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Original Research Article

Development of a Mobile Health System (m-Health) for Students in Tertiary Institutions

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Abstract

The health challenges of students' in tertiary institution have become imperative that increase attention be given to the method of health care delivery. The major purpose of the research is to develop a preliminary mobile health system (mHealth) for students in tertiary institutions. In this research, the waterfall model of software development methodology was adopted in developing a user friendly, web based, and mobile health system. The mHealth system developed has two interfaces: Students and Admin interface. The system has the ability to diagnose diseases, proffer treatments, give health advice and book appointment for students by assigning username and password to every student after registering with the Admin. Since increase utilization of mobile technology by tertiary institution students has been observed in recent times, it is expected that this mHealth system will address problem such as long queues, ensure prompt treatment and problems associated with the tertiary institution social health insurance programme (TISHIP).

Keywords: Health challenges; mobile technology; e-Health; m-Health; tertiary institution social health insurance program (TISHIP).

1. INTRODUCTION

The health challenges of students in tertiary institution have become imperative that increase attention be given to the method of health care delivery. When students have good health, they are physically, intellectually, emotionally and environmentally stable. It also makes them balanced, strong and able to thrive in the midst of added tension that may affect their academic performance, relationship with their peer and their environment. As potential future leaders, politicians, and managers, their health and well-being is a world-wide public health priority [11]. Certain health challenges have been identified to affect different individual at some particular age. For example, polio, chicken pox and cough are diseases that affect children within the age of 0-5 years [14]. For the older adults, diseases like arthritis, low or high blood pressure and cancer are peculiar to adults above the age of 24. While gonorrhea, strep, malaria are health challenges that are peculiar to youths [14].

Mobile technology is exposing and changing the various challenges associated with health care delivery through the introduction of e-health. e-Health is the provision of health services via mobile technology. e-Health was defined as the delivery of health care using modern electronic ICT's when health care providers and patients are not directly in contact and their interaction is mediated by electronic means [4]. Some of the benefits of e-health includes time saving, insight into owns health, lower administrative burden, improved patient monitoring, more informed patients and encourages healthier habits [4]. There are different types of e-Health. They include electronic health records, telemedicine, consumer health informatics, health knowledge management, virtual healthcare teams, health care information system and mobile health system (mHealth).

A mobile health (mHealth) system is the mobile technologies to support health information and medical practices [5]. The term is most commonly used in reference to using mobile communication devices such as mobile phone, tablets computers, and PADs for health services and information [2]. It has the potential to fundamentally change how patients manage their own health [7]. m-Health can help prevent, slow the progression of, manage chronic disease and valuable in helping to lower health care costs [7]. mHealth systems have the ability to give control back to patients [13].

With mobile health system, each student can sit at their comfort zone and get diagnosed easily in a secured and confidential environment without being physically present in the clinic [10]. A large number of mobile communication technologies are being used by many tertiary institution students in different parts of Nigeria [6]. For student, also, m-Health would greatly improve accessibility to better health care, save time and assist these students in their health management [15]. This mobile communication technology along with the internet offers anytime and anywhere connectivity and play key role in modern health solutions [9]. Increase utilization of mobile communication devices by tertiary institution students has been observed in recent times. However, the inadequacy of health facilities to care for the increasing students' population in Nigerian tertiary institutions is an issue of serious concern to both school management and the government. Although health facilities are said to be provided to higher institutions in the form of school medical centers, most existing health centers in tertiary institution are not well equipped to meet the health challenges of their students. In addition, time spent in waiting to be attended to in the available health centers is alarming and such delays affect the ability of students to keep to their lecture schedule, makes them inattentive during lectures, encourage them to patronize quack drug shops, practice self-medication (drug abuse). These has lead to poor academic performance and development of long term illness among students. In studies of health care and health related lifestyles, young people are an under researched group and there are few survey on health of student at universities and other higher education institution [11]. Thus, it becomes imperative that increase attention be given to the use of electronic health app in the form of m-Health system to complement already existing healthcare centers in tertiary institutions.

2. OBJECTIVES

The primary objective of this research is to develop a preliminary mobile health system for students in tertiary institution. Other objectives are to:

a. Reduce time wasted in long queues
b. Ensure prompt treatment of sick students

1.2 Tertiary institution social health insurance program

TISHIP is another form of National Health Insurance Scheme (NHIS) designed primarily for students in tertiary institution. TISHIP was introduced to capture the health care of student in tertiary institutions with a view to creating conducive learning environment and uninterrupted academic activities due to poor health [8]. But according to the findings by [1], 56.3% of student have never benefitted from the scheme while 52.8% indicated dissatisfaction with the quality of health care offered by the scheme. From the above result, it can be deduced that many students have not benefitted from the programme either because they have no knowledge of the existence of TISHIP or because the facilities are not enough to cope with the population of student in tertiary institution. The researcher has also observed that such programme do not run in all tertiary institution, especially state owned institutions. One of the consequences is increase in the numbers of health challenges among students in tertiary institutions.

