. Ways for users to know of the online education platforms

With its unique advantages, virtual online education is very attractive to students, and what the platforms need to do is to improve their service quality to retain existing users. Figure 7 shows the types of online learning courses taken by college students. Main course types are skill certificate examination courses and software programming courses. College students do use online education to improve their strength and professional abilities, and other course types include extended courses, language courses, art & interest courses, etc.

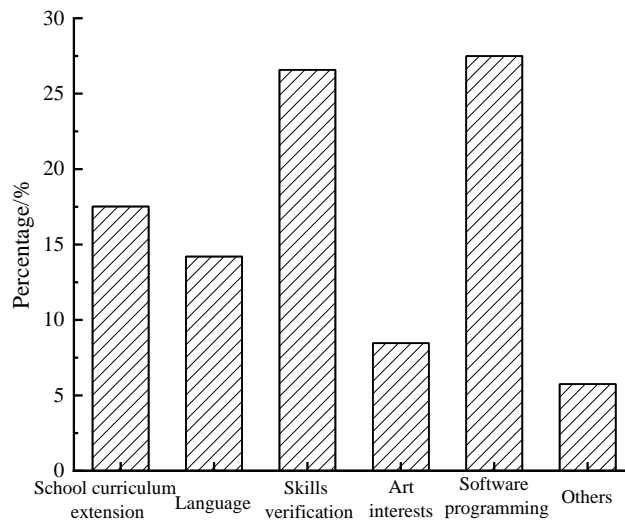
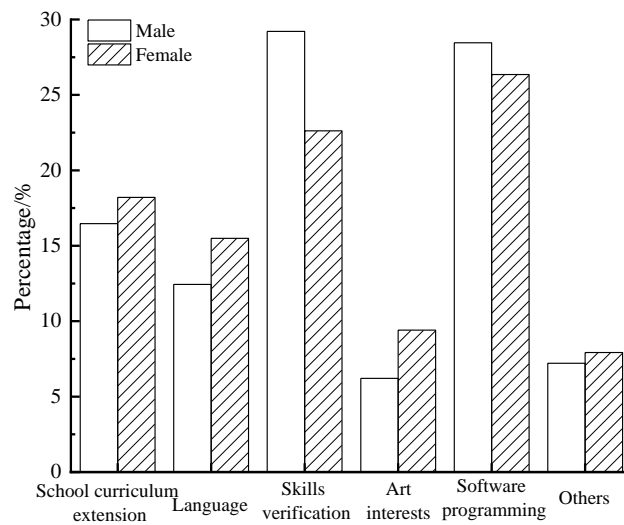


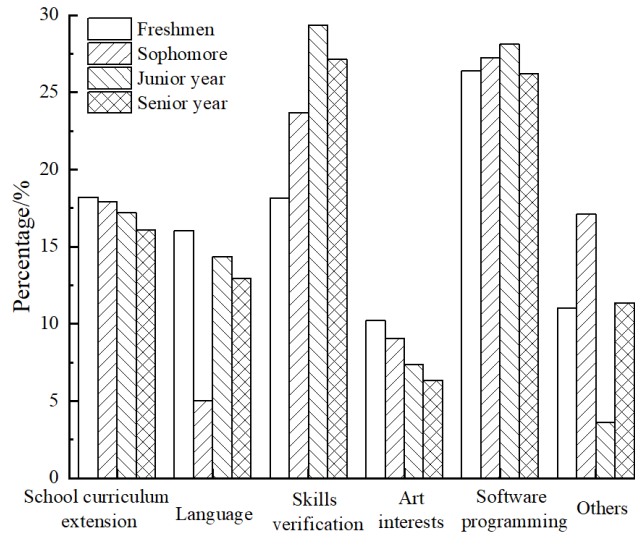
Fig. 7. Types of online learning courses taken by college students

Figure 8 shows the influence of different factors on the course type selection of college students. Figure 8(a) shows the influence of the gender factor, male students take more skill certificate examination courses and software programming courses than female students; while in terms of extended courses, language courses, and art & interest courses, the proportion of male students is lower than that of female students.

