Cross-cultural Language Learning and Web Design Complexity

Abstract

Accepting the fact that culture and language are interrelated in second language learning (SLL), the Web sites should be designed to integrate with the cultural aspects. Yet many SLL Web sites fail to integrate with the cultural aspects and/or focus on language acquisition only. This study identified three issues: 1) anthropologists' cultural models mostly adopted in cross-cultural Web user interface have been superficially used; 2) Web designers deal with culture as a fixed one which needs to be modeled into interface design elements, so 3) there is a need for a communication framework between educators and design practitioners, which can be utilized in Web design processes. This paper discusses what anthropology can contribute to language learning, mediated through Web design processes and suggests a cultural user experience framework for Web-based SLL by presenting an exemplary matrix. To evaluate the effectiveness of the framework, the key stakeholders (learners, teachers and designers) participated in a case scenario-based evaluation. The result shows a high possibility that the framework can enhance the effective communication and collaboration for the cultural integration.

Keywords: cultural integration; cultural usability; second language learning; user interface; Web based language learning

Introduction

Language and culture are dimensions of each other that are interrelated and inseparable (Fantini, 1997; Pethő, 2005). Language and culture reflect and affect how individuals learn (Swierczek & Bechter, 2008). This principle is often ignored in Web-based second language learning (SLL). It has been agreed that Web technologies support quality of SLL by enhancing person-to-person interaction as well as person-to-interface interaction by adopting various communication tools (synchronous and asynchronous) (Son, 2008). Yet these communication technologies have been used to focus on language acquisition only rather than the cultural integration (Massey et al., 2001). Many SLL Web sites have been focusing on individual learners' progressive language acquisition and self-directed learning activities without or lack of the cultural integration (Altstaedter, 2009; Shih, 2005).

Although some Web sites provide cultural information and materials, these are regarded as a merely supplementary or less interacting with the language learning (Kamppuri, Tedre & Tukiainen, 2006). When a SLL Web site is built with a template which has been developed with a specific culture and set of values, the template often restricts the flexibility and adaptability of a certain culture. Thus, it is seen that some graphical elements such as symbols and images are usually adopted to represent cultural characteristics. As Richardson and Smith (2007) argued, a fundamental design issue here is that many Web sites have a tendency to be standardized and structured by Western communication styles regardless of culturally preferred communication styles. For example, content management systems (CMS) and learning management systems (LMS) do not support cultural differences excepting text and translation services (Marcus & Baumgartner, 2004).

Web user interface is deeply influenced by cultural differences because cultures have various patterns of social behavior and interaction (Marcus & Baumgartner, 2004). SLL and Web design are far different domains. In practice, thus, anthropologists' cultural models (i.e. Hofstede's cultural dimensions (1991), Hall's cultural factors (1976)) have been adopted into cross-cultural Web user interface design. Cross-cultural Web user interface design refers to cultural dimensions embedded in the user interface to the extent that users' thinking, acting, and feeling are deeply influenced by cultural characteristics (Marcus, 2001; Vatrapu & Pérez-Quiñones, 2006). With anthropologists' cultural models, design researchers have proposed various user interface elements / components that have high possibility to embrace cultural characteristics (i.e., Mushtaha & Troyer, 2007; Marcus & Baumgartner, 2004; Evers, 2002; Marcus, 2001). A focus here is on how Web designers can efficiently symbolize, iconize and visually re-present the target culture mapped by anthropologists' cultural models.

From a perspective of Web design processes, however, anthropologists' cultural models are very complex to be embedded in interface design elements. To resolve this limitation, researchers claimed that the cultural models need to be integrated into the design process (i.e. Jagne & Smith-Atakan, 2006; Miah, 2004). This is in line with the conception of participatory design which users (i.e., educators and learners) need to participate in the design processes in order to achieve user-centered design or user-friendly design (Park, 2011). The argument implies that the feasibility of cultural integration in Web sites can be achieved by neither educators' knowledge nor designers' expertise, but the collaborative efforts on both the sides in the design process. Yet there is no specific framework for effective

communication and collaboration between the stakeholders who have different specialties and skills that respects the cultural variations.