3. METHODOLOGY

For the purpose of this research the IF THEN rule was adopted. The waterfall model of software development life cycle (SDLC) [12] or software methodology was adopted as the software methodology [3]. Begin the simplest model for software development; it follows a sequential process when developing software or system. By this, it means that one phase has to be completed before moving to the phase. The phase involved in this model includes analysis, design, implementation testing, deployment and maintenance. The Programming language used was Html (Hypertext markup language) and CSS (cascading stylesheet). JavaScript was used to handle the interaction of the application with the student on the web browser. Php (Hyper Text Preprocessor) is the server-side programming language that runs on an Apache server and is integrated with a database administered by MySQL.

4. RESULTS AND DISCUSSIONS

For the developed m-Health system, it contains two interfaces: the student interface and the Admin interface. The student has to be an authentic user of the system before they can login unto the system. To be an authentic user, the student has to be registered (Signup) by the Admin of the system. After registration, the student clicks on the Sign in icon on the student interface (Figure 1). This opens the Sign in interface (Figure 2). Then, the username (email) and password as issued by the admin is entered and click on the Sign in icon below. This opens the student dash board (figure 3). In the student dash board, the student can take a diagnostic test, get result and logout when done. However, the Admin has the privilege of registering (Signup) more than one Admin. The advantage of registering more Admin is to easy the registration process due to large population.

The result of the system is shown in figure 1 to figure 5. Figure. Figure 1 is the Student interface. Figure 2 is Student Sign in. Figure 3 is the Student dash board. Figure 4 is the Admin interface. Figure 5 is the Admin dash board.

Student interface

This is the interface that appears when the m-Health system is lunched. On this interface is the Signup icon (for first time user) and the Login icon (for already registered user). Also on this interface is a caption "The mHealth Diagnostic System Developed

for Student and their Well Being". This is followed by the "Take A Test Now" icon and below it is some wellness quotes. When the Signup icon is clicked the Figure 1 below is since.

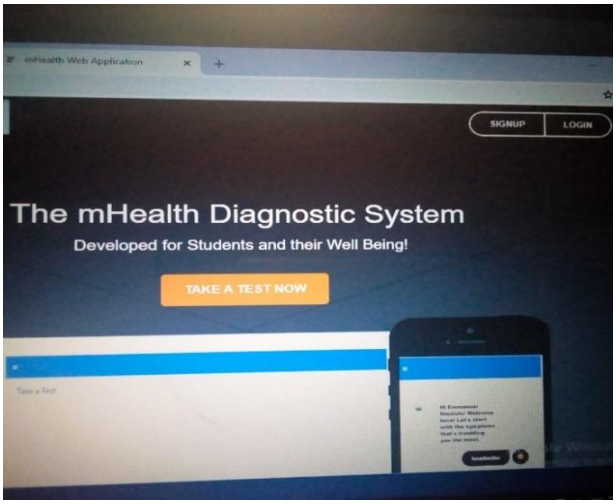

Fig-1: Student interface

Student Sign in

This is the interface that pops up after the student clicks on the signup icon as shown above with the credentials (email and password) provided by the Admin. Here, the system request for students' email and password and ask if the student wants the system to "remember" the credential for subsequent login. Then click on the sign in icon to display students sign in.