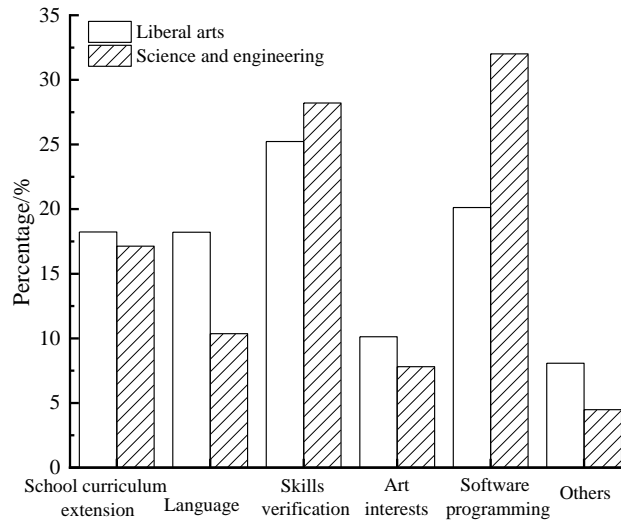
Figure 8(b) shows the influence of the grade factor, according to the figure, junior year college students take more skill certificate examination courses and software programming courses than students of other grades, which has something to do with their employment pressure; freshman students take more extended courses and art & interest courses than students of other grades. Figure 8(c) shows the influence of the major factor, as can be seen from the figure, liberal arts majors and science majors have different emphases in extracurricular learning; liberal arts majors take more extended courses, language courses, and art & interest courses than science majors; while the science majors take more skill certificate examination courses and software programming courses than liberal arts majors.



a) Influence of the gender factor



b) Influence of the grade factor



c) Influence of the major factor

Fig. 8. Influence of different factors on the course type selection of college students

4 Analysis of factors affecting users' willingness to continue to use virtual online education platforms

4.1 Proposal of influencing factors

For online education, many factors can influence user willingness, such as the educational nature of the course, content richness, course type, operation interface, learning method preference, learning enthusiasm, and whether charge of courses is reasonable, etc. Figure 9 shows the user preference model of online educational resources, which can be summarized into three aspects: usefulness, reliability, and cost. Usefulness contains the academic information, subject interest, and topic interest. Reliability contains media category, form quality, and content quality. Cost contains application practice, acquisition cost, data duration, and learning basics. Figure 10 shows the factors affecting users' willingness to continue to use online education platforms, including perceived usefulness, expected confirmation, content quality, service quality, system quality, satisfaction, perceived switching costs, and willingness to continue.

