RESEARCH ALLOCATION MANAGEMENT SYSTEM (REALMS)

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ABSTRACT

Research Allocation Management System (REALMS) is a dynamic web-based research management system. It is developed to assist the administrative staffs, research coordinator and research members of the Faculty of Computer Science and Information Technology (FCSIT) in managing and facilitating the research project information available in the faculty. Besides that, the web-based application will also assist research coordinator and research members in obtaining the right information easily and effectively. REALMS is developed using Hypertext Pre-Processing language (PHP), JavaScript, Cascading Style Sheet (CSS) and Hypertext Mark-up Language (HTML). The system is run using the Open Source APACHE web server together with MySQL database.

ABSTRAK

Research Allocation Management System (REALMS) atau Sistem Pengurusan Penyelidikan merupakan sebuah sistem pengurusan dinamik yang berorentasikan web. Ia dibangunkan untuk membantu kakitangan administrasi, kordinator penyelidikan and ahli-ahli penyelidik Fakulti Sains Komputer and Teknologi Maklumat (FSKTM) dalam mengurus dan mengendalikan maklumat penyelidikan projek yand ada di fakulti. Selain itu, aplikasi berasaskan web ini juga akan membantu kordinator penyelidikan dan ahli-ahli penyelidik dalam memperolehi maklumat yand betul dengan cepat dan berkesan. Halaman web sistem ini telah dibina menggunakan Hypertext Pre-Processing language (PHP), JavaScript, Cascading Style Sheet (CSS) and Hypertext Mark-up Language (HTML). Server web dan server pangkalan data yang digunakan dalam sistem ini adalah Server web APACHE dan pangkalan data MySQL.

CHAPTER 1: BACKGROUND

1.1. Introduction

The Faculty of Computer Science and Information Technology (FCSIT) is involved in various of ground-breaking research projects with goals to achieve a quality and world-class researches in technological innovations and developments. These researches initiatives further highlight FCSIT and University Malaysia Sarawak (UNIMAS) as a centre of research which focuses on the research and development (R&D) in the areas of computer science and information technologies.

FCSIT has three Core Research Groups that facilitate the R&D of Information and Communication Technology (ICT). These Core Groups are:

i. Knowledge System

ii. Geographical Information System (GIS) and Image Processing

iii. Information Infrastructure

The Core Groups serve as a niche area of FCSIT which reflects the research strengths of each faculty members. Each Core Groups is consisted of several Clusters of research programs which are then further divided into individual research Projects. All of these projects are conducted by the staff members and research assistants according to their research strengths and niche areas.

The faculty's research works are divided into two types of research categories which are the Fundamental Research and Intensification of Research in Priority Areas (IRPA). The

Fundamental Research is a short term projects with most of its funding provided by UNIMAS short term grants. IRPA on the other hand is the long term research projects that are associated with research programs under IRPA mechanism provided by the Ministry of Science, Technology and The Environment (MOSTE) (Ministry of Science, Technology and Innovation, 2005).

The REALMS was proposed to provide the faculty with a proper channel to manage its vast and growing numbers of research projects and its funding information in an efficient and timely manner. The proposed system is a web-based application that will assists research coordinators and research members in obtaining the right information easily and effectively.

The main features of REALMS are mainly the dynamic research project registration where all the crucial information such as the project description and the funding information are registered; search engines to help users finding the research projects among the different research Core groups and Clusters without any difficulties, and also reporting capability that highlights the R&D progress and research projects outline.

1.2. Problem Statement

There is currently no research management system available in FCSIT to keep track all of the research information and its funding. UNIMAS main website and the FCSIT Intranet only provides certain research projects information without any features to register new research projects or to search for certain research projects effectively. Most of the

research information is being filed manually by the administrative staffs using ordinary word processor or spreadsheets.

Besides that, the research information is vast and difficult to organise due to the diversity of existing relationships among the research Core Groups and Clusters involved when organising the research projects information. Registering and entering the new project information requires tedious user input and redundant effort, hence reducing the efficiency and the effectiveness of the administrative productivity.

The lack of a proper system to manage all the information also hinders research coordinators, research members or administrative staffs from getting the required information in a timely and orderly manner. In some of the cases, researchers are required to request the documents from the administrative staffs beforehand before the information is made available to them.

Research coordinators are also faced with a daunting task of producing ad-hoc reports of the R&D progress and projects' outline for the reason that all of the information has to be compiled manually every time a report is requested. Currently, most of the progress and outline reports are generated by spreadsheets using the information compiled and summarized manually by the administrative staffs.

