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DOCTOR/PATIENT PORTAL

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***Abstract*—**In today's world if someone wants to book a Doctor's Appointment we need to call in clinic or personally go to that place and book the appointment. This consumes precious time of the patient. Also if the doctor cancels his/her schedule, the patient does not come to know about it unless he/she goes to the clinic. It would be very convenient if we have an application for the same. This project aims to build a web application that will ease the process of booking appointment of the doctor.

Keywords – Appointment , patient , clinic , application , convenient etc.

1. INTRODUCTION

What is the project all about?

This project is to serve a better idea to automate the existing manual system of appointment by the help of fully fledged computerised application, which can be met via building a web portal to book an appointment at ease.

Why is the specific topic chosen?

The project idea came by the research that Patients being sick, there was always a high probability of the attendants also falling sick as everyone was crowding around each other. This evolved to a telephone based appointment booking, mainly managed on paper. It was hardly flexible. No-shows were very common. With the advent of Personal Computers, appointments were maintained in the desktop. This certainly brought more order, however appointments still required the patient to phone in to the receptionist to book the appointment. Widespread use of mobile phones and the internet has driven the need for doctors to offer the facility of online appointments booking – a far superior option for both doctors and patients.

What could be the probable problems that would be

addressed during the course of project?

• Traditional system in this pandemic become tedious and needs to be improved according to vast growing population and available technology.
• Lessen the serpentine queues for booking an appointment
• Eradicating the problem of relying on documents for booking appointments which is the biggest roadblock and holding organisation back from growth. • Paper scheduling can mean a great deal of phone calls to ensure multiple patients are not being booked for the same slot. Steady stream of phone calls to be fielded and made would be less.
• An automated and self-managing online system can reduce clinic personnel required to man the appointment desk. So, they can redirect existing staff for other key functions.

➢ Objectives

• To develop an web application for booking appointments at ease of use & quick access for doctor as well as patient and wipe out the inefficiencies of manual booking system. • To save excessive time of patient waiting in long queues just to make an appointment.
• To help patients stay better connected and makes them feel more in control of their time.
• To reduce no-shows and keeps the doctor's schedules full an online payment gateway is integrated.

➢ Scope

A growing number of healthcare practices worldwide are going online with appointment booking systems. Hospitals, clinics, therapeutic groups, name it and they have it. There is a greater need, now more than ever, to understand why such systems not just actually work, but potentially benefit the practice and its patients.

Bookings, re-bookings, cancellations, reminders, follow-ups and various other functionalities can now be easily handled online with efficiency and without all the fuss that is associated with manual appointment scheduling systems.

Doctor Patient portal which is an online appointment scheduling system is not only time saving agents but income-generating assistants too, that provide operational convenience and promote
relations built with your patients.

The public now resorts to online management for most services. Anything online spells convenience, ease of use and quick access. They not only want it, they expect it. It won't be long until patients look for a competing facility that offers online appointment scheduling, to circumvent the inconvenience and sometimes, frustration of phone-in bookings. And so, it is only a natural progression towards going online to assist in the most basic of healthcare interactions — scheduling appointments.

online scheduling systems are safe and the information is kept secure, people are comfortable with payments made online, especially in recent times when a myriad of services are sought online with convenience.

2. EXISTING SYSTEM

S. No.	Existing Systems	Features	Benefits	Limitations
1.	Practo	It created a SaaS product for doctors to easily organize appointments, track past medical records and provide e prescriptions.	Video consult with India's top doctors, anytime.	It is costly so it is not affordable for a doctor having a local clinic.
2.	Docpulse	This software helps in handling the patients admissions with great ease, allows hospitals to add their bills, bed charges, arrange the admission dates and discharge patients without any fuss.	Best dedicated software for improving the functioning for **Clinics, Hospitals** and **Doctors**.	It is also costly on the other hand our web application is free.
3.	Amwell	Amwell offers quality medical care on demand. You can schedule appointments, often with next-day availability.	55 +Health Plan partners, including Blue plans and UnitedHealthcare.	Amwell services vary between $69 or less for urgent care and up to $200 for an online psychiatry visit.