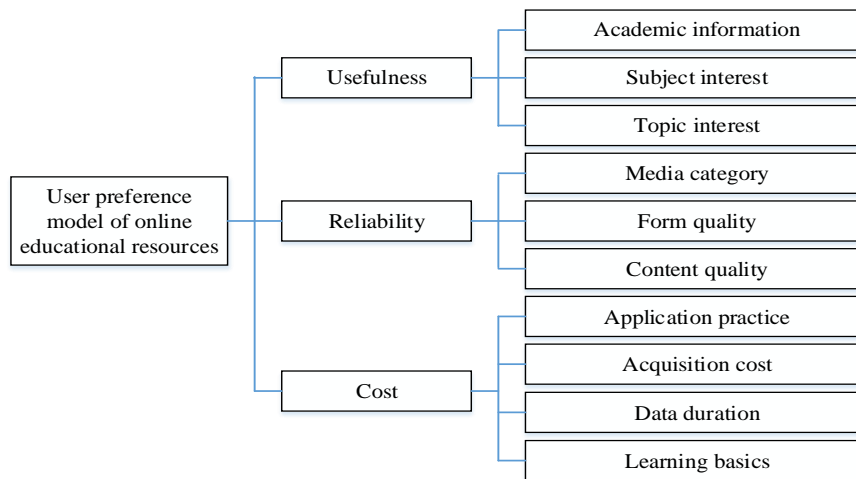


Fig. 9. The user preference model of online educational resources

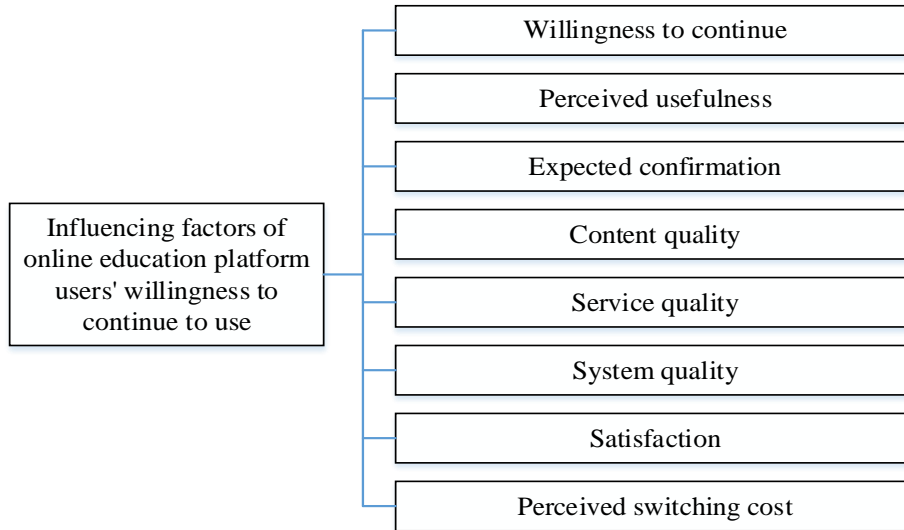


Fig. 10. Factors affecting users' willingness to continue to use online education platforms

4.2 Analysis of the sample data of influencing factors

Figure 11 gives a diagram explaining how the factors listed above influence the willingness of online education platform users. Expected confirmation and content quality can affect users' perceived usefulness and satisfaction; service quality, system quality, and perceived usefulness can affect the satisfaction of users; perceived usefulness, satisfaction, and perceived switching cost determine the user's willingness to continue to use the online education platforms; perceived switching cost plays a key role in increasing user resistance. Information quality, service quality, and system quality are three important variables of a successful information system model, all three variables have a positive correlation with user satisfaction. When users use the online platforms for learning, before purchasing the courses, the pre-purchase desire negatively affects the degree of expected confirmation; the greater the pre-purchase desire, the lower the degree of expected confirmation after purchase. The post-purchase perceived performance positively affects the degree of expected confirmation; the higher the post-purchase perceived performance, the higher the degree of expected confirmation.

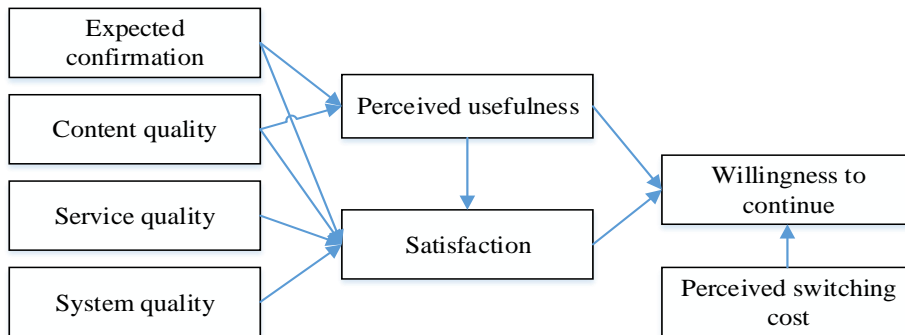


Fig. 11. How factors influencing the willingness of online education platform users

