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Knowledge Management in Web Communication Technologies

A thesis presented in partial fulfilment of the requirements for the degree of

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Abstract

In the tertiary educational area, the web communication technologies have been used for a long time for communication among students and teachers. The discussion forum system is one important type of web communication tools. This thesis suggests an advanced category of web-based discussion forum system to enhance the ability of knowledge management in the tertiary educational area. In this project, a prototype web-based discussion forum system is developed that not only contains the benefits of the traditional web communication tools, but also overcomes various shortcomings of current discussion system systems by using various technologies such as keyword search methodology, concept-based search methodology, interactive query expansion technology, and concept map methodology.

This project provides a solution which students can effectively and efficiently capture, retrieve, and share useful knowledge and relevant information in a web-based discussion forum.

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**Yours truly,
Jingyu Yang**

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Chapter 1 Introduction

1.1 Introduction

The aim of this thesis is to design and implement an advanced type of web-based discussion forum system, where students can communicate with each other and with teachers by using web communication technology. The system aims to overcome the limitations of the traditional discussion forum systems, and harnesses the power of knowledge management.

In the next sections of this chapter, the limitations of current discussion forum systems are analyzed. Then the objectives and methodology of this project are presented. Finally the outline of this thesis is introduced.

1.2 The Problems of the Traditional Discussion Forum Systems

As one of the web communication tools, a discussion forum (known also by various other names such as discussion group, discussion board, message board, and online forum) is an asynchronous communication module. It works much like a bulletin board, users post messages that can then be read and responded to by other users (Glossary Website, 2004). Although the web-based discussion forums are used in a range of undergraduate and graduate courses in many universities, some limitations exist in the traditional web-based discussion forum systems. These limitations are described below:

- **Too many messages in inappropriate topic folders** – In traditional discussion forum systems, students typically leave their message in inappropriate topic folders. This generally happens because while entering into a topic folder, many students are not concerned with the fact that different categories of messages should be left in different topic folders. In many cases students leave all of their messages and questions in the same topic folder for convenience, such as a query about “Java Programming” left in a “PHP

programming” topic folder. This approach makes it very difficult for other students and for teachers to find relevant information in appropriate topic folders, and forces teachers to spend more time and effort in managing the system.

- **Too many similar messages and queries in a topic folder** - Traditional discussion forum systems also suffer from duplicate messages and queries in topic folders. In particular when the number of messages is high in a particular folder, and if many of them are duplicate or not related to that particular topic, it becomes overwhelming for students to read all those messages. Students do not find enough time and patience to read all those messages to analyse if their own query has already been answered earlier. They just leave a message or query there, increasing again the duplication. It is possible that a similar query or message had already been posted by someone else in that same topic folder. It is more difficult for students to capture and retrieve relevant knowledge and useful information in such a scenario. Moreover, the teachers end up responding to duplicate queries more than once and spending more time and effort on managing the discussion forum.
- **Too many topic folders or not enough topic folders in the discussion forum** - In traditional discussion forum systems, if students are allowed to create their own topic folders, it is possible that many students will create either similar topic folders or separate (unnecessary) folders for most of their messages, contributing to an unmanageable situation. However, if students are not allowed to create topic folders, it is possible that students will not find any of the existing folders appropriate for their queries and therefore they will either hesitate to post or leave their messages in wrong topic folders.
- **Work overload for teachers to manage the discussion forum** - In traditional discussion forum systems, teachers typically end up managing too many unnecessary topic folders and duplicate messages. Sometimes they have to answer similar queries more than once because the student who asked at later stage would be expecting an answer.

1.3 The Objectives of the Project

This project aims to find a new solution to overcome various drawbacks of the traditional discussion forum systems. A new type of web-based discussion forum system has been developed that aims to harness the benefits of knowledge management in the educational area. The objectives of this project are described as follows:

- To allow students to easily create their own topic folders and teachers to easily manage them.
- To prevent students from leaving a message in an inappropriate topic folder by the system identifying whether the message belongs to that particular topic folder or not.
- To allow students to easily find relevant information before they post a duplicate message.
- To allow students to easily retrieve and share relevant and useful information despite a large amount of messages in the discussion forum.
- To allow students to easily find the relevant information among different topic folders.
- To ensure teachers are not overloaded with the heavy burden of managing a messy discussion forum.

1.4 The Methodology of the Project

In order to achieve above objectives, various methodologies and technologies are used:

- The discussion forum technology.
- The knowledge base methodology.
- The search engine technology.
- The keyword search methodology.
- The concept-based search methodology.
- The query expansion technology.
- The concept map methodology.

