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INTERNET-BASED CLINICAL DECISION SUPPORT SYSTEM

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This report is submitted in partial fulfillment of the requirements for the Bachelor of Computer Science (Software Development)

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DECLARATION

I hereby declare that this project report entitled

INTERNET-BASED CLINICAL DECISION SUPPORT SYSTEM (ICDSS)

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT : ..... Date : 19/06/2008

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SUPERVISOR : ..... Date : 19/06/2008

(MADAM SITI AZIRAH BINTI ASMAI)

DEDICATION

To my beloved parents, Mr. Wan Azmy Bin Wan Ismail and Mrs. Noorina Binti Mohd. Ismail, who have been giving me fully support and motivation throughout my project.

To my supervisor, Madam Siti Azirah Binti Asmai, for making it all worthwhile. Thank you so much…

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ABSTRACT

The system developed for Projek Sarjana Muda (PSM) is entitled Internet-Based Clinical Decision Support System which is a web-based system that gives users the ability to examine the asthma symptom through the Decision Support System (DSS) function. As for the development tools, this system is developed with Appserv-win32-2.5.1 Package software which includes the MySQL 4.0.20a-nt running on localhost as the database and Apache HTTP Server 2.0 as the web server. This system applied PHP as the programming language and phpMyAdmin as the database interface. Plus, the development tool that is used to develop this system is Macromedia Dreamweaver 8. Meanwhile, the hardware used is one set of computer which includes Windows XP Professional Edition, 166 Megahertz Intel Pentium Processor, 256 MB DDR memory and 40 GB HDD hard disk. Hopefully, Internet-Based Clinical Decision Support System is capable to help users in improving their healthy.

ABSTRAK

Sistem yang dibangunkan untuk Projek Sarjana Muda (PSM) ini dikenali sebagai 'Internet-Based Clinical Decision Support System' di mana sistem ini merupakan sistem berasaskan web yang akan membolehkan pengguna untuk menganalisa tahap penyakit asma yang dihidapi dengan menggunakan fungsi 'Decision Support System'. Sistem ini dibangunkan dengan menggunakan perisian Appserv-win32-2.5.1 Package yang mana di dalamnya mengandungi MySQL 4.0.20a-nt berfungsi di localhost sebagai pangkalan data dan Apache HTTP Server 2.0 sebagai pelayan web. Sistem ini mengaplikasikan PHP sebagai bahasa pengaturcaraan dan phpMyAdmin sebagai antaramuka pangkalan data admin. Selain itu, Macromedia Deramweaver 8 turut digunakan dalam membangunkan sistem ini. Manakala antara alat perkakasan yang digunakan adalah satu set komputer yang mengandungi Windows XP Professional, prosessor Intel Pentium 166 Megahertz, memori DDR 256 MB dan cakera keras HDD 40 GB. Diharapkan, 'Internet-Based Clinical Decision Support System' ini akan dapat membantu pengguna terutamanya pesakit asma dalam membantu mereka menangani masalah asma yang lebih serius kepada tahap yang tidak membahayakan.

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CHAPTER I

INTRODUCTION

1.1 Project Background

Nowadays, there are increased demands on healthcare delivery systems. This rapid growth in scientific knowledge has made the practice of medicine increasingly complex. Despite the widespread publication of clinical standards and practice guidelines traditionally, physicians have had difficulty understanding and applying the guidelines in the clinical care setting. As a result, to have responded to this growing complexity is developing Internet-Based Clinical DSS (ICDSS). These practice guidelines to simplify and improve healthcare quality and delivery. It is clear that in addition to the development and content of clinical practice guidelines, dissemination and implementation strategies are critical to the impact the guidelines will have on physician behavior.

Both paper-based and computer-based decision support systems (DSS) have evolved to educate physician about practice standards and to improve guidelines impact on a case-specific basis. Many previously described computerized Clinical DSS were running on stand-alone and not available to most physicians (Thomas KW, Dayton CS and Peterson MW). While physicians have not yet widely embraced the Internet as a professional information source, they are nevertheless beginning to use it for clinical

information and education. Because of its open source, the Internet-Based Clinical DSS can be used to deliver information easily to computer networks anywhere in the world.

1.2 Problem Statements

The simulated field study involved recording subject to clinical decisions regarding diagnoses and treatment suggestion for a set of simulated cases. In this case, the quality of CDSS diagnostic suggestion list was unexamined. Many studies have demonstrated that traditional education including practice guidelines does not significantly alter physician behavior (Kolbe J, Vamos M, James F, 1999). This ineffectiveness may result from the fact that these modules fail to link the educational activity to the time and setting of the intended activity. DSS is a method to overcome this problem. DSS can act to remind physician of certain behavior at the most appropriate time and location needed.

This system will test the effectiveness of the Internet delivered guidelines compared to paper-based resources using clinical scenario testing. The manual system (paper-based) is actually high risk due to lack of security such as insecure data management and time constraint for processing data. While for computer-based Clinical DSS can change physician behavior and improve quality of care. In contrast to paper-based clinical support systems, computerized Clinical DSS can easily accommodate broad content and knowledge base that can be access using specific clinical information quickly and efficiently. The growth and availability of the Internet provides a new model for information sharing, increased medical knowledge and DSS function across existing computer networks.