4.3 Strategies to prompt users to choose online education platforms

By analyzing the factoring affecting the willingness of users and combining with the actual situations of the promotion and application of online education platforms, this paper proposes following strategies to prompt user willingness from the perspective of platform developers. Figure 12 lists the proposed strategies that give detailed suggestions from three aspects of operation, pricing, and development. In terms of operational strategies, in order to promote brand image, investment in advertising should be increased, a public opinion management department could be established to maintain and protect the image of the company, and the service department could be expanded to improve after-sales service. In terms of pricing strategies, some low-cost or free courses could be launched; comprehensive consideration should be given to the cost and the price of some online courses should be raised (a set of reasonable online course prices should be determined based on market research, cost analysis, and competition analysis); some preferential promotion activities should be held from time to time to promote payment conversion. In terms of development strategies, update frequency should be increased to optimize the operation interfaces of the platforms, intelligent learning systems could be developed to help users improve their learning effect, and more personalized courses could be developed and launched.

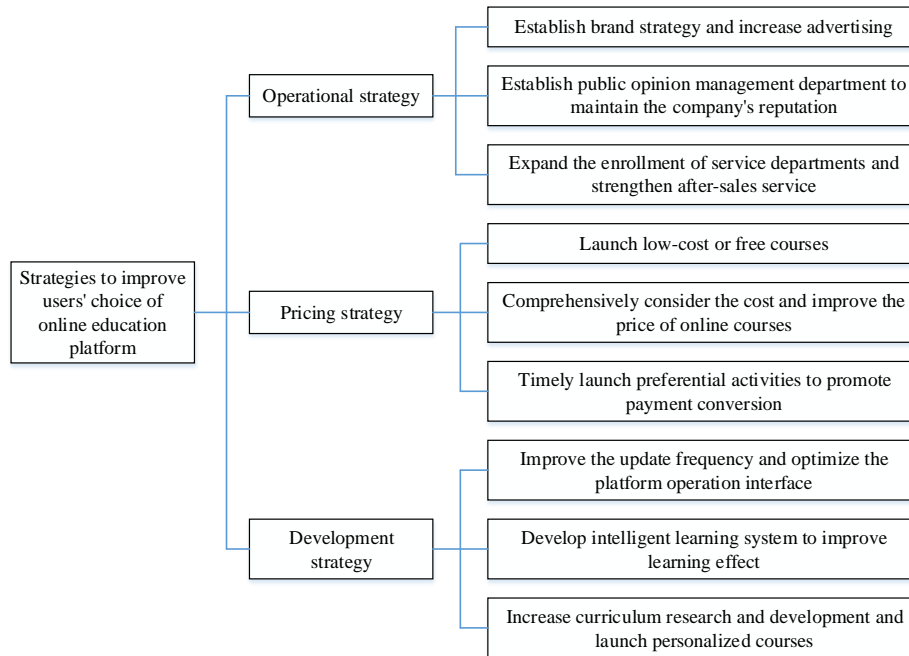


Fig. 12.Strategies for online education platforms to prompt user willingness

5 Conclusions

Taking virtual online education platforms as subjects, this paper explored factors affecting user willingness and provides useful evidences for better developing and promoting the virtual online education platforms. The specific conclusions are:

1. College students are positive and in favor of extracurricular learning. The main course types chosen by college students on the online education platforms are skill certificate examination courses and software programming courses, and they do use these platforms to improve their own strength and professional abilities.
2. Factors affecting users' willingness to continue to use the online education platforms include: perceived usefulness, expected confirmation, content quality, service quality, system quality, satisfaction, perceived switching cost, and willingness to continue.
3. Perceived usefulness, satisfaction, and perceived switching cost determine the users' willingness to continue to use the online education platforms; the perceived switching cost plays a key role in increasing user resistance.
4. To improve user willingness, online education platforms need to continuously improve themselves using operational strategies, pricing strategies, and development strategies, thereby gaining high user satisfaction.

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