This paper aims to discuss what anthropology can contribute to language learning, mediated through Web design processes and to propose a cultural user experience framework for effective communication and collaboration between educators and designers. To do so, first, it reviews how anthropologists' cultural models have been used in cross-cultural user interface design and addresses design issues in Web-based SLL. Second, it argues for the necessity of conceptualizing and materializing cultural variations, an essential aspect of Web-based SLL, which must be engaged at the design processes. Third, it suggests a cultural user experience framework for Web-based SLL which was developed with the following key considerations: 1) interpretations of cultural dimensions in line with 2) defining user interface design components of Web design processes, and 3) a conceptualization of cultural usability as a result of understanding of relevant pedagogical principles and culture learning from a viewpoint of the design process. Finally, the framework was further practically applied with East Asian cultural aspects because their collectivistic cultures require a more comprehensive and complicated Web site design. To verify the practicality of the framework and provide insight for further development, a case scenario-based evaluation built based on the framework dimensions via an online survey method was implemented.

Cross-cultural user interface design and anthropologists' cultural models

The conception of cross-cultural user interface has been introduced in Web design area because of the necessity of localization and internationalization (Jagne & Smith-Atakan, 2006; Marcus, 2001) and regarded as the highest level of Web design evolution (Grudin, 1990; Kamppuri et al., 2006). The theoretical foundations of cross-cultural Web user interface are built based on anthropologists' cultural models (Table 1).

Table 1
Anthropologists' cultural models used in cross-cultural user interface studies

Cross-cultural user interface studies	Adopted anthropologists' cultural models
Gould, Zakaria & Yusof, 2000; Jagne, Smith, Duncker & Curzon, 2004; Marcus & Baumgartner, 2004; Miah, 2004; Mushtaha & Troyer, 2007; Xie et al., 2008; Xinyuan, 2005	Hofstede's cultural dimensions (1991): *power distance, uncertainty avoidance, masculinity vs. femininity, individualism vs. collectivism,* and *time orientation*.
Jagne, Smith, Duncker & Curzon, 2004; Marcus & Baumgartner, 2004; Mushtaha & Troyer, 2007; Syarief et al., 2003; Xie et al., 2008	Hall's cultural factors (1976): *context (high vs. low), time (monochronic vs. polychronic),* and *space (high territoriality vs. low territoriality)*

Gould, Zakaria & Yusof, 2000; Marcus & Baumgartner, 2004; Mushtaha & Troyer, 2007; Jagne, Smith, Duncker & Curzon, 2004	Trompenaars' and Hampden-Turner's cultural factors (1997):*universalism vs. particularism, analyzing vs. integrating, individualism vs. communitarianism, inner-directed vs. outer-directed, time as sequence vs. time as synchronisation, achieved status vs. ascribed status, and equality vs. hierarchy.*
Marcus & Baumgartner, 2004; Mushtaha & Troyer, 2007	Victor's LESCANT model (1992): *language, environment and technology, social organisation, contexting, authority conception, nonverbal behaviour,* and *temporal conception*
Dong & Lee, 2008	Nisbett's cognitive model (2003): holistic and analytic thought

Based on the cultural models, design researchers and practitioners have proposed cross-cultural user interface components and elements (Table 2). Their common beliefs are that the Web is a cultural artifact and the cultural models offer a way to understand and measure differences and similarities of user experience. As a result, they have insisted that cultural features can be embedded into their proposed user interface elements.

Table 2
Cross-cultural user interface components/elements

Cultural user interface frameworks	Elements/components
Five components of user interface (Marcus, 2001)	*Metaphors, mental models, navigation, interaction, appearance*
Users understanding elements of website interface (Evers, 2002)	*Text, graphic elements, metaphors, general context, cultural context*
Five prior components of cross-cultural user-interface (Marcus & Baumgartner, 2004)	*Context, experience of technology, uncertainty avoidance, time perception, authority conception*

However, there is a doubt whether or not the anthropologists' cultural dimensions are appropriately representing a certain culture, and of how they are functionally related to specific language learning and cross-cultural Web user interface. Further, the effectiveness of the cultural dimensions in online learning environments has not been researched, but rather focused on user satisfaction toward visual and graphical interface. Regardless of these doubts, it is generally accepted that culture has many controversial characteristics and can be defined from various levels of perspectives (Hoft, 2000; Strauss & Quinn, 1997).

