

Cultural Variables in the Building of Pedagogical Scenarios: the Need for Tools to Help Instructional Designers

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Abstract. This study investigates the application of cognitive informatics in the domains of education and culture. It focuses more particularly on cultural diversity in computer-assisted distance learning environments. The goal of this investigation is to allow for significant and more authentic learning by way of an instructional scenario method that integrates the processing of cultural variables through the use of a knowledge base called “Cultural Diversity”. The hypotheses are as follows: 1) to create an instructional design method that makes it possible for designers to consider and process cultural variables, while exploiting the novel technical possibilities offered by the semantic Web, will facilitate authentic learning, promote equitable access to education and improve scenario efficiency, 2) to systematize support for designers by means of knowledge-based tools that will allow them to consider and process cultural variables and become creative mediators, rather than consumers. This study will model, implement and test a) a “cultural diversity” knowledge base that is exploitable by a system designed to help instructional designers in their design tasks and b) a method to process cultural variables that can be implemented into an instructional design process.

Keywords: Cultural Diversity, Instructional Design, Authentic Learning, Pedagogical Scenarios

1- Introduction

There are numerous reasons for the enhanced popularity of distance training programs that are available today: the ever-increasing need for continuing education, the exponential number of new online learners and the desire, by universities, to reach a clientele challenged by time constraints or remote locations. Since many distance training programs are offered at an international level, learners registered for a given course often have disparate cultural heritages. Indeed, according to Goodear (2001), Australia has witnessed a proliferation of Web learning resources and platforms, adding that the multidimensional nature of Web-based technologies offers the possibility of reaching a wide range of learning needs in a culturally diversified learning environment.

The role of culture in these new types of instructional interactions is thus of great interest. We believe that cultural variables must be considered in the instructional design process and that tools must be provided for designers who may be ill-prepared when it comes time to plan material for a culturally diversified clientele. Moreover, in her study on instructional training references published between 1993 and 2003, Man (2004) reveals that cultural variables are rarely or never taken into consideration. She concludes that future instructional designers are not well equipped to design material destined for a clientele whose cultural background is either different or diversified.

This paper presents a tool currently being developed for instructional designers: the “Cultural Diversity” Knowledge Base (KB) which is built on the basis of the “Cultural Factors” ontology, which is also under development. Firstly, the notion of culture is explained. Secondly, the KB is presented and emphasis is placed on the conceptualization of the “Cultural Factors” ontology. Finally, future works are briefly described.

2- Culture

The etymology of the word "culture" comes from the Latin term *colere* which means "live", "cultivate" or "honour". The notion of culture is defined in various ways and in different fields. For instance, in their book called *Culture: A Critical Review of Concepts and Definitions*, Kroeber & Kluckhohn (1952) inventoried a list of over 200 different definitions for the word *culture*.

Two definitions seem most widely accepted: *individual culture*, which refers to the set of general knowledge acquired by an individual and *collective culture* which, is a set of usages, customs, artistic, religious and intellectual expressions that define and differentiate a group, a society. *Collective culture* refers to a shared set of convictions, of ways of viewing the world or interacting in it, which guide individuals or groups in a more or less conscious manner.

This paper addresses the concept of collective culture only. Personal culture would comprise the learner's set of unique characteristics, to be taken into account in the framework of tutoring. Such a topic would be a valuable research topic for the fields addressing student modeling.

2.1. Collective Cultures

The concept of collective culture comes from an anthropological movement. Considered the father of British anthropology, Edward Tylor (1832-1917) first suggested a definition for the concept of culture:

Culture or civilisation, in its broadest ethnological sense, refers to this complex whole that comprises knowledge, beliefs, art, ethics, rights, customs and other capacities or habits acquired by humans as members of society. (cited in Cuche, 2004)

This excerpt indicates that culture is acquired, learnt. The individuals' knowledge is considered, albeit always from the perspective of a group member.

