Journal of
Information Technology & Software Engineering

Design, Implementation and Evaluation of a Web-Based Physical Fitness Teleconsultation System

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Abstract

Emerging evidence has revealed the efficacy of teleconsultation model as a modern tool in healthcare and fitness establishments. This research entails the design of a web-based teleconsultation model, its implementation and system performance evaluation using Nest Hotel, Ogbomoso as a case study. The application was built using different developmental tools and imaging technologies such as Hypertext Markup Language (HTML), Cascading Style Sheets (CSS3), JAVASCRIPT, Pre hypertext processor (PHP), Asynchronous JavaScript (AJAX), My Structured Query Language (MySQL), and JQUERY. The system was structured into three modules namely user, administrator, and instructor modules. The implementation of this system involves the use of designed user-instructor model, for an appropriate physical fitness exercise guide. The user, instructor, and administrator were able to can log into the system and get the relevant information on appropriate physical fitness exercise, with a detailed previous record. In this model, user was able to extract details about their physical fitness condition (body weight, body fat, pregnancy state) in form of multimedia files. The developed fitness model, therefore, showed a remarkable improvement over the already existing system in term of cost-effectiveness, confidentiality, 24 h daily service and uninterrupted accessibility. This study, therefore, provided a cordial link between the physical fitness instructors and users, thereby making information readily available to the end-users.

Introduction

Teleconsultations empower health experts to conduct an outpatient consultation, diagnosis and potential treatment thereby improving the overall healthcare delivery system [1]. The emancipation of healthcare data in relation to exercise activity is rapidly evolving into the public domain. This has energized technology vendors, gym instructors, healthcare systems, start-ups, and researchers to develop new applications, tools, and products that can harness big gymnastic data to improve provider-level exercise decision-making [2]. This is so paramount in Africa bedevilled with the problem of inadequate equipment, unstable electricity, and limited bandwidths. On the other hand, advances in technological solutions, such as mobile apps, are expected to empower consumers to effectively interact, engage in shared exercise decision-making with providers, and access relevant information to manage their health better [3]. The introduction of a web-based application for physical fitness works in such way as to enable users to register, search and meet with the best instructors online. Intending users can book an appointment for training, use of machines at the gym centre, get counsel on dieting, and perform exercise through a virtual interface [4].

Many studies had been conducted on the use of teleconsultation in different workplace application such as in outpatient geriatrics Esterle and Mathieu-Fritzand empathic patient-doctor interaction [1,5]. Emily Collis reported the increasing number of demographic death from cancer, dementia and other terminal diseases across the United Kingdom [6]. This could be attributed to the lack of proper synergy between several health care agencies and the patients. Similar failure has been reported in other care and professional practice such the physical fitness providers which have seriously affected the quality access to client obtaining excellent fitness services. The use of a teleconsultation system, therefore, provided a solution to mitigating the inherent difficulties experienced by remote used at an affordable rate [7].

This study, therefore, provided an effective information flow and uninterrupted interaction between the fitness instructors and their client through the use of a web-based teleconsultation model developed into the user, administrator and instructor interface. The graphic user interface (GUI) will enable users to interact directly with physical fitness experts for information and advice via text message, email and video clips incorporated into the system.

Methodology

Description of system features

The teleconsultation system comprised of the user module, administrator module, and instructor module. In the user module applicant is allowed to register before login. A registered user can then view and edit profile, get instructors advice, view appointment schedule, view user's record and after then log out. Similarly, the instructor must also register and get approval from the administrator before login. He/she can thereafter view, edit profile, give advice to users, view user's details with previous records, and after then log out. However, the administrator in this module can view both user and instructor details/information, edit their information and prominently delete any if need be (Figure 1).

Development tools and design technologies

    a) Development of Structured Query Language (SQL): Structured

Query Language (SQL) is one of the most commonly used languages for accessing databases, which for many years has been in use by many database vendors. Many consider it as the best database language to use. It is used by the MySQL database feature inside a system's control panel. SQL as a language can be used to create, make changes, and retrieve data from a database with its commands. These commands can be issued through a Graphical User Interface or by embedding them in a computer program that is written. The MySQL Control Panel provided as part of an account, is a GUI that works over the internet through the web browser. This makes it very convenient for the administration of web-based database applications. Setting up and management of the database was carried out using MySQL Control Panel as shown in Figure 2.