The dominant approach – visual interface-driven, is less effective for cross-cultural Web design to the extent that 1) it discourages educators and learners to participate in Web design processes and as a result, 2) it relies on designers' individual capacity of cultural understanding with little or no consideration of pedagogical and cultural concerns. These tendencies result that both educators and designers regard culture as an eternally fixed value or statically conceived abstraction within interface design elements. Recalling that the impact of culture affects the development process and design methods (Clemmensen et al., 2009;

Vatrapu & Pérez-Quiñones, 2006), the cultural integration has to be implemented through collaboration and communication between educators and designers or other stakeholders within the design process.

This study claims that the cultural models are not unchangeable forms, but selective classifications for Web design. The classifications have to be conducted by both educators and designers (and end users if necessary). The cultural models can be more effectively used for the cultural integration when they are conceptually and methodologically applied in Web design processes rather than (visual) interface design elements. Hence, the most important step for the cultural integration is to build closer communication and collaboration between educators and designers in understanding and developing of learners' cultural activities and language learning via Web.

Language learning and cultural integrations on Web user interface
"The process of teaching a Foreign Language should imply teaching the cultural aspects connected to such a language, and no just its grammar and vocabulary" (Cortés, 2007, p. 230). If teachers limit SLL in teaching grammatical syntax and vocabulary only, students are learning a dead language. Familiarizing learning a second language with its cultural background, such as customs, historical and geographical aspects, traditions, values and people's way of thinking is the key to SLL because both culture and language are firmly interrelated (Cortés, 2007; Genc & Bada, 2005; Fantini, 1997; Watson, 2010). Pedagogically, SLL will be inaccurate and incomplete without learning culture (Genc & Bada, 2005).

The philosophy behind cultural programs is based on the idea of big 'C' Culture and little 'l' language (Huachuca, 2008 as cited in Watson, 2010). Genc and Bada (2005, p. 73) asserted that "most language learners, exposed to cultural elements of the society in questions, seem to encounter significant hardship in communicating meaning to native speakers" because of lacks of the cultural aspects in SLL. In this sense, the contemporary language and culture studies have focused on the following three points: 1) language and culture are interrelated and cannot be treated separately (Cortés, 2007; Genc & Bada, 2005; Fantini, 1997; Watson, 2010), 2) so missing either one in the program is not effective for SLL (Cortés, 2007; Genc & Bada, 2005; Fantini, 1997; Watson, 2010), and 3) pedagogically, culture learning can humanize and motivate effect on the language learners and the learning process (Genc & Bada, 2005).

The benefits of Web technologies in SLL are to keep updating authentic materials, to provide an opportunity for high quality of communications and to develop a learning community (Reategui, Polonia & Roland, 2007). Task and scenario-based learning is the most effective in language learning because SLL is a complex cognitive process (Reategui et al., 2007). In line with this, a SLL Web site needs to be designed by focusing on contextual learning and stimulate the use of authentic task that enables learners to improve their communicative skills and cultural knowledge (Reategu et al., 2007). However, many Web-based language learning sites seem not to be built in reflection with these language learning requirements and the integration of cultural aspects (Fitzpatrick, 2000). Shih (2005) also claimed that lack of studies have been conducted to identify learners' social and cultural participation through computer-mediated communication.

There are two extreme views of Web-based SLL. Technologies enhance learners' self-regulated and -motivated learning by exploring and discovering their learning paths and allow teachers building culturally authentic and highly interactive language learning experiences (Son, 2008). On the contrary to this, technologies can promote superficial and injudicious reasoning and lead to short-term memory programs (Pino, 2008). These different views imply that Web-based SLL materials and activities need to articulate both modalities of language learning and pedagogies based on constructivist philosophies such as collaborative and cooperative learning (Kukulska-Hulme & Shield, 2004). In particular, it is acknowledged that cognitive activities of learning such as perception, semantic association and logical reasoning are affected by culture, and representational variations between cultures can be found in content presentation as well as graphical elements (Onibere et al., 2001). In this sense, cultural cognitive activities are crucial for Web-based SLL and Web design, and the disconnection between cultural aspects and Web design could devalue Web-based SLL.

