

# Chapter 14

## Minimizing Cultural Differences Using Ontology-Based Information Retrieval System

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### ABSTRACT

*Effective global information access is more critical now than ever before. The digital world where users have diverse languages and diverse cultural backgrounds is increasing more rapidly than at any other time in history. This chapter addresses the cause of ineffective international information access from the standpoint of the user as well as from an information and system perspectives. The chapter also describes the traditional and emerging approaches to enhancing global information access and proposes a system that shows how emerging approaches can minimize cultural differences.*

### INTRODUCTION

According to the Ethnologue organization, there are 6,809 distinct languages in the world (Anderson, 2004). Although many Internet users speak English as a native or as their second language, a recent study shows that only 27.6% of individuals use English when online (Internet World Stats, 2009). This factor is significant. Not only do lan-

guage differences inhibit the ability to search, but individual differences can also make information searching ineffective and inefficient.

When it comes to searching for information, everyone uses different words (or, at least different symbols). Each individual, moreover, has a unique conceptualization of ideas and uses different terms when he or she searches for information. Therefore, everyone searches and interprets information differently. Kelly (1955) asserts that each individual constructs his or her own con-

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cepts – a process Kelly calls Personal Construct Theory. The central idea is that everyone has different concepts that are created by variations associated with each person's particular culture (Taylor, 2004). Park's (2004) study supports this idea as he demonstrates cultural differences affect learners' searching for, analysis of, and use of information – particularly in a technology-based learning environment. Park's study shows that East Asians' information retrieval is based on relationships such as associative relationships, while European Westerners' information retrieval is based on categories such as classification.

A number of more recent studies have been conducted on similar aspects of online information seeking behavior. In particular, some studies on understanding individual differences (Maureen E. Detlor, Toms, & Trifts, 2009; Nancy M. Salbach, Sara J.T. Guilcher, Jaglal, & Davis, 2009) have received much attention. Related studies, such as Zhao's (2009) work on Internet users associated with social and economic conditions are also interesting in terms of understanding the importance of different approaches to Internet use.

Perhaps the overarching aspect of these studies is that most information retrieval systems are dependent on users entering terms and initiating a search. However, these terms might or might not match the informational frameworks used by those system. Within this context, minimizing language and individual differences in information retrieval is a vital issue because diverse cultures are brought close together through technologies – particularly online communication technologies. While research establishes the usage of Council on Library and Information Resources (CLIR) may minimize language differences, substantive empirical work remains to be done in identifying how individual users perform a multicultural information searches using an ontology-based information retrieval system.

The purpose of this chapter is to describe the limitations of traditional information organization approaches and introduce the emerging informa-

tion organization approaches with the proposed system. This chapter examines this issue by introducing the cause of ineffective global information access from a user, an information, and a system perspectives. The chapter also describes traditional and emerging approaches to enhancing global information access. It then presents a system that demonstrates how emerging approaches in ontology can minimize cultural differences associated with online searching by using an ontology-based information retrieval system.

To address these aspects, the chapter is organized as follows: The first section addresses three causes of ineffective global information access. The second section then presents traditional and emerging approaches to enhancing global information access. The chapter's third section describes a system that allows users to access information with enhanced global information access. The chapter then concludes with a section that examines the future direction of research in the context of global information access.

## **USER, INFORMATION, AND SYSTEM DIFFERENCES**

Seeking information is a common and an essential human behavior. Every day, we engage in the use of networked information systems and the Internet to search for information. But often, searching for information is neither effective nor efficient. Users are frequently required to review a lengthy list of irrelevant results in order to find relevant information, and such situations often result in information anxiety (Wurman, 1989) and cognitive overload (Conklin, 1987). In recent years, numerous studies have attempted to find and to explore the causes of ineffective and inefficient searching.

From the perspective of the user, most search systems rely on users to enter terms in order to begin a search. These terms, however, might not match those in the system the individual is using.

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