The Study on the Problems of Digitally Disadvantaged Groups in Using Online Medical Registration Public Numbers

--Take Changsha Xiangya Hospital as an Example

Zihan Bu[1,a,*]

[1]School of Design and Art, Changsha University of Science & Technology, Changsha, Human, 410000, China

a. 2036972089@qq.com

*corresponding author

Abstract: With the rapid progress of information technology, smart healthcare has been gradually integrated into people's daily lives. People pay more and more attention to their personal health care, and they are willing to invest more time and energy in health care, and start to transition from the original "medical treatment only when there is a disease" to the current "prevention of disease, intervention of disease, and focus on rehabilitation". At the same time, under the combination model of "Internet technology + hospital", patients can make an appointment with a doctor through the online form, which makes it easier and easier to seek medical advice. Changsha Xiangya Hospital, a famous modern medical hospital in Hunan Province, China, provides convenient services with its online medical registration public number, but also faces the challenge of the digitally disadvantaged group's difficulties in using it. The purpose of this paper is to explore in depth the problems encountered by this group in using the online medical registration public number and to propose corresponding optimization suggestions to promote the fairness and universality of medical services. This thesis finds that although the digitally disadvantaged groups is not able to use online medical registration flexibly, they have been presenting a positive learning attitude and are happy to learn about the process of using the online medical registration public number.

Keywords: digitally disadvantaged groups, online medical care, public number, registration

1.   Introduction

The rise of smart healthcare has changed the traditional healthcare service model, providing people with a more convenient and efficient medical service experience [1]. The online medical software is becoming more and more developed, but the public number has more advantages over other online software, such as it can be opened through the media platform, and users do not need to download additional software and take up additional memory [2]. Online medical registration public number is an official account that provides patients with medical registration services on social media platforms such as WeChat. Patients can register by appointment, and the registration process mainly includes the following aspects: registration and login: in order to ensure the effectiveness of the operation, but

also in order to reasonably allocate the limited medical resources, the system strictly requires the user to register and verify the patient's identity card number during the appointment process, to ensure the effectiveness of the subsequent medical treatment and the fairness of the allocation of resources; reservation and registration: the user can view and select departments and doctors according to their own medical conditions, which is important for the effective medical resources; appointment and registration: users can view and select the departments and doctors according to their own medical conditions, which is important for the effective medical resources. Appointment: Users can view and select departments and doctors according to their own conditions, make appointments for valid medical resources, and receive a reminder of whether their appointments have been successful; at the same time, they can also query the information related to appointment booking in their personal centers; Personal Center: Users can query the information about the current and historical appointment booking, etc., and also cancel the appointments, releasing the limited medical resources to facilitate the treatment of other patients. At the same time, you can modify the user login password and carry out the binding operation of cell phone number to improve security; background management: the administrator can manage the contents of doctors and patients through the background management system, mainly including the management of the doctor's department information and personal information, the management of user registration information, the management of the booking of appointments, and the management of the doctor's outpatient information and so on [3].The administrator can manage the contents of doctors and patients through the backend management system. However, the existence of digitally disadvantaged groups makes this population face many challenges in enjoying smart healthcare services. The widespread use of digital technology in the context of national and social governance has created a "digital divide" by "segregating" social groups. The digital divide has gone through an iteration of the connotation of "access gaps - use gaps - knowledge gaps", which is manifested at the practical level in the weakening of the capacity of the main body of the digitally disadvantaged groups, the unequal distribution of dividends, and the imbalance of the right to speak in cyberspace, among other dilemmas. At the legal level, the digital divide has a differential impact on the realization of fundamental rights such as equality, personality, freedom, etc. [4]. Changsha Xiangya Hospital, as a well-known medical institution, is representative of the use of its online medical registration public number. Therefore, this paper chooses Changsha Xiangya Hospital as the research object, and analyzes the problems encountered by digitally disadvantaged groups in using the online medical registration public number through literature research method, questionnaire survey method, and in-depth interview method, in order to provide references for solving this problem. Although there have been studies focusing on the problems of digitally disadvantaged groups such as middle-aged and elderly people in the field of smart healthcare, there are still insufficient studies on online medical registration public number. In particular, the problems faced by digitally disadvantaged groups may be heterogeneous in different regions and hospital contexts. Therefore, this study aims to fill this research gap and provide a useful reference for improving the equity and accessibility of smart healthcare services.

2. Program Practice

This study adopts a comprehensive research methodology, which includes both qualitative and quantitative research instruments, and combines both online and offline data collection methods to ensure the authenticity, completeness and validity of the research data. In the data collection phase, an online questionnaire platform was used to collect questionnaire data on a large scale to ensure the breadth and representativeness of the data. In addition, audio recording and transcription were used to record various information and details of the interview process in detail for subsequent data analysis and research. In order to gain a more comprehensive understanding of the registration process, the actual registration of patients in the healthcare facilities was also recorded through on-site filming

and observation. This approach helps to gain an in-depth understanding of patients' needs, disturbances and problems in the registration process, and provides a wealth of empirical material for subsequent research. In the data analysis stage, statistical methods will be used to quantitatively analyze the collected data, while combining qualitative analysis, with a view to drawing scientific and objective research conclusions.

