Chapter 25

Adaptation–Oriented Culturally–Aware Tutoring Systems:
When Adaptive Instructional Technologies Meet Intercultural Education

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ABSTRACT

Modern societies have a growing need for highly specialized education and traditional educational systems have a difficult time providing solutions. E-learning applications could become an important part of the solution. With improvements in network technologies and systems' scalability, more and more globally-distributed applications are now available. Opportunities for people from varying societies to learn synchronously have thus multiplied. This being said, systems developed in a particular cultural setting and distributed around the world without taking into account variations in learners' cultural backgrounds pave the way for potential misunderstanding and failure of adequate teaching. How might learners' cultural background be adequately taken into consideration? How can content displayed to learners be culturally adapted? How can the most suitable strategies of interaction in accordance with learners' cultural specificities be selected? These are some of the questions that will be addressed in this chapter.

INTRODUCTION

With improvements in network technologies and systems' scalability, more and more globally-distributed applications are available. Opportunities for people from varying societies to play, exchange, confront, cooperate or learn synchronously have multiplied, resulting in many technology-mediated intercultural interactions. Furthermore, with globalization, software creation and distribution is no longer confined within borders; it can be developed anywhere and distributed everywhere around the world.

Various researchers (Hofstede, 2001; House et al., 2004; UNESCO, 2007) point out that culture can have a profound impact on the way people physically interact with their environment and peers, as well as on their cognitive reasoning, such as interpretations

and affective reactions they have when faced with specific terms, symbols and situations. In order to better take learners' specificities into account, research in e-Learning definitely needs to improve its consideration of such an issue.

Modern societies have a growing need for highly specialized education and traditional educational systems have a difficult time providing solutions. E-Learning applications could become an important part of such solutions. This said, systems developed in a particular cultural setting and distributed around the world without taking into account variations in users' cultural backgrounds pave the way for potential misunderstanding and failure of adequate teaching. This issue is particularly complex because the representation of the domain to be learned in e-Learning systems frequently reflects the cultural values of a given author, and these may greatly differ from those of e-learners of a different cultural background.

How might learners' cultural background be adequately taken into consideration? How can content displayed to learners be culturally adapted? How can the most suitable strategies of interaction in accordance with learners' cultural specificities be selected? These are some of the questions that will be addressed in this chapter.

After a brief overview of the findings of previous research on cultural awareness in e-Learning systems, especially in the sub-domain of Intelligent Tutoring Systems, we discuss a generic modular architecture for designing culturally-adaptive e-Learning systems. We then describe a rule-based process for culturally selecting culturally appropriate pedagogical resources and propose a method to determine the most culturally suitable pedagogical strategy. Finally, we investigate the potential of ontology engineering for dealing with several relevant issues when developing Culturally-Aware Tutoring Systems.

BACKGROUND

In order to clearly understand some of the problems we are facing when designing globally distributed e-Learning applications, let us begin by giving a brief introduction to intercultural education. According to UNESCO's guidelines (2007), intercultural education should:

- Respect *"the cultural identity of the learner through the provision of culturally appropriate and responsive quality education for all"*,
- Provide *"every learner with the cultural knowledge, attitudes and skills necessary to achieve active and full participation in society"*,
- Provide "*all learners with cultural knowledge, attitudes and skills that enable them to contribute to respect, understanding and solidarity among individuals, ethnic, social, cultural and religious groups and nations*".

Indeed, there are many reasons to take culture and learners' cultural differences into consideration within e-Learning systems, and as such, discuss the development of adaptive e-Learning systems aimed at providing intercultural education. Following are some examples of important e-Learning elements that have been proven to be culturally-sensitive.

Culturally-Sensitive Elements in e-Learning: Examples

In the field of adaptive e-Learning, *Emotional management* has been growing in importance (Conati, 2002; Chaffar, Frasson, 2004). It appears that there are strong links between culture and emotional behaviour. According to Scollon and his colleagues (2004), the frequency with which someone feels positive or negative emotions is culturally dependent. Categorizing an emotion

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