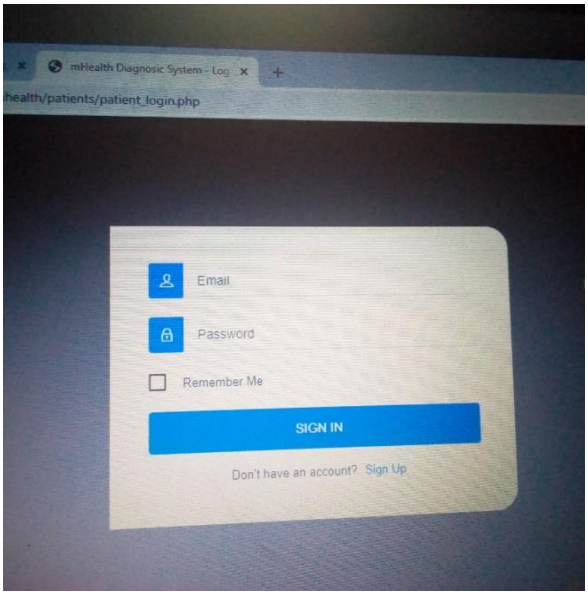

Fig-2: Student Sign in

Student Dashboard

This is the interface that is created automatically once a student successfully login to the m-Health system. After successful login, the student receives a warm well come (Hi, ada) and followed by the students' email (adaemaka100@gmail.com). The student dashboard consists of several navigation icons which includes, Appointment, Take Test, Medical History, Profile and a Logout icon, all positioned at the left hand side of the student dashboard. To the right are quick icons that represent Test taken, booked appointment and pending Appointment. Below this quick icon, the student is also able to view the "Patient over view" (a chart of the entire test taken by the student) and "Daily patient buttons" (explain).

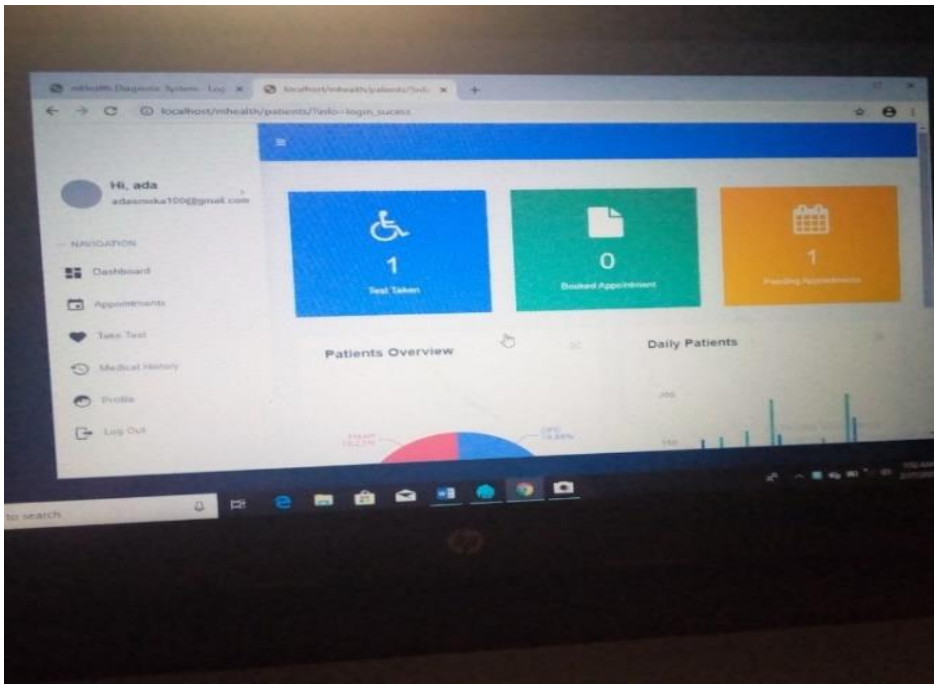

Fig-3: Student Dashboard

Admin interface

To login to the Admin interface, the URL on the browser has to be changed from localhost/mhealth to localhost/mhealth/admin, then click to lunch the Admin interface. This lunches the Admin interface.