The existing system almost was stand-alone and not widespread usable. It is limited due to only physician can manage the system perform on the specific task. Besides that, the medical knowledge stated in the system cannot be share between

physician and the information only be updated by the owner physician. The open source ICDSS available on the Internet allowed simplifying user interface within existing standards and thus ensuring widespread availability. To target the largest possible audience, this system used nationally developed and widely applied online clinical guidelines. Therefore, the system can able to restrict the focus of data synthesis and delivery to review information of the highest quality.

1.3 Objectives

The objective was to develop and test decision support systems (DSS) based on clinical guidelines that can be delivering over the Internet for the asthma symptom. The purposes of the system are:

1.3.1 Potential to improve decision making in health care

This system builds to test the effectiveness and accuracy on decision-making of asthma clinical scenarios such as diagnostic assistance. This Clinical DSS can function to educate and encourage sustained improvements in clinical judgment.

1.3.2 To improve physician behavior by sharing information

Any physician able to update and share their medical knowledge about asthma disease at 'Health Care Centre' module when register. Furthermore, physician can enter additional suggestion or recommendation in the system.

1.3.3 To help pharmacist make decision in medicine

Pharmacist can use this system to help them make decision in order to identify asthma medicine. They also can add list of asthma medicine in 'Medicine Item' module.

1.3.4 To supervise patient in handling asthma disease

They can view and request information about asthma disease including medicine item, diagnostic assistance, consultation via this online system from any location at time of need.

1.4 Scope

The scope of the Internet-Based Clinical Decision Support System (ICDSS) is to express diagnostic clinical problems in easy-to-understand terminology and associate these terms to coding system. The target users are physician, pharmacist and patient. The modules of the system include the following:

1.4.1 Login

Physician and pharmacist need to register before login to the system. They can update and share the information about asthma symptom such as recommendation of medicine item, asthma treatment and asthma consultation.

1.4.2 Diagnostic Assistance

Patients need to fulfill diagnostic input requirement in order to ask DSS function in making decision about asthma therapy and preventive. Besides that, user may have consultation suggestion according to their types of asthma.

1.4.3 Medicine Item

The module is design to provide medicine recommendation to the patient after entering a few medical data. It will determine the medicine required by patient based on their asthma type.

1.4.4 Health Care Centre

This module acts as medium for physician and pharmacist to update the information. Physician can make additional suggestion or recommendation in the system. Pharmacist can add list of asthma medicine.

1.5 Project Significance

Previous system (manual system) has shown that guidelines disseminated through traditional educational interventions have minimal impact on physician behavior. Although computerized Clinical DSS have been effective in altering physician behavior, many of the system are not widely available. This project is build to develop Internet-Based Clinical DSS on national guidelines and published them on the Internet. The system will improved physician compliance with national guidelines when tested in clinical scenarios. By providing information that is relevant to the suitable activity, the

expectation that this widely available DSS will serve as effective educational tools to give positive influence physician behavior. Furthermore, the main purpose of ICDSS will serve easier for clinician and patient to view clinical information. The Internet-based system adds security features that were not in place in the paper system.

1.6 Expected Output

The expected output will be a web-based application on Clinical DSS that gives benefit for healthcare user with user-friendly interfaces and easy instructions for patient to access and request decision maker. In the end of the proposed system, the outcome will show:

i. Guidelines-based DSS will be deliver via Internet enabled that user to be more accurately knows about an assessment or treatment plans in concordance with established guidelines.

ii. Physician can share and update asthma information about suggestion consultation to help patients care.

iii. Pharmacist can enter additional list of asthma medicine in order to standardize the medicine suitable for asthma symptom.

iv. The system will able to view the medicine recommendation to the patient after entering a few medical data.

1.7 Conclusion

This project background describes the introduction to the project as a whole. It includes the content of the project, target users and the importance of the project. The problem statements describe the problems related to reason of this project should be develop. From the problem statements, the objectives of the project can be extracting. One of the objectives is to develop an Internet-based application that demonstrates the use of the DSS element in delivering the guidelines. The scopes of the project explain the boundary and target users of the project. The needs and the content of this project are also cover in this topic. The project significance explains the output and the approach used in this project. The target of this project is to ensure that the decision making by computerized is achievable. Further research and evaluation studies are necessary to determine the ultimate value of such systems.

At the end of the project, all the objectives hope can be achieve and the application can be develop successfully. For the next chapter, the literature review will be covered and from that, some ideas will be generated for the next task.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

Literature review is about fact and information that can be used as the reference. It is to review the critical points of current knowledge based on medical information. The literature review provides references and supporting facts for the system to be developed. Its ultimate goal is to be up to date with current literature on the medical knowledge about asthma that will be used to form the basis for developing the Internet-Based Clinical Decision Support System for Asthma, such as the justification for future research in the online system.

The data for the reference are finding from the past research or sentence and the existing system that have been used today. The purpose of a literature review is to give overview to the reader about the project study with related information, sufficient evidence and the ideas that related with clinical DSS. Besides, the strengths and weaknesses will be identifying.

Methodology is a method or process of activities that has been used in developing the system. There are phases in developing the system and each step of this phase is shown by modeling it. Object-oriented (OOAD) methodology will be apply in