1.3. Objectives

The main purpose of the web-based REALMS is to provide a convenient and timely access, as well as the organization of the faculty's researches information and their current progress to researchers and administrative staffs anytime and anywhere via the World Wide Web.

The objectives of REALMS are:

i. To design and develop a dynamic research management system that is easy to maintain and cost effective.

ii. To assist administrative users in maintaining, categorising and managing the research projects and funds in an economic and efficient manner.

iii. To enhance the Management Information System in providing timely information to researchers, research progress and funding opportunities.

iv. To reduce redundant efforts in compiling the information for report generation purpose.

v. To enable effective sharing of research information among fellow researchers of FCSIT over the intranet in a secure manner

vi. To assist users in searching for the desired research project information

vii. To develop a robust system for monitoring the progress of research project.

1.4. Scope of Project

Currently REALMS is focusing only to the needs of the researchers and administrative staffs from FCSIT. Therefore all of the research information and contents included in this project are only from FCSIT.

The functions of the web-based REALMS are mainly to register, store and provide research information in an effective and efficient manner using the current technology available.

The main users of the system will be focused on the researchers and administrative staffs only. Since that this system only caters for higher access users, the users are given the rights and authority to store, view, delete or make changes to the information available. They too have an unlimited access to the content of REALMS database.

REALMS project search function is provided to enable users to search for related research projects and funding information carried out by the research members of FCSIT according to the research Core Group, Cluster and Projects or researcher's name.

In the future, more functionality could well be included to enhance the existing REALMS. Functions such as publishing research papers and research findings could improve the functionalities of the current system. The future system could also be improved to cater for other users such as the postgraduate students whom will be undertaking some research topics related to the research Core Group and Cluster as part

of their academic requirements, and also to cater the needs of other users from other faculties in UNIMAS.

1.5. Expected Outcome

The expected outcome of this project will be a working prototype of the web-based REALMS. The system is focused on providing good and convenient solutions for the content management of the research projects collections, reporting and searching capabilities for the required information. Besides that, it will also provide an accurate and timely access to the information that is useful for doing research work and monitoring research progress.

1.6. Significance of Research

The significant of this research is to provide solutions to the problems encountered by the researchers and administrative staffs while registering and searching for research information.

The web-based REALMS will benefit the faculty administration level and its fellow researchers in the aspect of efficient and effective research information management, increasing availability of research opportunities and cost of handling and streamlining the projects contents and information.

In addition, it will also establish well-organised research project information storage and consistent methods of report generation through the dynamic system.

1.7. Project Plan

The estimated duration of this project is about eleven months. The initial start of the project planning is dated on the 29th March 2004 until the project closure estimated around the 18th February 2005. The project is broken into phases and deliverables so that each task can be estimated accurately and carried out efficiently. Refer to **Appendix A** for the project schedule.