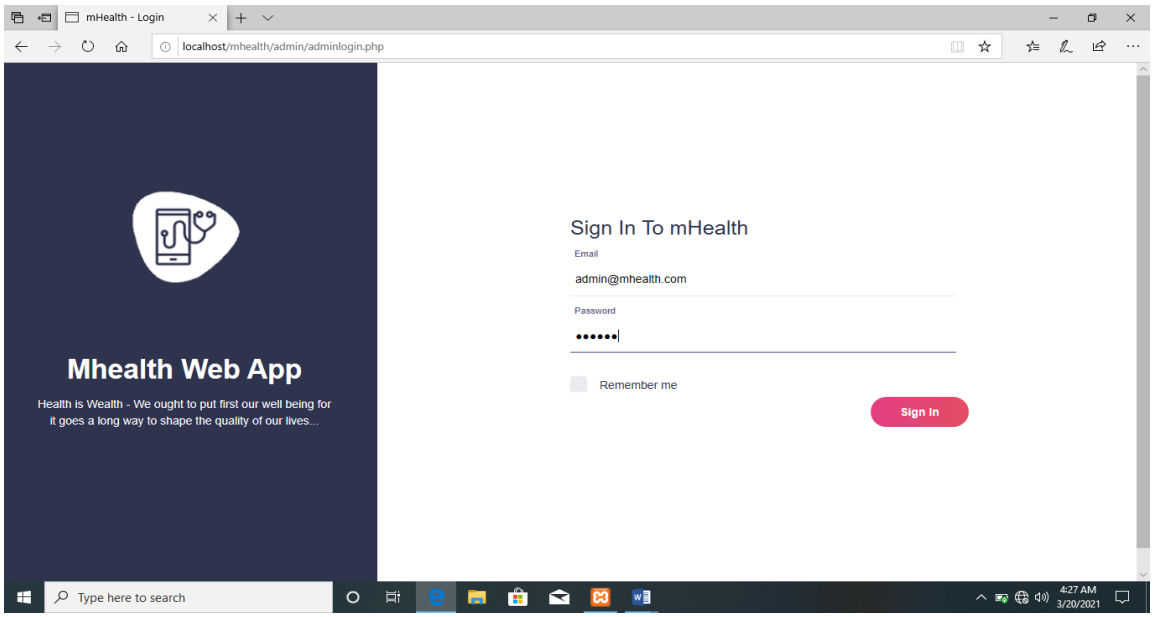

Fig-4: Admin interface

Admin dash board

After successful lunching of the Admin interface, the Admin enters the admin user name and password to login to the admin dash board. This is the most important interface of the system. It can also be referred to the operating system of the m-Health system.

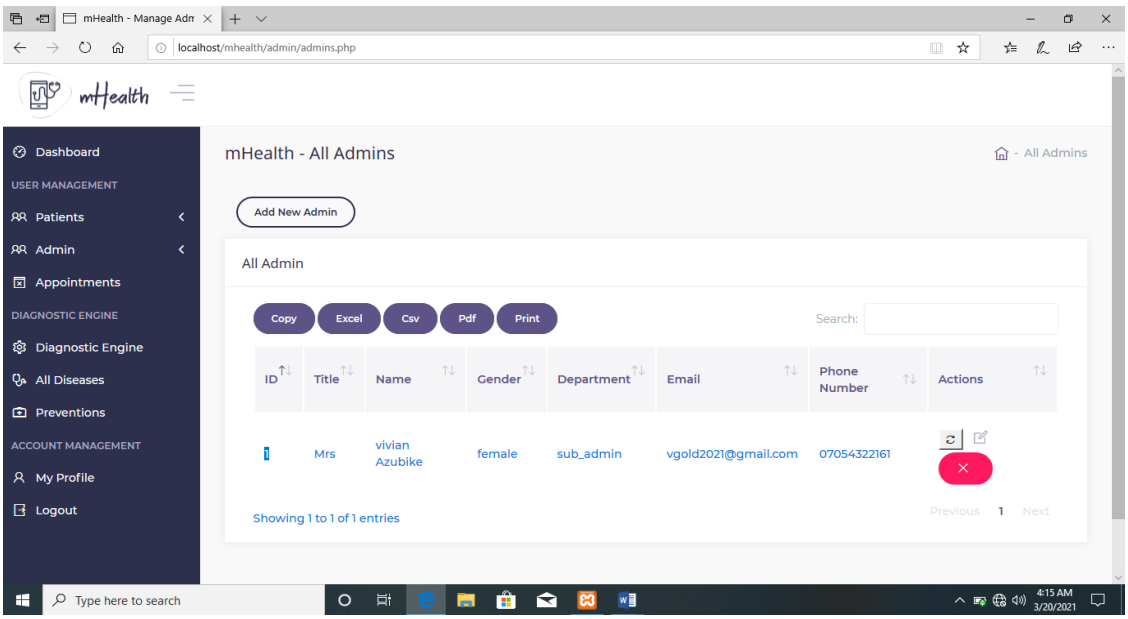

Fig-5: Admin dash board

5. CONCLUSION

The study concludes that mHealth system is the best option to complement the already exiting health intervention (centers) provided for students in tertiary institutions. mHealth is the creative use of emerging mobile technology to deliver and improve healthcare practices. Being a subset of e-Health, it integrates mobile technology (phone, laptops) with the premise of promoting a better health and improving efficiency in health care delivery. Statistics have revealed high usage of mobile technology among students in tertiary institutions, it could therefore serve as a solution to health related issues associated with students. Its major advantage is the availability during emergency health challenges, especially at no cost, meaning it is user

friendly, accessible and effective. Being web-based, it has the possibility to diagnose, proffer treatment, give health advice, book appointment and make updates to the database. It is evidence that when this system is used by students, long queues in clinics will be reduced. In the long run, some life-threatening problems will be eliminated and even death of students due to delay in treatments, will be a thing of the past. The study is of the view that mHealth system will promote health literacy of students, improve academic performance and produce a healthier population for greater development of the country.

6. COMPETING INTEREST

Authors have declared that no competing interest exit.

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