3. RELATED WORK

Traditionally, medical appointments have been made with schedulers over the telephone or in person. These methods are based on verbal communications with real people and allow for maximum flexibility in complicated situations. However, because these traditional methods require the intervention of schedulers, the ability to get a timely appointment is not only limited by the availability of appointment slots, but also by the schedulers and phone lines.
Patients' satisfaction with appointment booking is influenced by their ability to book at the right time with the right health service providers.

The Internet has recently emerged as another means to make appointments. Web-based appointment scheduling has been a popular research topic. Several studies conducted satisfaction surveys and found that Web-based appointment scheduling is an extremely important feature, and most patients would use the service again.

There are two major types of Web-based medical appointment services, medical scheduling software as a service (SaaS) and proprietary Web-based scheduling systems. Medical scheduling SaaS has gained increasing prominence in recent years.
These appointment systems are not built up by health care practices themselves, but are provided and maintained by health IT companies such as ZocDoc and InQuicker on a paid subscription basis. The appointment services are cloud-based and can be integrated into health care providers' own management systems. The other type of appointment service is proprietary appointment systems, which are integrated into patient portals on providers' websites.
A patient portal is a secured Web-based service that allows patients to access their health information and communicate with their health care providers at any time. In the United States, the growth of patient portals has largely been spurred by meaningful use (MU) requirements because of the federal incentive program for adoption of electronic health records. To meet the requirements of MU and receive its incentives, the portal should be actively used by both the practice and patients.

There are two modes of Web-based appointment systems, asynchronous and real-time. In the asynchronous mode, appointments are requested through emails or electronic forms on providers' website, and then manually processed by schedulers. In the real-time mode, patients can directly interact with providers' scheduling management systems. Although the asynchronous Web-based appointment systems also use the Internet as a medium, they basically replicate the process of telephone-based appointment scheduling.
Under the asynchronous mode, if an appointment is requested outside of a provider's business hours, it will not be processed until schedulers return to work. Normally, Web-based appointment requests are put in the same queue as phone-call appointments, and are thus limited by the backlog of phone calls in the queue.

1.1. Statement of the Problem

The practice before the online scheduling system was established was that the users of the health centre walked-in to schedule appointments before they could access the health care services. Furthermore, the old system was based on first come first served, which resulted in users lining up very early to write their names, and the arrival time in the registration book at the reception area or

desk. The quality of service as it relates to the speed of registration and patient flow was slow and patients also experienced the long waiting time before seeing the doctor. Aware of the challenges of manual registration method, the university's management introduced an online system for scheduling appointments in 2014. With this system, patients can select the date and time they would like to see the doctor, as well as select other services provided at the health centre, and the health centre staff can access the medical records ahead of the patient's visit.

Since the launch of the online scheduling system for booking appointment, there has not been any study to document the users' views on the system. This study was designed to provide evidence on the users' views of the online scheduling system, its benefits and challenges. It is believed that the findings of this study will contribute to the existing body of literature on this topic as well as to lead to the improvement of the online scheduling system.

1.2. Research Questions

The following research questions were answered:

1) What are the views of the users about the online scheduling system?

2) To what extent are there differences in the views of the different groups of users (students vs staff & males vs females) about the services provided at the health centre?

3) What suggestions, if any, could be made on how to improve the online scheduling system and services at the health centre?

Only 50 users' views on the online scheduling system and health services provided were investigated. Therefore, the findings cannot be generalised.

4. METHODOLOGY

➢ Improve the Online Scheduling System and Services

Research Question Three: What suggestions, if any, could be made on how to improve the online scheduling system and services at the health centre? Four themes (appointment efficiency, walk-in and online scheduling system, linking health centre service with pharmacy, time management, & educating the users) emerged from the analysis of the responses to the open-ended question on suggestions on how to improve online scheduling system and services. The findings are presented under the themes mentioned above.