CHAPTER 2: METHODOLOGY

2.1 Introduction

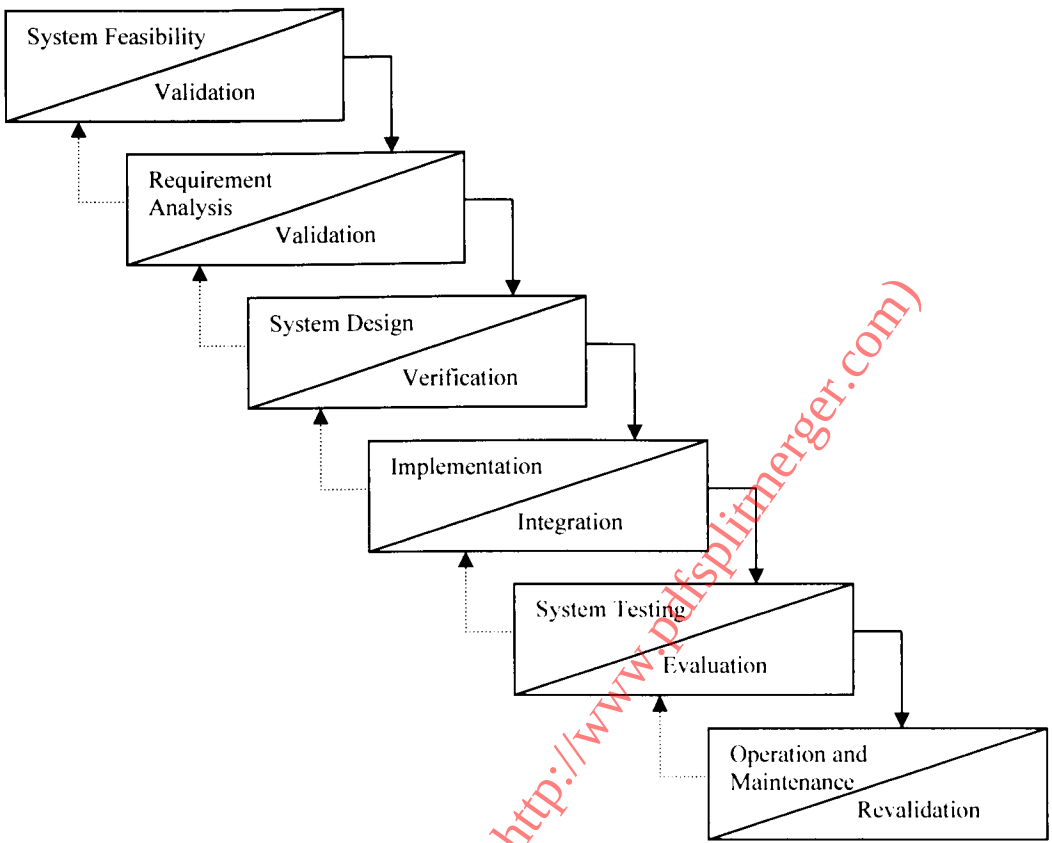

Figure 2.1 Waterfall Model Adapted from Barry W. Boehm

The methodology that will be used throughout the development of the project is the Waterfall model. The Waterfall model is a cascading of activities from one phase to another in a logic sequence (Sommervile, 2000). The life cycle of the Waterfall model is similar to the System Development Life Cycles (SDLC) that consists of phases like planning, analysis, design, implementation and maintenance. However, the phases in the

Waterfall approach are furthered revised and refined in which following activities are as illustrated in Figure 2.1 above.

The Waterfall approach is chosen for the Research Allocation Management System (REALMS) because it is not just a linear model, but it also involves a sequence of iterative activities in the project development. The approach is suitable for developing the medium size REALMS project because it provides a solid structure that can minimize wasted effort (Marchewka, 2001).

2.2 Phase 1: System Feasibility

System feasibility involves in identifying the project goals, the system contribution and its overall objectives to assess whether or not the system is worth carrying on. The REALMS feasibility outcome was previously discussed in the Chapter 1 Introduction. This phase also includes defining user requirements to identify the functionalities that will be desired in the system. The methods that are used to identify the user requirements are:

- Interview sessions with the users and potential users of the system.
- Reviewing existing system functionalities and its operating environment that is related or similar to REALMS.

2.3 Phase 2: System Requirement Analysis

The phase involves in identifying the system requirement and technological requirements that will be needed for REALMS. The information gathered during the system feasibility

phase is then analyzed to refine the system goals into well-defined functions and operations of the intended application.

During this phase, the system requirements are analyzed and determined based on the information gathered during the literature reviews and comparison of the existing Research Management System (RMS).

The system developer interacts with the system end-users such as the lecturers and faculty staffs to find out about the:

- Application domain in terms of understanding the processes and procedures of managing the faculty's research projects and its funding information.
- Functionalities and services that end-users would like to use in REALMS such as report generating functions and online search and browse functions.
- The required performance of REALMS and,
- The hardware and software constrain.

The logical and physical views of this phase are conceptualized by developing the logical and physical Data Flow Diagram (DFD) of how the data move from one process to another and the what the outputs are (Kelly, 2000). The attributes in the DFDs are then clarified through the data flow descriptions and data stores of REALMS.

2.4 Phase 3: System Design

The design phase describes the architectural, navigational and user interface designs which includes screen layouts, business rules, process diagram, and other documentations.

2.4.1 Data Modelling and Database Design

Database development focuses on the database designing of the REALMS which includes modelling the system Entity Relationship Diagram (ERD) to give the system designer with a better view and concept of how the real business process of managing the research project information is being done. The process of data normalizations and defining data dictionary are also carried out during this development stage.

2.4.2 User Interface

The development of the web page structure focuses on the usability of the REALMS website by providing a consistent formatting of the site's page layout and the order of the site navigation. A systematic site navigation and consistent page layout minimize the user's confusion when they are exploring the web pages.

Page designs and colour schema are also important in improving the usability and appearance of REALMS website. A good page design allows users to navigate through the contents of the web pages easily. Colours used in the website are