Likewise, Hofstede & Hofstede (2005) define culture as *the collective programming of the mind that distinguishes the members of one group or category of people from others. (p.4)*. Their view of culture refers to patterns of thinking, feeling and acting. They specify that culture is always a collective and learned phenomenon.

UNESCO adopted such a perspective and defines *culture* as follows:

The set of distinctive spiritual, material, intellectual and emotional features of society or a social group, [...] it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs.¹

Since this definition is based on an international consensus, it has been adopted for the purpose of this research.

2.1.1 Components of a Collective Culture

Hofstede & Hofstede (2005) present the manifestations of culture at different depth levels, using four concepts: symbols, heroes, rituals and values. They introduce such terms with an analogy to the various onion skins in which symbols, appearing on the outermost layer, represent the most superficial elements while values, the innermost concept, is shown as the deepest manifestation of culture. The first three onion skins (symbols, heroes and rituals) are visible in practice, contrary to values. This anthropologic approach respects the adopted definition.

¹ UNESCO Universal Declaration on Cultural Diversity, Mexico City Declaration on Cultural Policies, July 26 to August 6, 1982.

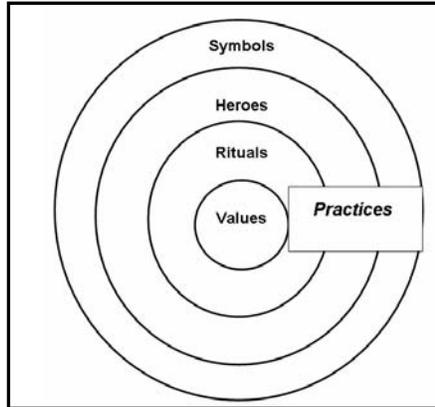


Figure 1: The “oignon”: Manifestations of Culture at Different Levels of Depth (Hofstede & Hofstede, 2005)

In the model proposed by Hofstede & Hofstede, values take a central position. At the very heart of societies, endowed with the power of influencing learning and/or instructional designers’ tasks, they have a direct impact on all other layers of the onion.

3- The “Cultural Diversity” Knowledge Base

As highlighted by Powell (1997), when teaching in a foreign culture, knowledge transfer depends on the trainer’s capacity to establish connections with the learners and to communicate with them in an efficient manner. He adds that the latter must incorporate the learners’ technical, cultural and organisational situations. Since designers are not necessarily knowledgeable in various cultures, we believe that a KB on these topics has become essential.

As specified by Mizoguchi (2004), “a differentiation must be made between *“ontology”* and *“knowledge base”* as to their roles, meaning that the ontology provides a system of concepts that are used to build a knowledge base. Consequently, an ontology can be a specific conceptualization of the target world, defined by the engineers who create the knowledge base, hence a traditional meta-system knowledge base.” To enable data consistency in the KB and cross-cultural equivalences, the KB will be built on the basis of an ontology of cultural factors, which is at the heart of this research project. The following figure presents the “Cultural Diversity” KB, which is composed of various knowledge bases, all instantiated from the “ontology of cultural factors.”

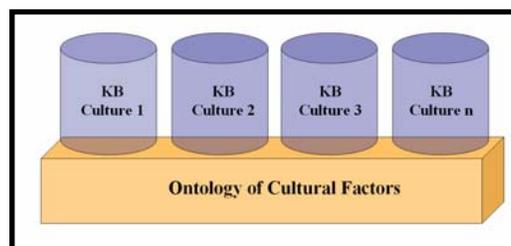


Figure 2. Representation of the “cultural diversity” KB.

Each KB thus constitutes an instance of an ontology which is specific to a given culture. Each concept of the ontology will then take on different values according to the reality of each culture represented. In the framework of this research, the development of at least four instances has been planned: one for the province of Quebec (Canada), one for Mauritius and two others to be announced. Plans have been made to work with instructional designers at these locations in order to instantiate knowledge bases. Indeed, as Goodear (2001) explains, it is beneficial to tap into the knowledge of people from the area where the target populations live, in order to avoid imposing the perspectives of observers from another culture looking in from the outside.

