

# The Willingness to Use Mobile Libraries in Colleges: Cognitive Lock-In

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**Abstract.** From the perspective of cognitive lock, according to the development status of college mobile libraries in China, the article concerns about how cognitive lock-in affects the user's willingness to use mobile library. 6 variables are defined which include emotional lock-in, material lock-in, perceived usefulness, perceived ease of use, perceived costs, willingness to use. Therefore, this paper proposes the hypothesis about the relationship among these six variables and finally constructs a research model of the impact of cognitive lock-in on the willingness of users of mobile libraries in colleges and universities. Based on literature surveys and questionnaire surveys, SPSS and structural equation model analysis shows that material lock-in positively affects users' willingness to use, perceived usefulness, perceived ease of use, and has a negative impact on perceived cost. Emotional lock-in positively affects perceived ease of use, and perceived ease of use positively affects users' willingness to use and perceived usefulness, perceived cost negatively affects the user's willingness to use. Finally, combined with the research results, some suggestions are proposed for the construction and service of college mobile libraries.

## 1. Introduction

In recent years, Internet technology has developed rapidly and the penetration rate of mobile devices has also been widely improved. Human beings living in this social context have been affected differently in various fields. As an emerging approach to library information services, mobile libraries allow users to be free from time and space, using only a variety of mobile devices (such as smartphones, PDAs, E-Books, Kindles, Mp3/Mp4, laptops, etc.) to log in to library resources, browse and read, download and store, and self-check related services [1-2]. In the past, most of the existing research on mobile libraries focused on investigating and analyzing the current development of mobile libraries, service models or technology implementation, and the research methods are mainly qualitative. Only a small part of the literature adopts empirical research [3]. There is less research on user cognition as an entry point to explore the willingness of mobile libraries to use. Based on the current research status of cognitive lock-in and mobile library users' willingness to use, this paper proposes a research model of cognitive lock-in on the willingness of mobile library users in colleges. Using questionnaires and structural equation models, this paper conducts an empirical study on the cognitive lock-in influence mechanism of college mobile library users' willingness to use, so as to provide suggestions for the further improvement of university mobile library construction and service.

## 2. Research Design and Implementation

### 2.1. Research Models and Assumptions.

Hung-Pin Shih (2012) proposed a theoretical model of cognitive lock-in affecting consumers' willingness to purchase through the relevant research on the actual situation of mobile phone and mobile service industry, to study the impact of cognitive lock-in on consumers' willingness to purchase. After research, he believes that cognitive lock-in positively and significantly affects consumer perceived value and willingness to purchase [4].

Duo-Gang Zhu (2012) studied the relevant influencing factors of Wuhan university students' use of mobile libraries, and combined the technology acceptance model with perceived cost to construct its research structure. Research shows that perceived ease of use positively affects perceived usefulness, and perceived usefulness positively affects the attitude of college students' mobile libraries, and the attitude of use positively affects their use behavior intentions, while perceived cost negatively affects the attitude of college students to mobile libraries [5].

The author collects and references the research literature on cognitive lock-in and mobile library user behavior. Based on the above two models, the author proposes a research model of the impact of cognitive lock-in on the willingness of users of mobile library users in colleges: Perceived usefulness and perceived ease of use represent perceived value. Predecessor variables are cognitive lock-in classified into emotional lock-in and material lock-in. Mediator variables are perceived ease of use, perceived usefulness, and perceived cost, as shown in Fig. 1.

Hung-Pin Shih (2012) constructed a theoretical model of cognitive lock-in affecting consumers' willingness to purchase. According to the actual situation of mobile phone and mobile service industry, it is considered that cognitive lock-in has a significant positive impact on consumers' perceived value and purchase intention. At the same time, from the literature review, the cognitive lock-in can be divided into two types: material lock-in and emotional lock-in. Based on these, this paper proposes two basic assumptions of cognitive lock-in on the willingness of mobile library users to use:

H1: Material lock-in has a positive impact on the willingness of mobile library users to use;

H2: Emotional lock-in has a positive impact on the willingness of mobile library users to use;

