Designing an Appointment Management System for the Mother and Child Health Department of the Klinik Kesihatan Changlun

Alghamedi, Ahmad Ali A

UNIVERSITI UTARA MALAYSIA

2011
Designing an Appointment Management System for
the Mother and Child Health Department of the
Klinik Kesihatan Changlun

A project submitted to the Academic Dean of Awang Had Salleh Graduate School
of Arts and Sciences in Partial Fulfillment of the requirements for
the degree Master of Science
(Information and Communication Technology)
Universiti Utara Malaysia

By

Alghamedi, Ahmad Ali A

Copyright © 2011 Alghamedi, Ahmad. All rights reserved.
PERMISSION TO USE

In presenting this project in partial fulfillment of the requirement for a postgraduate degree from Universiti Utara Malaysia, I agree that the Universiti Library may make it freely available for inspection. I further agree that permission for copying of this report in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence by the Dean of Awang Had Salleh Graduate School of Arts and Sciences. It is understood that any copying or publishing or use of this or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of material from my report.

Requests for permission to copy or to make other use of materials in this report, in whole or in part, should be addressed to

Dean of Awang Had Salleh Graduate School of Arts and Sciences

UUM CAS

Universiti Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman

i
Abstract

Information and Communication Technology has been changing the way things have been carried out. Traditionally many work required people to visit the location where the work has been carried out. ICT has been making these services available at their fingertips by hosting these applications online. *Klinik Kesihatan Changlun* is a public general clinic in the state of Kedah. The appointment management which is one of the most important services of a clinic is presently carried out manually here. Both patients and the staff have to face a lot of problems due to the inefficiency of the manual system. If the system can be automated and made available on the internet, it will solve a lot of problems currently faced by them. This project proposes to design an appointment management system for the Mother and Child Health Department of the *Klinik Kesihatan Changlun*. The project has been proposed to follow the formal research methodology proposed by Kuchler and Vaishnavi due to its suitability for small to medium sized development projects. Finally it has been proposed conduct a usability test on the prototype developed for ease of use and user friendliness with the aid of the questionnaire.
ACKNOWLEDGMENTS

Praise to Allah for guidance and blessing for giving me the strength and perseverance to complete this project. I would foremost like to thank my parents and my wife, for providing me with the opportunity to pursue my goals and for their love and affection, which has helped me through the most trying times. Equal gratitude goes out to my siblings and brothers. I would like to thank my supervisor: Prof. Abd Ghani B Golamdin and Mr. Mustafa Alobaedy for their guidance and constant motivation that has enabled me to complete my project work. Moreover, I would also like to thank them for the opportunities that they made available to me.

ALGHAMEDI, AHMAD ALI
TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

1.1 Introduction 1
1.2 Problem Statement 3
1.3 Research Question 6
1.4 Research Objective 6
1.5 Research Scope 7
1.6 Research significance 7
1.7 Organization of the Thesis 8
1.8 Summary 9

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction 10
2.2 Quality of Service in Healthcare Services 12
2.3 Issue of Waiting Time 14
2.4 Impact of the Internet on Healthcare 18
2.5 Appointment Scheduling Systems 19
2.6 Related Work 21
2.6.1 DynaCares Clinic Management System 21
2.6.2 Total Clinic Automation Solution 23
2.6.3 Health on Click Hospital Management System 24
2.6.4 MediNous Hospital Management System 26
2.6.5 Profmax Healthcare ERP 27
2.6.6 FreshLogics Clinic Management System 29
2.6.7 MemDB Clinic Management System 30
2.7 Summary 34

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction 36
3.2 Research Design Methodology 37
  3.2.1 Awareness of Problem 37
  3.2.2 Suggestions 41
  3.2.3 Development 41
    3.2.3.1 Prototype Development 42
  3.2.4 Evaluation 43
  3.2.5 Conclusion 43
3.3 Summary 44