3.1. Engineering an Ontology of ‘Cultural Factors’

Mizoguchi (1998) proposed three levels of ontologies: level 1 where an ontology is a *structured collection of terms*; level 2, comprising level 1 with formal definitions of concepts, relations and constraints which enable computers to make interpretations; level 3 ontology can be executed. The cultural factor ontology remains at level 1: a number of cultural factors likely to influence learning and/or instructional designers’ work have been identified and structured into four main categories. The following table presents an initial version of a list of factors generated by a literature review on the topic, as well as a research internship conducted at the *Virtual Center for Innovative Learning and Technologies (VCILT)* at the University of Mauritius in 2006. During this study, semi-structured interviews were conducted with nine instructional designers in order to inventory the cultural factors likely to influence learning in their practice of instructional design.

Table 1 presents factors organized into four main categories. They pertain to learners, human interactions, resources for learning and teaching and learning environments. Each of these categories is associated with sample factors.

Table 1: Four Categories of Cultural Factors

Examples of Cultural Factors					
Cultural Context	<p>Learner</p> <p>Motivation</p> <p>Values</p> <p>Perceptions</p> <p>Learning Styles</p>	<p>Valorization of formal education</p> <p>Locus of control</p> <p>Attitude towards school work</p> <p>Values (Hofstede’s dimensions)</p> <p>Cultural stereotypes</p> <p>Attributional Process</p> <p>Learner = passive or active in the world</p>			
	Cultural Context	<p>Human Interactions</p> <p>Professor-Learners</p> <p>Learner-Learners</p> <p>Learner-Family</p> <p>Learner-Social Environment</p>	<p>Expectations – Respective roles (Eg. Prof. = model or mentor)</p> <p>Behaviorist vs socio-cultural orientation</p> <p>Competition vs collaboration (individualism vs collectivism Hofstede)</p> <p>Valorization of school work</p> <p>Family obligations</p> <p>Locus of control</p>		
		Cultural Context	<p>Learning Objects</p> <p>Granularity</p> <p>Flexibility</p> <p>Significance</p> <p>Orientations</p>	<p>Atomic object vs aggregation (quantity of culture)</p> <p>Content = fixed vs = flexible</p> <p>Symbols, pictures, icons, signs = culture specific vs universally recognized</p> <p>Behaviorist vs socio-cultural orientation</p>	
			Cultural Context	<p>Learning Environments</p> <p>Types</p> <p>Teaching and learning rituals</p> <p>Orientations</p> <p>Interface</p>	<p>Pedagogic community vs online distributed</p> <p>Individualised vs community-based learning</p> <p>Learner = passive vs = active in the world</p> <p>Communication patterns</p> <p>Behaviorist vs socio-cultural orientations</p> <p>Accent on product or on process</p> <p>Significance = culture specific vs universally recognized</p>

The importance of context must be highlighted since it has an impact on each category. Moreover, it has an effect on the design of scenarios where the elements of such categories converge.

The elements that make up the cultural context refer to those presented above in Figure 1, that is symbols, heroes, rituals and values.

3.1.1 The Learner

Learners' sources of motivation vary from one culture to another. For example, the value of formal education, especially for those of the female gender, differs in African and North American cultures. Not all learners feel that they can control their destiny in their roles of students. In certain cultures, individuals' fate is pre-determined and they are left with little control over their destiny. Their attitude towards schooling can be significantly affected and, in our opinion, it is essential to consider such factors when attempting to maintain high motivation levels for these different learners.

Learners' values are most likely to affect their learning and attitudes towards the competencies to be developed. Hofstede (1980) suggested four main facets for culture, and a fifth was subsequently added. They are the following: 1) Power Distance (i.e. the "submitted's" level of acceptance that power is shared unevenly), 2) Individualism vs. collectivism, 3) Masculinity vs femininity, 4) The uncertainty avoidance index and, 5) Long term orientations. These facets are considered in this study in order to identify factors that influence learning.