Shapiro and Varian (1999) define “cognitive lock-in” to provide relevant lock-in measures for suppliers and increase the cost of conversion of users to their existing services or products, thereby ensuring the continued advantage of users over alternative suppliers. In the process of using mobile library, users will generate certain user cognition. For example, mobile library can help to use library resources, improve learning and scientific research efficiency, ease of use of mobile library, and when users use mobile library, perceive the amount of cost associated with it. As the degree of cognitive lock-in deepens, users' perceptions of different aspects of the mobile library will change. Therefore, the hypotheses proposed in this paper on cognitive lock-in and perceived usefulness, perceived ease of use, and perceived cost is as follows:

H3: Material lock-in has a positive impact on perceived usefulness;

H4: Material lock-in has a positive impact on perceived ease of use;

H5: Material lock-in has a negative impact on perceived costs;

H6: Emotional lock-in has a positive impact on perceived usefulness;

H7: Emotional lock-in has a positive impact on perceived ease of use;

H8: Emotional lock-in has a negative impact on perceived costs.

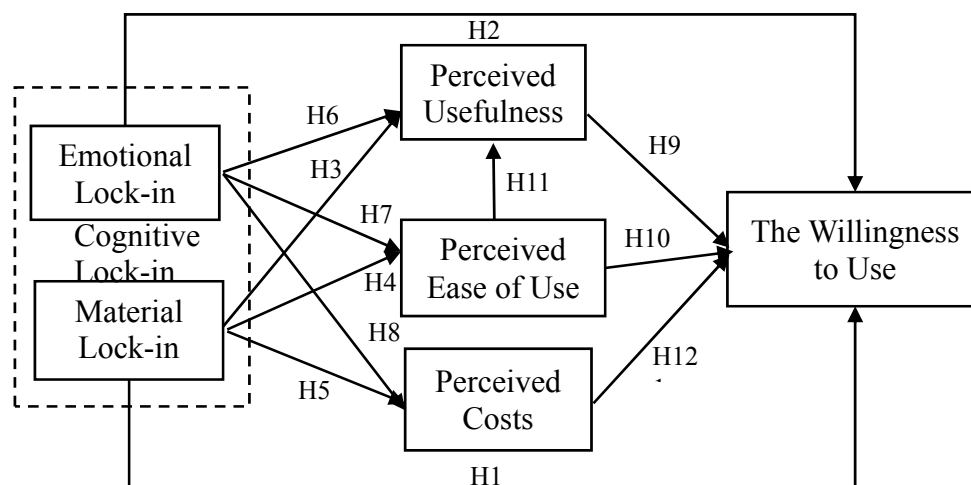


Figure 1. Research model

Although the technology acceptance model originally constructed by Davis (2003) is mainly used to explain the influencing factors of user adoption behavior of information systems, a large number of follow-up studies suggest that the model also has a high explanatory power for users' continuous use behavior and confirms that there is a relationship between the perceived ease of use, perceived usefulness and willingness to continue to use. The influencing factors of the use behavior of college students' mobile libraries studied by Duo-Gang Zhu (2012) mentioned that when using mobile libraries, college students need to pay a certain cost, such as mobile device purchase fees, mobile device usage fees and Information fees for using mobile library services, etc. At the same time when learning how to use mobile library, college students have to pay extra time and energy. Therefore, if the perceived cost of mobile library users is too large, it will reduce their willingness to use mobile libraries. Based on this, this paper proposes hypotheses about the relationship between the above variables:

H9: Perceived usefulness positively affects the willingness of mobile library users to use;

H10: Perceived ease of use has a positive impact on the willingness of mobile library users to use;

H11: Perceived usability has a positive impact on perceived usefulness;

H12: Perceived cost negatively affects the willingness of mobile library users to use.

## 2.2. Variable Measurement and Questionnaire Design.

In this paper, the questionnaire is designed based on the theoretical model constructed and the measurement scale of each variable defined. A total of 21 items in the core part of the questionnaire were measured using a five-point Likert scale. Each value represents the degree of consent of the respondent for each measurement item. 1-5 represents very disagree, disagree, no opinion, consent and great agreement. This part of the questionnaire contains the measurement of the six variables studied in this paper, that is, the degree of cognitive lock-in, the perceived usefulness, the perceived ease of use, the perceived cost, and the willingness of mobile library users to use. The specific information of the scale, such as the name of the latent variable, the number and content of the measurement item, and the reference source are shown in Table 1.