b) Development of Pre Hypertext Processor (PHP): Pre Hypertext Processor (PHP) on the other hand is a server-side programming language with text page document which helps in creating a response
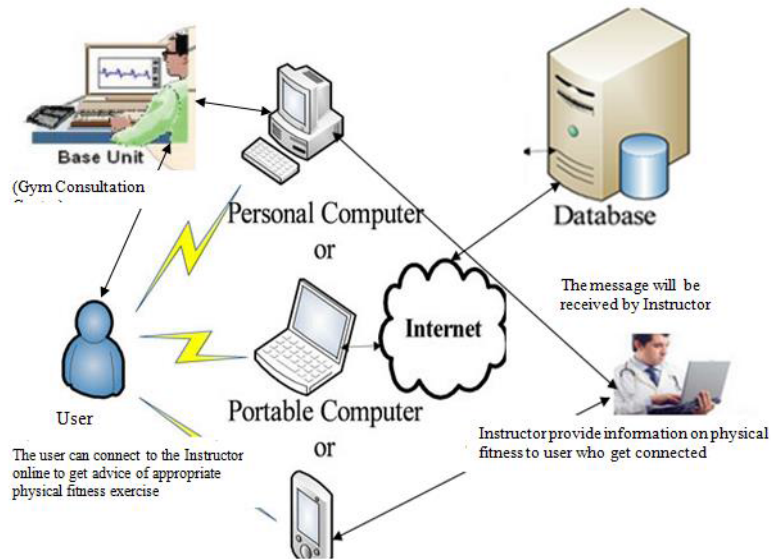

Figure 1: Illustrative chart of Teleconsultation between a User and an Instructor.
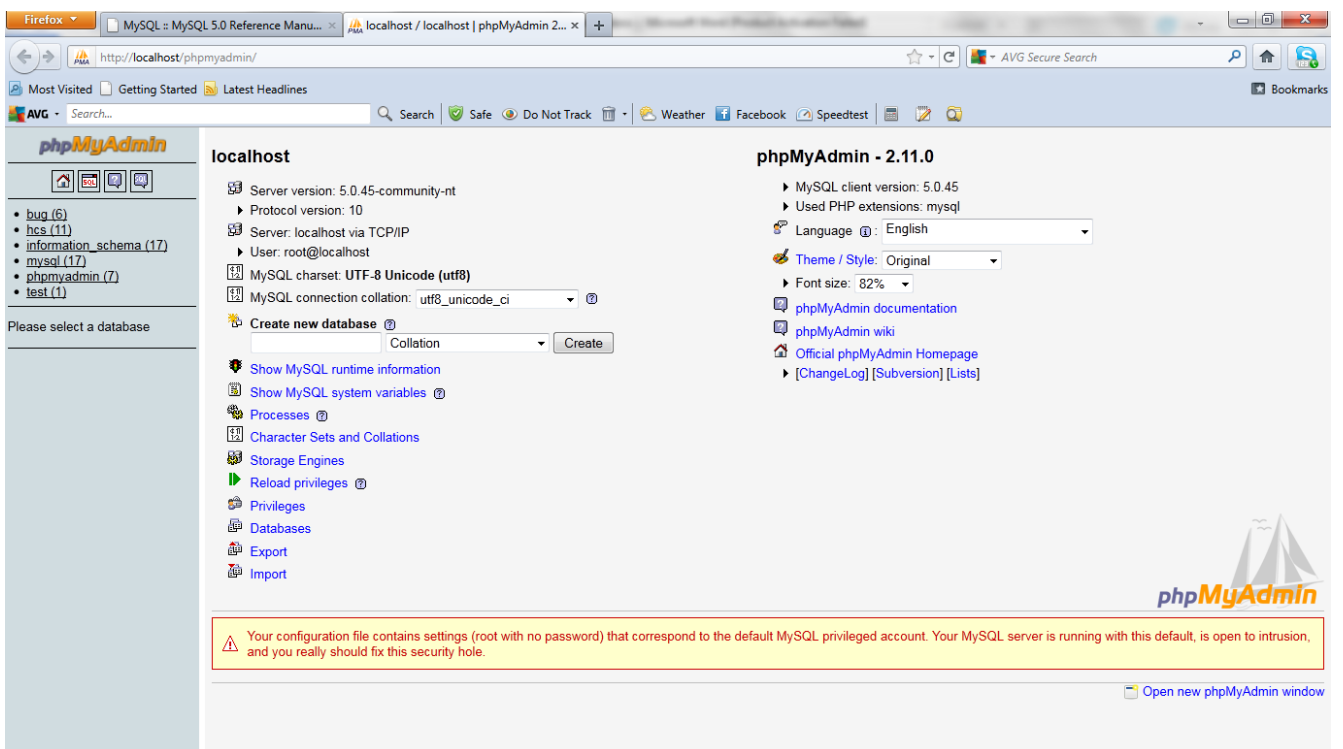

Figure 2: Interface showing how MySQL is been used.

to a process request. PHP simplifies the process of developing dynamic websites. The web development can be done quickly by incorporating dynamic elements into web pages using embedded the PHP tags and simple markup tags.