1.5 The Outline of the Project

This thesis describes the rationale behind the development of the suggested web-based discussion forum system, the methodologies and the technologies used in the project, the outcomes and the way forward. The outline of the thesis is shown in Figure 1-1.

The thesis is largely divided into three sections:

- The first section presents the existing research in the field, which includes two chapters (chapters 1 and 2) – introduction and literature review.
- The second section discusses the system design and implementation, which includes chapters 3 and 4 – system architecture and technology, and system design and implementation.
- The third and final section is the project results, which includes chapters 5 and 6 – evaluation, discussion, conclusion and future work.

The next chapter will introduce the concept and theories of knowledge management, knowledge management systems, and the methodologies and technologies used for knowledge management.

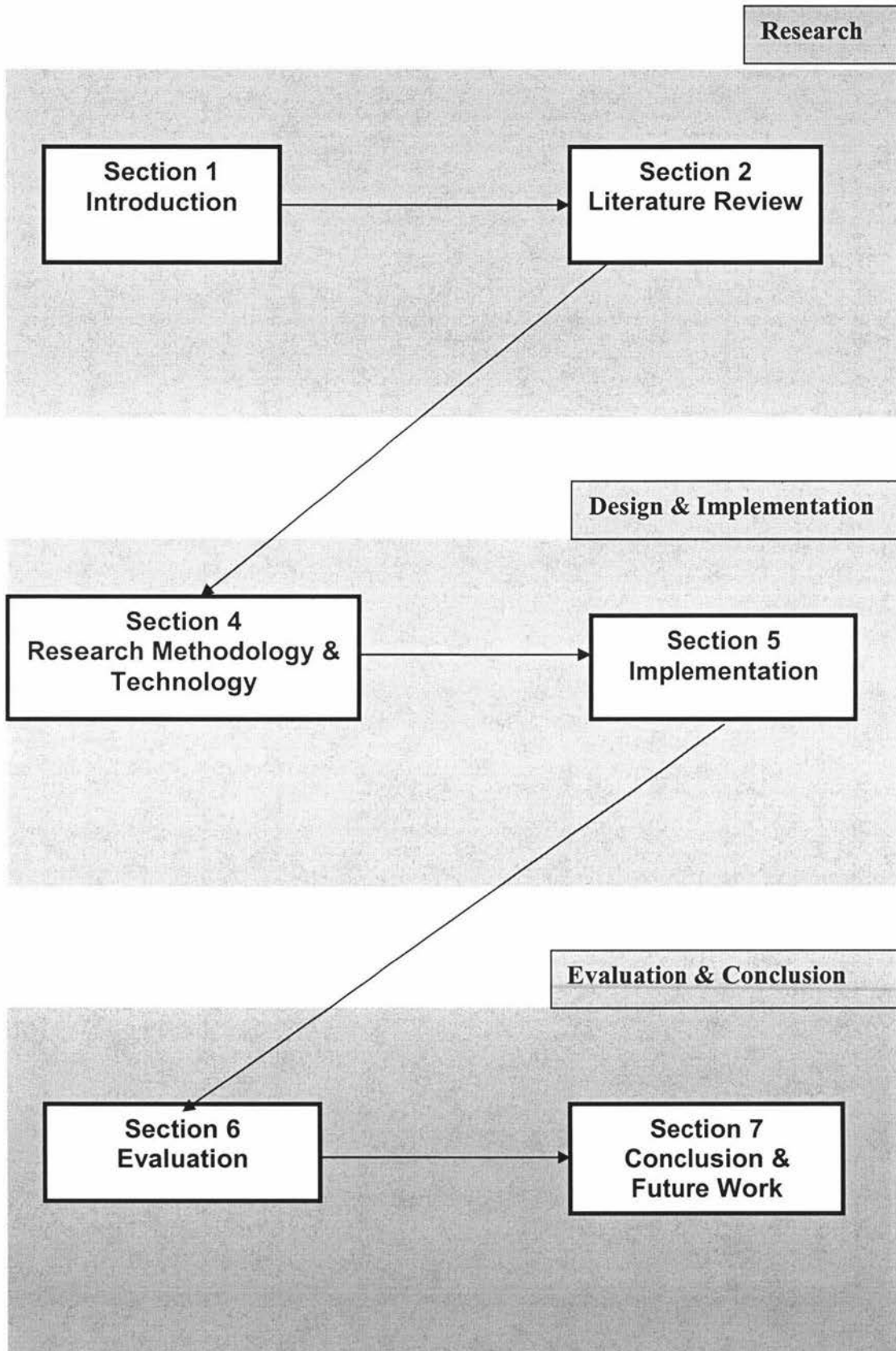


Figure 1-1: Outline of the thesis