In the research process, emphasis is placed on following scientific research methods to ensure the reliability and validity of the research results.

2.1. Online Questionnaire Sending

The online questionnaire was used to collect user data of Changsha Xiangya Hospital's online medical registration public number and to understand the usage, problems and needs of the digitally disadvantaged groups. The online questionnaire focuses on the analysis of the product homepage information, interface design, and layout, collects participants' intuitive feelings and suggestions for modification, and collects and analyzes users' satisfaction from different perspectives. The questionnaire was set up from the collection of basic information, analysis of the advantages of registration, research on hospital services, detailed analysis of interface services, and collection of the actual situation combined with opinions and suggestions.

2.2. Offline Interviews and Tests

This thesis utilizes in-depth interviews and feasibility tests to gain an in-depth understanding of the actual use of digital disadvantaged groups. The offline part focuses on the research of the user's feeling of use and practical experience, through the design of usability testing given to the interviewees in the process of completing the task so that the interviewees in the practice of self-feeling, and also be able to observe the user's use of the program defects and can be optimized in the process. Still from Basic information collection, registration advantage analysis, hospital service research, interface service detailed analysis, collecting the actual situation combined with comments and suggestions from six points, set up offline interviews and testing. Table 1 is the content of the feasibility test. The research covered all age groups and different genders to conduct interviews and tests. The test structure required users to complete the whole process of searching for Xiangya Hospital program and registering on their own, during which the team members did not intervene and let the users choose the public number or the small program to register on their own. The user then registers or logs in, enters the registration interface, and searches for the corresponding department and the designated doctor. The test mainly focuses on the user's search for the applet and the operation process, checking the registration information in the program and other steps to time, in order to analyze the smoothness of the operation, clarity of information and so on in the online registration.

Table 1: Feasibility test: registering on Xiangya Hospital's public number

Procedure	Tasks	Ask the participant a question
Open "Xiangya Hospital of Central South University" WeChat applet	Search: Search for the app and find the correct "Xiangya Hospital of Central South University" app to open, it takes X seconds.	Q: How convenient is it? Is it fast and accurate to find the entrance of the small program? Is the network smooth and can the webpage open normally?

Table 1: (continued)

Login account in the applet	Login: find the login location, login mode: cell phone number quick login / cell phone number login / registration. It takes X seconds.	Is it easy to find the login location, do you encounter any obstacles during the login process, and can the cell phone number login normally?
Go to Appointment Booking	Register: Find the location of "Register Appointment" module and click to enter. Information Import: Add patient's e-health card, including the existing health card associated/added health card. Instructions for registration: Read the 5s instructions for registration before agreeing to enter. It takes X seconds.	Is it easy to find the location of the Appointment button? Is it easy to link the health card? Is the information on the registration instructions complete? Is the information on this page helpful to the patient? Are patients reminded of important information?
Make an appointment with Dr. Yong Liu at Pharyngeal Tumor Clinic.	The user clicks on Dr. Yong Liu's clinic in the ENT department of the Medical Center according to the directory guide, then checks the available dates, finds Dr. Yong Liu's number on X day, finds out if there is a number available on that day, and then makes an appointment (a.m./p.m.) It takes X seconds.	Did you have trouble finding the department? Was it easy and fast to make an appointment? Is the department information clear?
Checking your appointment history after registering	Time to find "Appointment Record": (seconds)	Is the location of the appointment record conspicuous or oriented? Can I see the information I need at the first time?
Appointment completed	Exit the app	

3. Data Analysis

With regard to the collected data, this thesis conducts an in-depth exploration through statistical analysis methods to reveal the challenges and problems faced by the digitally disadvantaged groups in the process of online medical registration.

3.1. Usability Test Analysis

During the testing process, valid suggestions were received from some respondents. Although most of the respondents did not explicitly mention difficulties in the process of usage, a number of potential shortcomings were still identified by observing the respondents' usage. They will be explored together with the collected timing data in the subsequent data analysis.

According to the timing data statistics, the average time taken to complete this feasibility test was approximately 2 minutes and 20 seconds, with the shortest time taken being 48 seconds, the shortest time was 3 minutes 49 seconds, and the longest time was 3 minutes 49 seconds, with a gap of

approximately two minutes between the two. In the time spent on each part, the longer part is mainly concentrated on "cell phone number registration" and "department search".