**Table 1.** Scale information of the research model

Latent Variable	Measurement Item	Source
Material Lock-in	MCQ1: In order to use the mobile library more efficiently, you have invested too much time or money to master the relevant knowledge and form appropriate usage habits. MCQ2: You feel that trying the traditional library service model requires too much time or money to search and analyze the information. MBQ1: For similar book resources, you feel that the quality of information obtained through mobile libraries is higher than that of traditional library services. MBQ2: You feel that accessing library resources through mobile libraries is more cost-effective than traditional library service models.	Burmham, Frel and Mahajian(2002)
Emotional Lock-in	FCQ1: In order to use the mobile library more efficiently, you have invested too much emotion or energy to master relevant knowledge and form appropriate usage habits. FCQ2: You feel that trying the traditional service model of the library requires too much emotional or energy to search and analyze the information. FBQ1: You think that your preference for mobile libraries is higher than the traditional service model of libraries.	Burmham, Frel and Mahajian (2002)

	FBQ2: You feel that using the mobile library to access the library information resources is more fun than the traditional library service model.	
<b>Latent Variable</b>	<b>Measurement Item</b>	<b>Source</b>
Perceived Usefulness	PUQ1: Your learning (work) efficiency increases by using mobile libraries. PUQ2: Using the mobile library makes learning (work) easier. PUQ3: In general, mobile libraries make you feel useful for learning (work).	Davis et al(1989)
Perceived Ease of Use	PEQ1: When using the mobile library, you feel that the operating platform is easy to use. PEQ2: When using a mobile library, you feel that the interaction with it is clear. PEQ3: In general, mobile libraries make you feel easy to use.	Davis et al(1989)
Perceived Costs	PCQ1: Compared to the traditional library access model, you think that using mobile libraries requires higher mobile communication traffic charges. PCQ2: Compared to the traditional library service model, you think that using mobile library will take more time or energy. PCQ3: Compared to the traditional library service model, you think that using the mobile library to get (download) information resources will pay more.	Hung Shinyuan et al(2004)[6] Pagani M (2004)[7]
Willingness to Use	CIQ1: You will continue to use the mobile library in the future. CIQ2: You will increase the frequency of use of mobile libraries. CIQ3: You believe that library services will develop towards mobile services in the future. CIQ4: You are willing to recommend mobile library to others	Venkatesh et al.(2003); Davis et al.(1992)

This survey mainly adopts online distribution methods. Because college students have more contact networks and mobile libraries are more popular in colleges, we regard them as the main research object of this survey. From April to June 2018, a small-scale questionnaire was distributed. It included a total of 68 paper questionnaires, 350 online questionnaires, and 400 questionnaires were collected. The questionnaire recovery rate was 95.7%. We screened the content of the collected questionnaires: deleted the questionnaires that do not meet the requirements of the survey, selected the same results for each question, and the contradiction between the results of the same variable selection. Finally, 218 valid questionnaires were collected, with an effective rate of 54.5%.