➢ Appointment Efficiency

Several views were expressed about the efficiency of booking of appointment as some of the respondents expected that with the online scheduling system, their appointment with the doctor would be on time. However, their experiences reflected otherwise. Here are some of the suggestions made by the respondents:

• Using the online scheduling system, I was of the view that I will be seeing the doctor on time, but this is not the case. This system only allows you to indicate that you will be seeing a doctor. The doctors need to ensure that the patients get service on time. (Female student, 21 - 30 years)

• The doctors sometimes arrive late or are behind time in seeing the patients. The nurses and doctors should consult within the time frame booked by the patients. (Male, staff, 41 - 50 years)

- **Walk-in and Online Scheduling System**

Some of the respondents were not of the view that both the online scheduling system and the walk-in method should be used in the health centre. This omission of information was reflected in their suggestions. It should be pointed out that both the online scheduling system and the walk-in method are used. However, the latter is usually done to accommodate emergency cases. Here are some of the comments made by the respondents:

• I need to be able to see a doctor through the walk-in method. (Female staff, 41 - 50 years)

• It will be nice to accept walk-in patients also. (Female staff, 31 - 40 years)

- **Linking Health Centre Service with Pharmacy**

Currently, the practice is that patients physically take their prescriptions to the pharmacy which is located elsewhere on campus. Some patients are of the view that the services provided by the two units should be linked together. Stated below is the suggestion made by a respondent.

• The doctors could send the prescriptions to the UTech's pharmacy, which would make the filling of the prescription faster. The pharmacy service is very slow, and this increases the waiting time before getting the medication. (Female student, ≥50 years).

- **Time Management**

Some of the respondents were of the view that there is a time management problem with the online scheduling system. They are of the view that with more doctors, the consultation time could be managed properly. Hence the suggestions made below.

• At times, there are available time slots, but there are no doctors. Engage the services of more doctors and try to allocate more appointment spaces for customers, if possible. (Male student, ≤20 years)

• There is a need to get more doctors on board and standardise the amount of time the doctors spend with a patient. (Female student, 21 - 30 years)

• In the study conducted by Braddock and Snyder, they stated ethical obligations should guide physicians about time management [31] . They added that ‒as such, judging the adequacy of time in clinical practice requires that we call on the ethical principles and values inherent in medicine‖ [31] (p. 1056).

- **Educating the Users**

Some of the respondents were of the view that more information about the health centre and its services should be provided. Hence, some have made suggestions on how to disseminate this information to the users.

• Not everyone is familiar with the acronym on the website as it relates to the online scheduling. There is a need to make the information clearer on the university website. (Male student, 21 - 30 years)

• Place notices around the campus to make users more aware (Male student, 21 - 30 years)

• Have a worksheet instruction flyer on how to use the online scheduling system, and make it more user-friendly. (Female student, 31 - 40 years)

5. SYSTEM PROPOSED

• 24/7 Medscape is the web application to automate the manual process of booking an appointment via this Doctor Patient Portal.

• At very first, patient have to resister themselves via authenticated registration process.

• Whenever patient wants to book an appointment they have to login from there respective credentials. From this they would be directed to patient panel. Here they can see doctor specialisation.

• Through this panel, patient can book an appointment on their time from their own place. Patient will be notified if the time slot is already booked

• Here they will get additional feature of choosing between virtual meet or physical meet with doctor according to their own convenience.

• As soon as they will confirm the appointment they will get an SMS alert. • Addition to this, secure payment gateway is also integrated so that there will be a reduction in no-shows.

• Patient can also look for their visiting history in patient panel only.
• Furthermore, when doctor's login with their respective credentials they will be directed to doctor's dashboard where they can see the appointments booked on respective time slots.

• So, doctor can also pre plan their schedule accordingly and if some emergency comes they can cancel the appointment too. As soon as he cancels the patient's appointment, the patient get notified.

• At last, user can drop a complaint(if have any) and can also share feedback after using service.

✓ Resources & Limitations

Software Resources:

- NetBeans IDE: An entire application software component that is modules has been developed using NetBeans.
- Apache Tomcat: An application server which allows us to run Servlet and Java Server Pages. Supported Database and Library that supports the database connection with java
- APIs to enable computer to possess a common interface, which allow us to integrate different properties of it like sms, payment gateways.
- Browsers and available Ports.

Hardware Resources:

1. Core i3 or higher Processor
2. 8Gb RAM; 1TB HDD
3. Windows 7 or Higher

✓ Limitations:

- At time, this application is just providing limited

services. Also it is only for a particular organisation.

- This application requires internet connection.

