Research on Patient Acceptance Behavior of Online Medical APP Based on UTAUT Improved Model

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Abstract. In recent years, with the continuous development of mobile communication technology and the Internet, Chinese mobile medical industry has entered an explosive development stage. The gap between medical supply and demand has brought a bright future to the mobile medical industry. From the perspective of "patient" We use UTAUT to improve the model and study the behavior of patients' mobile medical APP acceptance. Through the combination of literature research and questionnaire survey, collect relevant data and conduct empirical tests. Finally, by analyzing the main factors affecting the behavior of users using mobile medical APP and the impact, it puts forward effective suggestions and Countermeasures for the development of mobile medical APP.

Introduction

With the improvement of people's living standards, people's awareness of their own health management has been enhancing, and also growing demand for their health knowledge. Following the improvement of mobile communication technology and network communication platform, the Internet has played an important role in understanding the health care knowledge of the majority of Internet users [1]. In 2015, Ping An Health launched the online health consultation and health management app “Ping An Good Doctor”, which aroused great interest from the public. After 100 days of online launch, the number of registered users has exceeded one million. According to Analytics' easy-to-view statistics, China's mobile medical industry market has grown rapidly, reaching 23.07 billion yuan in 2017, an increase of 118.47% compared with 2016. Medical digitalization has become a global trend.

Mobile medical APP products have their own advantages: (1) The patient has the initiative to promote reasonable medical treatment; (2) Realizing the sharing of quality medical resources; (3) Improve the medical service model and improve the efficiency of medical treatment.[2] However, mobile medical care has its disadvantages compared with traditional medical treatment. Firstly, there is a hidden danger in the security of user information; secondly, medical diagnosis may be partial and unconfident; finally, commercial information with strong advertising colors is easy to mislead patients. It can be seen that before the legal control is not yet perfect, mobile medical development faces strong pressure. The significance of this study is to promote the development of mobile medical care and improve the acceptance rate of mobile medical APPs.

Literature Review

Mobile Medical Service

Mobile medical service refers to a service that provides users with medical and health information by collecting physiological information of users through mobile intelligent terminals.
For the new product of mobile medical care, domestic and foreign scholars have carried out related research. Liang (2015) developed the emergency call mode mobile medical service, which can transmit basic information of patients in the event of an emergency to nearby search and rescue personnel. Jones (2015) discovered that mobile medical services, including wireless systems, portable network devices, and wearable devices, through mobile medical service technologies, enable patients to live under the supervision of mobile medical devices through mobile medical service technologies. Han Jia (2015) studies and analyzes the structure and function of remote monitoring products in mobile medical services, and analyzes the design key points and interactive characteristics of such mobile medical service products in detail. Rui Tingting holds that (2016) mobile medical services refer to the collection and intelligent analysis of physiological information through mobile intelligent terminal devices that integrate sensing devices, computer technology, multimedia technology and other technologies to provide users with health information and medical services.

Mobile Medical APP Products Related Research

Mobile medical is based on mobile terminal-based software APP, which covers intelligent medical software for medical service and mobile financial payment functions [3], such as Chun Yu doctor and lilac garden. Yin Zhiping believes that (2018) the promotion of medical and health software applications focuses on four aspects: consultation appointment, awareness of disease prevention, patient record, and treatment. The functionality of the mobile healthcare app itself is a major factor affecting the willingness of users to adopt. Wang Jingqi believes that (2017) consumers’ perception of income, community impact, and protection beliefs have a great impact on Internet + medical product preferences. Liu Qingshun and other scholars believe that (2016) the usefulness and ease of use of mobile medical APP perception is the primary premise of users, while perceived professionalism and community entertainment are the key factors affecting the acceptance behavior of medical APP.

A review of mobile medical research literature, model-based research in the online medical field, and research on behavioral factors for patient acceptance and use are numerous. Different from the existing literature, based on the UTAUT model, combined with the actual situation of China's online medical system, this paper constructs a model that affects patients' use of online medical system from the perspective of patient perception, and discovers the problem of online medical information system through test analysis. To provide reference for the development and progress of online medical systems.

Model Building

Firstly, UTAUT was used as the basic model of this study. Venkatesh et al. used experimental data to prove that UTAUT can explain the behavior of information technology well. This paper attempts to apply the UTAUT theory to the field of mobile medical technology under the new information technology.

Secondly, the factors influencing patients' behavior intentions are: hard work expectation, social impact, performance expectation and contributing factors, which have been repeatedly verified by various scholars. While mobile medical care is different from traditional information technology in terms of security and ethics, UTAUT theory cannot fully reflect the influencing factors. Therefore, this research model absorbs the core variables of UTAUT and adds two variables based on this: “trust factor” and “perceived risk” to better explain the factors affecting patients' acceptance and use of mobile medical APP [4].