Result and Discussion

System implementation

The implementation of this system involves the use of designed user-instructor model, for an appropriate physical fitness exercise guide (Figure 3). With the aid of an online service, the user, instructor, and administrator can log-in into the system and get the relevant information on appropriate physical fitness exercise, with a detailed previous record. Users are able to send the details about their physical fitness condition (body weight, body fat, pregnancy state) in form of multimedia files. The instructor receives SMS or email alert on the user physical fitness via his/her mobile phone. The teleconsultation system can easily be accessed once the instructor gets to the workstation where relevant physical fitness advice can give to the user and the user adheres thereby enjoying the benefit of the system.
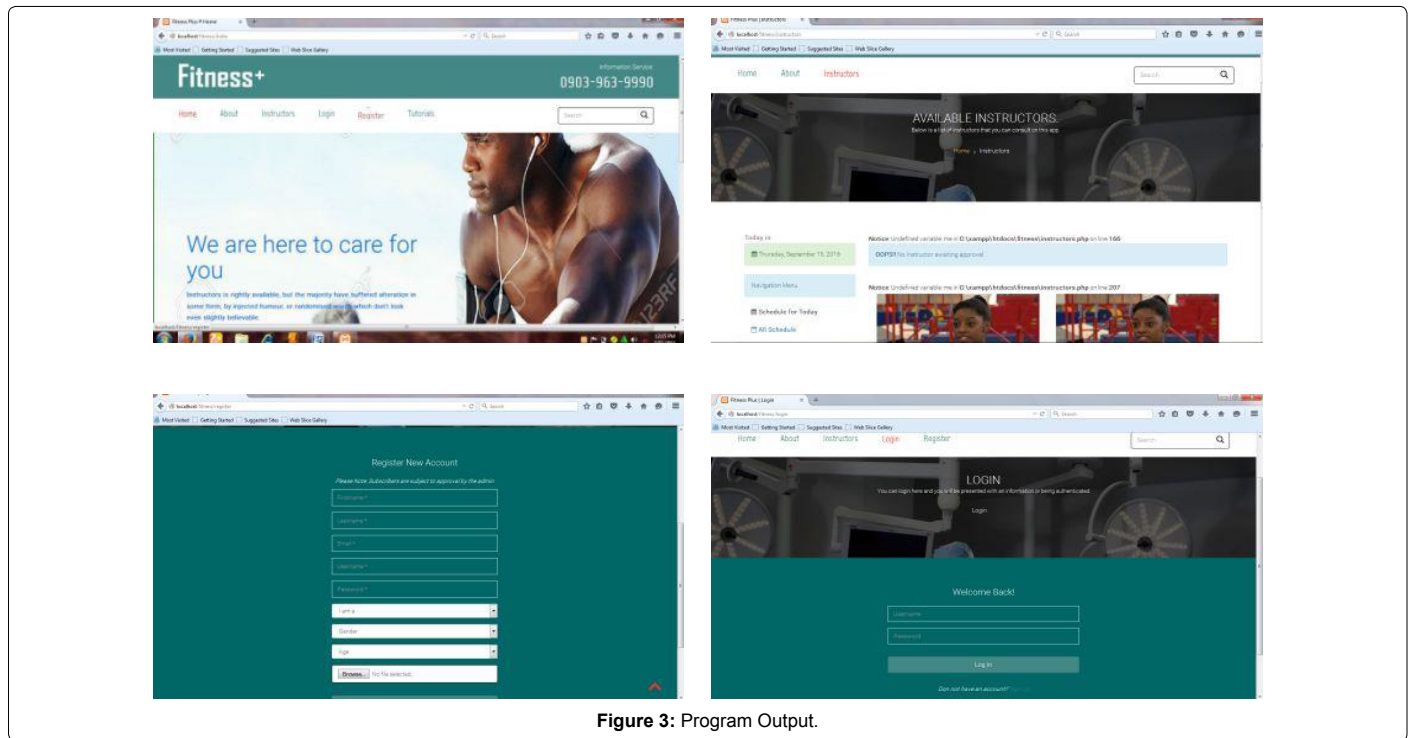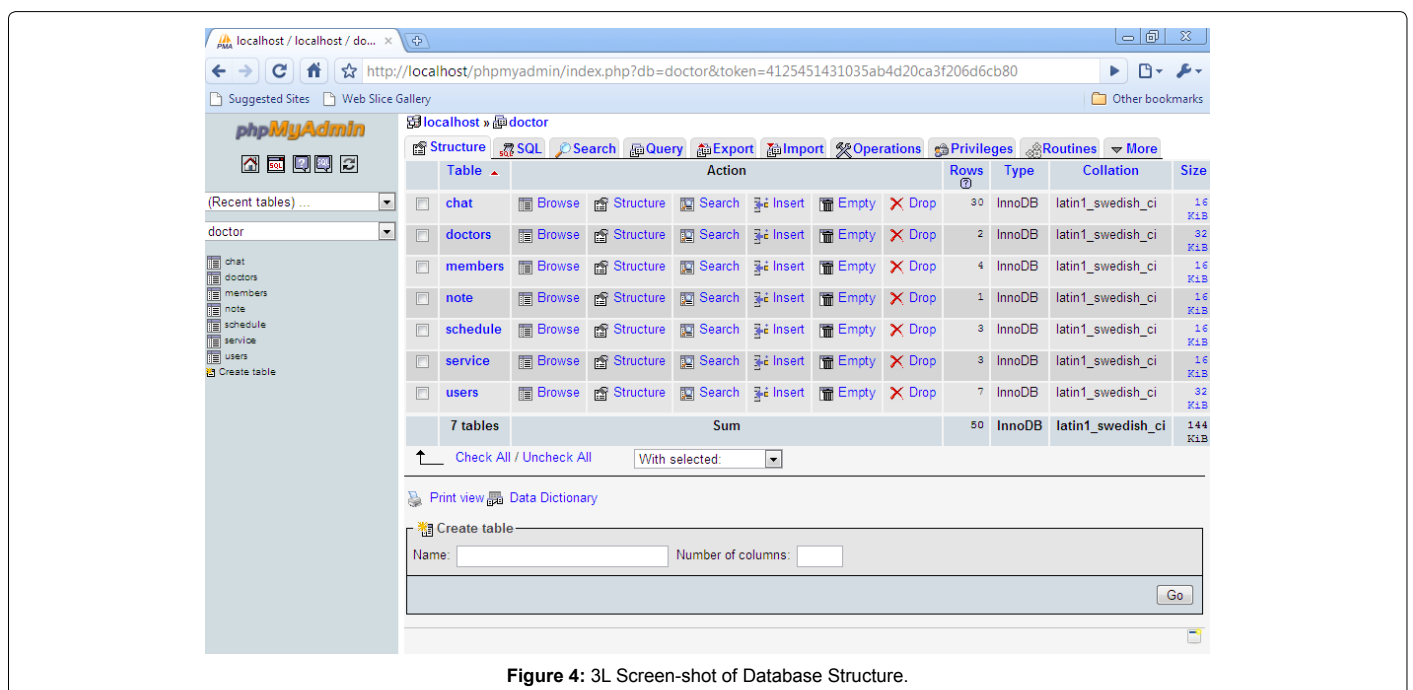