Learners' perceptions must also be considered. For instance, there are cultural stereotypes that can influence learners' behaviour when interacting with peers from different cultural backgrounds. Gunawardena, Wilson and Nolla (2003) cite Chen and Starosta (1998) who noted that the influence of culture on perception is often reflected in the attributional process. They specify that attribution means that we interpret the meaning of others' behaviours based on our past experience or history.

Learning styles vary from one culture to another. In certain cultures, learners must remain passive while in other cultures, they are expected to play an active role, interact with professors and build knowledge. As stated by Gunawardena, Wilson and Nolla (2003), *the instructor and the individual student bring to the course a set of non-negotiables inherent in their own cultures. These include language, beliefs, preferred methodologies and learning styles, knowledge and skill base, and attitude about learning.*

3.1.2 Human Interactions

What about instructors' expectations towards learners or learners' expectations towards their professors? Reeves & Reeves (1997) address such issues and stress that the fundamental instructional values of one culture can be inappropriate in another culture. For example, they refer to the behaviour of students' apprehension to ask questions about the material presented, or their attempts at challenging instructors. Such behaviour may be accepted in North America, yet it would be unseemly in many European countries. In order to identify such factors, four main types of interactions will be considered: professor-learner, learner-learners, learner-family and learner-social environment.

Furthermore, regarding human interactions, Gunawardena, Wilson and Nolla (2003) add that *if we subscribe to the view that knowledge is socially constructed (Vygotsky, 1978), then the group interaction becomes critically important and becomes part of the design.*

3.1.3 Learning Objects

According to Wiley (2002), in order to be reused, LOs should be as neutral as possible. However, students need certain references or anchors for learning to occur and LOs must be presented in a context that is meaningful to them. The results found during the aforementioned research study, conducted at University of Mauritius, support such a concept: all designers interviewed admit to working for a diversified clientele and most of them claim that they specifically consider this element when scripting; eight of nine designers mention that the material they use has to be adapted to their local context and they believe that culture influences the design of LOs; most of them consider that the reuse of certain LOs can be difficult and cite "adaptation to the local context" as the reason therefore. The granularity of LOs becomes an important cultural factor and needs to be considered because, contrary to aggregated resources, atomic resources are less likely to be burdened with content that is loaded with strong cultural connotations.

Yet another factor to be considered is the flexibility of resources, as well as the orientations that guide their design (behaviourist vs. socio-cultural orientations), which can vary from one culture to another. According to Wild (1999) *the artefact or instructional product the designer produces “embodies cultural influences such as the instructional designer’s world view, their values, ideologies, culture, class and gender, and their commitment to a particular design paradigm (cited in Gunawardena, Wilson and Nolla, 2003).*

Finally, the level of significance of resources must be taken into account, given that the symbols, signs and pictures which are used are not always recognized universally. Certain culture-specific symbols can become a hurdle to learning for those of another culture. For instance, the significance of colours varies considerably from one culture to another.

3.1.4 The Learning Environment

According to Sanchez & Gunawardena (1998), the heterogeneity of cultures and learning styles must become the starting point of learning environments, in order to provide rich learning experiences for learners from a variety of backgrounds. It is thus clear that, considering cultural variables has become necessary to the development of distance learning environments and that current technological means can facilitate such tasks.

As for the learning environment, we consider types, teaching and learning rituals, orientations as well as the particularities of the interfaces.

The expression “teaching and learning rituals” refers, for example, to the types of learning that learners are used to; for instance: are they used to being passive or active in the world? Are they used to individualised or community-based learning? According to McLoughlin and Oliver (2000), *the community of inquiry approach (Lipman, 1991) with its emphasis on collaboration, shared experience and participation, offers a robust theoretical basis for the design of culturally specific environments.* However, we feel that the willingness of actors, within the learning environment, who adopt such practices may differ from one culture to the other. Communication rituals are also part of this category of factors. Silence is interpreted differently from one culture to another and politeness rules vary (Johnson, 2005). In these environments, communication spaces must be planned according to such differences.