Through analysis, the following problems were found:

1). In the WeChat public number reservation function, it is not possible to obtain the cell phone number with one click, thus prolonging the operation time;

2). In the registration interface, there is no obvious pattern in the order of departments;

3). Problems with the department function query: a. There are bugs in the search function, which automatically jumps before the input of keywords is completed. b. Sometimes it is impossible to query the corresponding departments and doctors, resulting in information asymmetry.

3.2. Analysis of Interview Results

Based on the semantic research and analysis of the interviewees, it can be found that for the people in Changsha area and even in Hunan area, Xiangya Hospital is well known.

Xiangya Hospital is well known. Many interviewees who come from abroad but study or work in Changsha said they know Xiangya Hospital, and some of them have been to Xiangya Hospital themselves. And some of the interviewees have been to Xiangya Hospital for medical treatment themselves. Under such circumstances, if one wants to see a doctor in a big hospital. It is very difficult to queue up and register offline on the same day, so if one wants to go to Xiangya, online registration is almost inevitable, which also confirms the practical usability of the research. There were also older respondents who said that the font size of Xiangya's online registration public number setting was too small for their eyes to see. Then developers can consider voice assistant, adjusting the font size within the program to help the older group. There are also interviewees who are puzzled by the repeated pop-up windows in the program. After the feedback from the interviewees, they found out by themselves that the pop-up windows keep appearing to remind the users whether to confirm or not is necessary, but the position of the confirmation and cancellation keys of the pop-up windows do not conform to the public's usual right hand habit, which leads to the interviewees repeatedly pointing the wrong way when they are choosing, and this is a key reason that makes him give this opinion.

3.3. Online Questionnaire Data Analysis

The survey report reveals a picture that in China vast youth groups, especially young people aged 18 to 25, their participation in the online questionnaire is extremely high. In terms of their opinions and feelings about online versus offline registration, most of them have similar views and prefer online registration [5]. This is mainly because online registration has obvious advantages in terms of convenience and time-saving. At the same time, offline registration also has its unique advantages. First, patients can consult the front desk staff on site to obtain relevant registration information and locations, which undoubtedly provides more direct assistance to patients. Second, despite the increasing popularity of Internet technology in China, there are still some people who have not adapted to the use of online registration, and they prefer offline registration. Overall, the vast majority of participants were satisfied with Xiangya's online registration service, but also thought there was still room for improvement. In terms of interface design, participants generally preferred a simple and clear layout, and they thought the interface design of the public number was better than that of the applet. However, the main problem encountered by participants in the online registration process was the lack of corresponding guidelines. Questions such as how to register, how to determine whether the registration was successful, and how to transfer to human customer service bothered them.

These problems reveal that the online registration service needs to be further improved in terms of user experience. Especially for patients using online registration services for the first time, providing clearer and more understandable guidelines and operational procedures will help increase user

satisfaction and further improve service quality. At the same time, online services need to be continuously optimized and upgraded to meet the growing needs of patients.

4. Strategies and Suggestions for Optimizing Online Medical Registration for the Public

In view of the problems of the digitally disadvantaged in the process of using the online medical registration public number, this paper puts forward the following optimization strategies and recommendations: first, optimize the user interface design to improve the operational convenience and intuitiveness; second, strengthen technical support and training to provide specialized guidance and help for digitally disadvantaged groups; third, simplify the registration process and lower the threshold of use; finally, strengthen information security and privacy protection measures to eliminate the concerns of digitally disadvantaged groups; and lastly, strengthen information security and privacy protection measures to eliminate the concerns of digitally disadvantaged groups. protection measures to eliminate the concerns of digitally disadvantaged groups. Specific solutions include: adding a key to get the cell phone number plug-in for WeChat public number reservation to save the operation time of registration; adding 26-letter side sorting for department selection to make it easier to find; solving the public number searching problem; turning the search magnifying glass into dynamic to increase the visual effect; optimizing the public number interface design and aesthetics; switching the pop-up window button position; providing voice help or font enlargement adjustment within the online program; adding AI navigation, online consultation to check the general condition and departmental recommendations; additional human customer service to strengthen the doctor-patient contact, and increase the online consultation function to facilitate users [6].

5. Conclusion

Through an in-depth analysis of the online medical registration public number of Changsha Xiangya Hospital, this paper reveals the problems and challenges faced by the digitally disadvantaged in the process of using it, and identifies many design deficiencies of the online medical registration public number. Through interviews with the digitally disadvantaged, it is found that they are highly enthusiastic about integrating into the digitally modernized world and are willing to try and accept challenges. In response to these problems, this paper proposes corresponding optimization strategies and recommendations in order to enhance the registration experience and service satisfaction of digitally disadvantaged groups. There are still some shortcomings in the online questionnaire survey of this paper. Due to the limitations of the circle of friends, the collected questionnaires of different ages and occupations are not enough. Future research can further focus on other needs and problems of digitally disadvantaged groups in the field of smart healthcare, such as remote diagnosis and treatment, health management, etc., to contribute more to the popularization and development of smart healthcare services.

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