CHAPTER 4: SYSTM ANALYSIS AND DESIGN

4.1 Introduction 45
4.2 WBCS System Requirements 45
  4.2.1 WBCS Functional Requirements 45
  4.2.2 WBCS Non Functional Requirement 47
4.3 WBCS Modeling and System Design 48
  4.3.1 Use Case Diagram 48
  4.3.2 Use case specification 50
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Dynacrates Clinic Management System</td>
<td>22</td>
</tr>
<tr>
<td>2.2</td>
<td>T-CAS Clinic Management System</td>
<td>23</td>
</tr>
<tr>
<td>2.3</td>
<td>Module Structure of the Health on Click HMS</td>
<td>25</td>
</tr>
<tr>
<td>2.4</td>
<td>Group User Manager of the MediNous HMS</td>
<td>26</td>
</tr>
<tr>
<td>2.5</td>
<td>Architecture of Profmax Healthcare ERP</td>
<td>28</td>
</tr>
<tr>
<td>2.6</td>
<td>Reception Module of the FreshLogics Clinic Management System</td>
<td>29</td>
</tr>
<tr>
<td>2.7</td>
<td>Main Interface of the MemDB Clinic Management System</td>
<td>30</td>
</tr>
<tr>
<td>3.1</td>
<td>Major Phases in Design Cycle</td>
<td>37</td>
</tr>
<tr>
<td>3.2</td>
<td>Main Steps in Prototyping</td>
<td>42</td>
</tr>
<tr>
<td>4.1</td>
<td>Symbols used to Represent Actors and Uses Cases in UML</td>
<td>49</td>
</tr>
<tr>
<td>4.2</td>
<td>WBCS Use Case Diagram</td>
<td>50</td>
</tr>
<tr>
<td>4.3</td>
<td>Log in Sequence Diagram</td>
<td>56</td>
</tr>
<tr>
<td>4.4</td>
<td>Log in Collaboration Diagram</td>
<td>57</td>
</tr>
<tr>
<td>4.5</td>
<td>View info clinic Sequence Diagram</td>
<td>57</td>
</tr>
<tr>
<td>4.6</td>
<td>View info clinic Collaboration Diagram</td>
<td>58</td>
</tr>
<tr>
<td>4.7</td>
<td>New Patient  Sequence Diagram</td>
<td>58</td>
</tr>
<tr>
<td>4.8</td>
<td>New Patient Register Collaboration Diagram</td>
<td>61</td>
</tr>
<tr>
<td>4.9</td>
<td>Make Appointment Sequence Diagram</td>
<td>62</td>
</tr>
<tr>
<td>4.10</td>
<td>Make Appointment Collaboration Diagram</td>
<td>63</td>
</tr>
<tr>
<td>4.11</td>
<td>Manage Patient profile Sequence Diagram</td>
<td>6</td>
</tr>
<tr>
<td>4.12</td>
<td>Manage Patient profile Collaboration Diagram</td>
<td>6</td>
</tr>
</tbody>
</table>
Figure 4.13: WBCS Class Diagram 65
Figure 4.14: WBCS Home Page 66
Figure 4.15: View clinic information of WBCS 67
Figure 4.16: Register page in WBCS 68
Figure 4.17: WBCS Login Page 69
Figure 4.18: manage patient profile of WBCS 70
Figure 5.1: Respondent Demographic 73
LIST OF TABLES

Table 2.1: Summary of Clinic Management Systems Discussed

Table 4.1: List of Functional Requirements 46
Table 4.2: List of Non-Functional Requirements 47
Table 4.3: Perform Log in Use Case Specification 51
Table 4.4: Register Patient Use Case Specification 52
Table 4.5: Make appointment Use Case Specification 53
Table 4.6: View Clinic Information Use Case Specification 54
Table 4.7: Manage Patient File Use Case Specification 55
Table 5.1: Demographic Data 72
Table 5.2: Analysis of the Items 74
CHAPTER 1

INTRODUCTION

1.1 Introduction

With the development of Information and Communication Technologies (ICT), more and more online services are becoming popular. These online services provide the users with the flexibility of getting their work done without leaving the comfort of their living rooms. Traditionally these services required the people to travel to the place where the services were provided.

*Klinik Kesihatan Changlun* is a community health clinic under the Ministry of Health that serves the people in the area around the city of Changlun. The clinic is of moderate size with two departments namely the Outpatient Department and the Mother and Child Health Department. The Outpatient Department provides general clinical services and the Mother and Child Health Department is a specialized unit providing antenatal and postnatal care for mothers and pediatric care to children up to the age of six years. The Mother and Child Health Department is staffed by 15 healthcare professionals comprising one specialist, one general physician, seven staff nurses and six community nurses. All the services are of outpatient type as the clinic does not have facilities to admit patients for inpatient care. The clinic is equipped with basic laboratory facilities to carry out urine test, blood pressure, weight and height measurements and physical examination of pregnant mothers.
The contents of the thesis is for internal user only
References