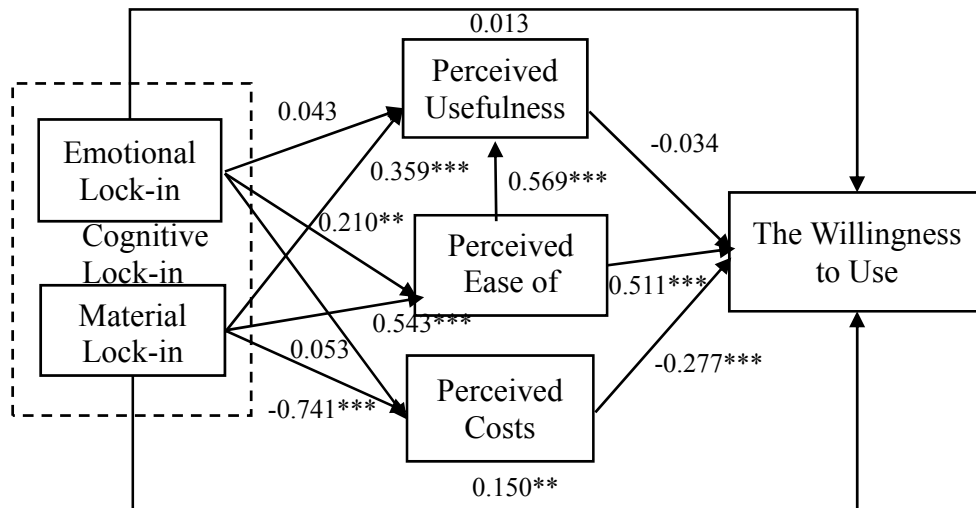
### 3. Research Results and Analysis

#### 3.1. Reliability and Validity Test.

In this paper, the Cronbach's  $\alpha$  coefficient is calculated and tested in units of a set of index problems for each variable in the theoretical model. We found that the Cronbach's  $\alpha$  coefficient of each variable exceeded 0.70. The reliability of this questionnaire is relatively good, the internal consistency is high, and the reference value is large. KMO measurement test and Bartlett sphere test were carried out for each variable. After the structural validity analysis, the principal component analysis method was used to extract the factors, and the factor analysis was used to analyze the measurement items corresponding to each variable, and then the maximum variance method was used for the analysis results. The output factor load matrix is used to analyze and verify the content validity of the sample. The KMO coefficients are all greater than 0.5, and the Bartlett sphere test is significant, indicating that the variable is suitable for further factor analysis. At the same time, all the measurement indexes of the variable are concentrated on the same factor, and the load values of

all factors exceed 0.5, indicating that the convergence validity of the research variable is good, all the measurement indicators can be retained. The content of this part of the scale is high and can measure variables well.

### 3.2. Research Model Testing.



**Figure 2.** Path coefficient of the theoretical model. \*\*\* is  $p < 0.001$ ; \*\* is  $0.001 < p < 0.01$

In this paper, the structural equation model analysis software AMOS24.0 is used to test the significant effects of variables such as emotional lock-in, material lock-in, perceived ease of use, perceived usefulness, and perceived cost on the user's willingness to use the mobile library. Figure 2 is the standardized path coefficients using AMOS.

### 4. Summary and Recommendations

From the model test results (Fig. 2), we can see: For the impact of cognitive lock-in proposed in this paper, the path of the assumption H1, H3, H4, H5, H7 are significant, and the assumption are true. Material lock-in not only affects the user's willingness to use, but also affects the user's willingness to use indirectly through perceived cost and perceived ease of use. Therefore, in order to achieve the purpose of increasing users' willingness to use, mobile library service providers can increase the material lock-in, that is, take some lock-in measures, so that users can generate lower cognitive conversion income and higher cognitive conversion costs when switching to other library usage methods. Such as the deep processing of the rich information resources, providing short and precise content products to attract users, paying attention to timely update resources, trying to avoid the placement of advertising, etc. In short, they should improve the mobility, portability, real-time, richness and initiative which the mobile library is better than the traditional library service mode.

The path of the assumption H10 is significant and it is validated, this conclusion is consistent with the conclusions reached by scholars in previous research literature, and it can be considered that it is still applicable in the field of mobile libraries. At the same time, in terms of perceived ease of use and perceived cost, the path of the assumption H11, H12 are significant and the assumption are validated. Mobile library service providers should continuously improve the service level of the interface design and resource query of the mobile library system platform, so that users can operate more conveniently and. To the appropriate extent, they should use low-cost strategies reasonably, such as with traffic operators, collaborating to reduce the cost of traffic usage, or organizing some downloads of book resource promotions to influence and maintain the user's willingness to use.

For the hypothesis that H2, H6, H8, and H9 are not established, the reason may be due to the fact that the mobile library appears later than the traditional library service model, and there is a gap with the transmission library service mode in terms of function use, resource acquisition, and user usage habits. The user's emotional lock-in and habits are low, and there is not a sense of identity and

dependence. This also shows that the popularity of mobile libraries should be promoted and users' willingness to use should be improved. Therefore, in the development process of mobile libraries, special attention should be paid to the function enhancement and service embedding of mobile libraries, gradually increasing their position in people's learning and research activities, and continuously promoting users' willingness to use.

## **5. Acknowledgements**

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