Marcus and Gould (2000) point out that Website metaphors, mental models, navigation, interactions or appearance can confuse, or even offend, or alienate users (cited in Gunawardena, Wilson & Nolla, 2003). This is also true for virtual learning environments and the cultural particularities of the interfaces must be taken into account in the instructional design process. For instance, certain authors recommend providing learners with the option of modifying the user interface to suit their preferences.

We consider that “culturally sensitive” (Powell, 1997) instructional designers’ tasks consist of designing according to these four main categories of factors. Moreover, according to Goodear (2001), the development of a learning environment that respects cultural variables becomes a responsibility that must be shared among instructors, designers/developers, administrators and learners.

4- Future Works

We believe that a methodology to process cultural variables in instructional design will better equip instructional designers, thus promote more authentic learning, improve scenario effectiveness and offer access to equitable education, as “*all persons are entitled to quality education and training that fully respects their cultural entity*” (UNESCO, 2002). We also consider that such a method can enhance resource reusability by indexing scenarios according to their cultural variables.

Consequently, we propose: 1) a “cultural diversity” KB that can be exploited by 2) a “Cultural INDEED” (Cultural INstructional DEsign to Enable Diversity) system, in order to support designers in their revised task and 3) a methodology that embeds cultural variables into the instructional design process.

4.1 Formalization of the Ontology and Knowledge Base Instantiation

Once the level 1 ontology (Mizoguchi, 1998) is validated, its formalization will begin in order to bring the “Cultural Factors” Ontology up to level 2 (Mizoguchi, 1998) and enable computer-assisted interpretations. The culture KBs will then be instantiated.

4.2 - The "Cultural INDEED" System

The "Cultural INDEED" system will support instructional designers in carrying out novel instructional design tasks. The developed functionalities will allow these professionals to primarily consider cultural variables, while designing and/or adapting training scenarios. Contextualized help features will make it possible to query LO repositories as well as knowledge bases for the various cultures concerned. Catalogue and research functions will allow for the indexing of pedagogical scenarios according to their cultural variables, as a complement to the standards already in place.

4.3 – A Method to Process Cultural Variables in Instructional Design

The main themes of the processing methods of cultural variables in instructional design are decision steps actually identified according to the generic steps of an instructional design process: analyze, design, develop, implement and evaluate. Such decision steps will allow interactions between instructional designers and "Cultural INDEED" to produce instructional scenarios that respect cultural variables while fostering authentic learning. The proposed method for processing cultural variables will thus generate a space to organize the various tools developed.

5- Conclusion

As mentioned above, we believe that cultural variables must be considered in the instructional design process and that designers must be provided with appropriate tools. This paper presents a solution for a culturally-aware authoring process and outlines the iterative processes required to develop such a solution. The "Ontology of Cultural Factors", at the heart of this research project, is considered a potentially useful tool. The earliest steps of the conceptualization efforts carried out for this ontology have been presented. Cultural factors that can influence learning and/or instructional designers' tasks have been identified and a first set of organized factors has been introduced. Through the Q4R-Quality for Reuse (www.Q4R.org) project, the international community will be consulted regarding the identified factors. After such consultations, the ontology of cultural factors will be conceptualized and validated. Once the Cultural Factors ontology is formalized, it will be used to instantiate the KBs for the selected cultures. Such instantiations will form the "Cultural Diversity" KB.

The "cultural diversity" knowledge base will be used by the "Cultural INDEED" system to help designers adapt their work and consider cultural variables when they design learning scenarios, environments, and resources. It is our hope that such a solution will indirectly provide learners with richer, more equitable and more authentic learning experiences.

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