6.Discussion of Results

In research question one, 92.0% of the respondents had visited the health centre and had used the online scheduling system. Fifty percent of the respondents were made aware of the online system by the health centre staff; this showed that the dissemination of information about the system was limited. Cao et al. recommended the need to better promote the use of the WAS among the patients.

The findings showed that approximately 76.0% of those respondents who had used the online scheduling system before were either satisfied or very satisfied, and also found it to be user-friendly. This is consistent with the findings of other studies. Cao et al. found out that patients in primary health care clinics in Saudi Arabia and China, respectively, were satisfied with web-based/online appointment systems when compared to those who use the queuing method who experienced a longer waiting time. In a study conducted in Iran involving the use of 425 women, Sadjadian, Kaviani, Yunesian, and Montazeri, they found that 82% of the women were either satisfied or very satisfied with the clinic's overall performance. Furthermore, the findings are also consistent with the literature, which also found that participants in their studies were satisfied with the services provided at their health facilities showed that. On the contrary, a study by Al-Refaie in Jordanian hospitals, indicated dissatisfaction of the respondents with service quality.

Regarding research question two, for the 13 Likert-type items, the percentage of agreement between the students and the staff who responded were between 64.0% and 98.0%. This showed that a majority were in agreement with their responses to the items. However, there were statistically significant differences in the views expressed by the students and the staff on two items: ‒I am satisfied with the services provided by the doctors,‖ and ‒I am clear about the procedure to access the different services.‖ This was because of the mean difference.

The mean for the students was (M = 3.53, SD .57) and (M =3.45, SD = .76) for the staff for the services provided by the doctors. This finding is consistent with the study done by Panda, Sinha, and Soni in India, which showed that 49.5% of the respondents rated the services by doctors as excellent. In another study by Sadjadian et al., the physical environment and the doctors' consultation style were the reasons why the women's overall performance satisfaction was high. For the statement ‒I am clear about the procedure to access the different services,‖ the values were (M = 2.57, SD = 0.82) for the students and (M = 3.35, SD = 0.75) for the staff. No study was found to support this finding.

Regarding the health centre and pharmacy services, due to lack of physical space, it will be hard to have both within a locality. In a commentary written by Inguanti , it was noted that pharmacy services that are located in health centres play an important role in providing services within the same location. However, in the current study, for medications that are available in the university pharmacy, the researchers support the view that doctors could send the prescriptions to the university pharmacy, which would make the filling of the prescription easier for the patients and a little cheaper. Inguanti, and Wright, Gorman, Odorzynski, Peterson et al.acknowledged that the physical proximity

of a pharmacy to a health centre tend to have a cheaper rate for the patients.

7.CONCLUSION

The online appointment system is gaining more popularity and due to its numerous benefits such as minimising waiting time, patients being able to schedule their appointment without using the walk-in method, getting email appointment schedule reminder, and among others. To some scholars, it is regarded as a win-win solution for patients and physicians. Despite its several benefits, the online scheduling system is also affected by several factors such as availability of information technology, issues with consultation time, and the experience level of the scheduling staff.

This study was designed to provide evidence on the users' views of the online scheduling system, its benefits and challenges. The findings showed that the views of the users about the online scheduling system were positive. There was a significant difference in the views of the students and staff on two of the 13 Likert-type items that measured the services provided at the health centre. The respondents were provided comments on how to improve the online scheduling system and services at the health centre. Although the findings of this study cannot be generalised due to the sample size used, the results could be used to improve the online appointment system as well as other services offered at the health centre. Based on the findings of the study, the following recommendations are made:

1) Use of a bigger sample size in future studies to make it possible to generalise the findings.

2) Ensure that more patients who continue to use the online appointment system find the experience satisfactory. This could be achieved by minimising the waiting time to see a doctor.

3) Advertise the online system not just by the health centre staff but electronically throughout the university community and also seeking suggestions on how to further improve the system.

4) Ensure that the doctors try to be on time to see patients who have already made such appointments.

5) Facilitate the patients whose prescriptions could be filled at the university pharmacy through the use of technology.

6) Engage the services of more doctors to better manage the consultation time between the doctors and their patients.

8. REFERENCES

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