Hypothesis Based on UTAUT Theoretical Model

H1: Efforts are expected to have a positive impact on the patient's willingness to use.
H2: Efforts are expected to have a positive impact on performance expectations.
H3: Performance expectations have a positive impact on the patient's willingness to use.
H4: Contributing factors have a positive impact on efforts.
H5: The contributing factors have a positive impact on the patient's behavior.
H6: Contributing factors are positive factors in the patient's willingness to use.
H7: The positive impact of social influence on the patient's willingness to use.
H8: The patient's willingness to use is positive for the behavior of the patient.

Research Hypothesis of Trust Factors

H9: Patient trust has a positive impact on effort expectations.
H10: The trust factor has a positive impact on perceived risk.
H11: The trust factor has a positive impact on the willingness to use.

Perception Risk Research Hypothesis

H12: Perceived risk negatively affects willingness to use.

Research Hypothesis of Control Variables

H13: Gender plays a role in regulating control.
H14: Age plays a role in regulating control.

Research Design

Research Object and Location

The respondents to this study were identified as mobile medical APP users between the ages of 18 and 49 years old. The location of the survey site involves four more developed eastern cities in Huzhou, Taizhou, Shanghai in Zhejiang Province and Anqing in Anhui Province, which ensured the scientific nature of the questionnaire survey.

Survey Design

The research questionnaire consists of two parts. The first part is the basic information questionnaire, which mainly investigates the basic conditions of using online medical users' gender, age, used online medical APP and satisfaction. The second part designs 20 items based on six hypothetical variables. The items were measured using the Likert five-point scale from 1 (very disagreed) to 5 (very agree).

At the same time, in order to ensure the validity of the questionnaire, experienced experts are invited to help to delete the contents of the questionnaire. Before starting a large-scale formal investigation, a pre-survey was conducted on the target sample group, and some topics were revised based on the survey results.

Sampling Method and Sample Characteristics

Data acquisition uses a method of random sampling. The investigation time is from June 2018 to August 2018. A total of 1380 questionnaires were distributed, and 112 invalid questionnaires were excluded. 1268 valid questionnaires were obtained, with an effective rate of 91.8%. Among them, the respondents were mainly young and middle-aged, concentrated in the 20-49 age groups, accounting for 60.67% of the total sample.

Data Processing

Trust Level Analysis

Reliability is the characteristic of a test score or the result of a measurement. Good reliability is a guarantee of consistency and stability of the scale. A common reliability test method in the Likert scale method is the "Cornbach's a" coefficient. The overall reliability coefficient α value of the test questionnaire is 0.790, which indicates that the reliability of the whole questionnaire is strong; and the reliability coefficient α of each part is greater than 0.7, indicating that the stability of each part is good, so the designed questionnaire is reliable.
Validity Analysis

This study used SPSS for constructive validity analysis. Experts such as Lundstrom and Oliver recommend single- and overall-relevant analysis to measure construct validity. It can be seen that the value of KMO for each variable is greater than 0.7 and the value of Sig is less than 0.01, indicating that the structural validity of the questionnaire is acceptable. In short, this questionnaire has reached the standards it deserves and has good overall validity.

Model Fit Analysis

Through AMOS, according to the theoretical model and research hypothesis, the structural equation model of mobile medical APP user behavior was constructed, which including trust factor, effort expectation, social influence, performance expectation, contributing factors, perceived risk, usage intention and usage behavior, and 21 observed variables. After many revisions, the model's fitting index is close to the ideal standard.

Model Verification

According to the research data, the model framework, influence path, path size and relationship between variables based on UTAUT improved model are drawn. The path coefficients of effort expectation, performance expectation, contributing factors and willingness to use were 0.139, 0.284, and 0.493, respectively, and the path coefficient of intention to use behavior was 0.446, which was statistically significant. Social impact had no significant effect on patient willingness to use, indicating that Hypothesis 7 was not supported. The resulting research model is shown in Fig. 1 below.

![Figure 1. Research Model.](image)

Research Conclusions and Management Implications

Through empirical analysis, this paper draws the following conclusions: 1. The improved model of UTAUT is suitable for the research of mobile medical APP. 2. The behavioral factors that influence users' use of mobile medical APP are ranked according to their influence: use willingness > contributing factors > patient's credit factor > hard work expectation > performance expectation. 3. The influence of social influence and perceived risk on the willingness to use and the regulation of gender and age in the model were not verified in this study.

Based on the above analysis, this paper proposes the following suggestions for improving the acceptance behavior of mobile medical APP users. (1) At the government level, improve mobile medical related laws and regulations, prevent network information security, and standardize the development of the mobile medical industry to reduce the perceived risk of patients. (2) At the
software application developer level, coordinate the different needs of patients of different age groups, improve performance expectations; simplify the operation steps of mobile medical APP; improve efforts and expectations; multi-party cooperation and complementary resources. (3) At the level of medical institutions, pay attention to the combination of “online” and “offline”, strive to solve online limitations, and provide offline medical service supply; increase the promotion of mobile medical APP.

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