Figure 3: Program Output.

Figure 4: 3L Screen-shot of Database Structure.

Database design, documentation, and maintenance

The system is designed to be users friendly; in which new users can easily interact with the instructors through the application. New users will have to register their information on the platform before they will be able to have more access to the instructional materials and the in the database. The intending instructors must register and wait for the approval after proper screening from the administrator before they can function as instructors to the registered users. The admin will assign an instructor to the user based on the kind of exercise demanded. Also, the system is designed to document all the interactions between the instructors and the users. Other instructional materials are also available for the users online such as E-books, and video clips based on the type of exercise desired. On the maintenance aspect, all the information inside the database is ensured safe and secured. Updating the application is performed and properly done by the admin of the site. Figure 4 is the database structure that shows the tables where the users and instructors information is being kept.

Conclusion

Effective and timely communication between end-users and professional fitness instructors is vital for a good service delivery. This entails the provision of consultation services using technology over a geographic distance. With the current communication mechanisms which are based on paper records; the introduction of teleconsultation presents a potent replacement to the old-fashioned, inefficient, and unreliable existing method. In this study, a web-based teleconsultation model was designed, implemented and evaluated using Nest Hotel, Ogbomoso as a case study. Ddevelopmental and imaging technologies (HTML, CSS3, JAVASCRIPT, PHP, AJAX, MySQL, and JQUERY) were structured into three modules (user, instructor and administrative). The model developed provided an effective information flow and uninterrupted interaction between the fitness instructors and their client.

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