Web user interface design for the cultural integration focuses on diffusion process of technologies to society and as a result, it requires a multi-disciplinary approach with various research methods (Grudin, 1990; Kamppuri et al., 2006). However, the theoretical discussions of cross-cultural Web user interface are weakly grounded because anthropologists' cultural models have been superficially adopted for (graphical) interface elements (Jagne & Smith-Atakan, 2006). Although diverse practical guidelines and implications for cross-cultural user interface have been introduced and developed, they often overgeneralize cultural

features and can be limitedly used within graphical interface. On the other hand, SLL study is the area where emphasizes significance of cultural aspects in language learning and has theoretical foundations for cultural user interface in terms of learners' participation and cultural activities (Son, 2008). These arguments imply that the cultural integration of Web-based SLL is a new challenge and task for designers as well as educators and researchers, and cultural variations, which are an essential aspect of SLL, need to be reflected in Web site development stages in specifying various user experiences.

Cultural variations and Web user interface design processes

As aforementioned, anthropologists' cultural dimensions are not used effectively by user interface design community because the characterizations are descriptive (Jagne & Smith-Atakan, 2006). Besides, Web designers tend to use the cultural models without being aware that they have been developed for different purposes (Jagne & Smith-Atakan, 2006). More specifically, Xinyuan (2005) criticized that subjective aspects of anthropologists' cultural models are too stereotypical or rigid for Web user interface, and they do not explain usability issues of Web sites. In response to these issues, Jagne and Smith-Atakan (2006) proposed the cultural issues have to be solved by practitioners in Web design processes. This proposal is also supported by Miah's (2004) study on designing of educational Web site in a multicultural context that the end user needs and preferences in terms of user-centered design have to be thoroughly reflected and evaluated in every stage of the design process. Although none of them proposed any feasible solutions, their key message is that cross-cultural interface has to be a form of design strategy. In other words, designers and researchers need to undertake more research about cultural and social aspects of users, especially by adopting ethno-methodology and to create a customized cultural model for the prototype development.

Linguists generally agree that culture and language are inseparable and each speech community embodies a distinct culture and world-view (Pethő, 2005). Xinyuan (2005) defined this as a 'communication style' that represents not only the end user's preference and behaviors, but also the overall patterns and values of a culture. In Web design processes, in other words, cultures become communication styles for learning activities via the user interface design. This implies that the cultural integration with user interface design can be linked to interaction design (learning activities) and information design (learning content) in the design process. Kamaruddin, Park and Hyun (2009) argued that learning experience (including cultural aspects) is the key of quality educational product development, and

learners' engagements need to be understood through the three design components: interface design, interaction design and information design. Therefore, the cultural integration into SLL Web sites can be conceptualized with the design components of Web design process. The three components are built based on concept design at the beginning of the design process in line with identified cultural features and learning objectives (Kamaruddin et al., 2009). This comprehensive and multi-faceted approach allows building a cultural framework of a SLL Web site, and further evaluating the site (usability) in terms of its cultural user interface design.

In Web site development, culture learning is also associated with pedagogical usability. Pedagogical usability aims to evaluate effective language learning through a Web site (Kukulska-Hulme & Shield, 2004); while general (or industrial) usability focuses on its functionality (effectiveness and efficiency) and user satisfaction (ISO 9241-11, 1998). In other words, pedagogical usability involves learners' learning quality based on pedagogical principles including reducing conflict and frustration, repetition of concepts using variations in technique, positive reinforcement, active student participation, organization of knowledge, learning with understanding, cognitive feedback, individual differences, and motivation (Hale & French, 1999). Likewise, culture learning refers to the acquisition of knowledge and skills that are in circulation of a particular cultural group or community (Paige et al., 2003). The acquisition associated with SLL aims to know the impact of culture on communication and interaction between individuals or groups (Paige et al., 2003). In this sense, the dimensions of culture learning include knowledge of culture for sociolinguistic competence, contextual behavior, and positive attitude toward the target culture and people. In Web-based SLL environments, the dimensions need to be transformed and embedded in cultural activities for learners' communication and interaction (Son, 2008) because the cultural aspects are "hidden" (Hall, 1976).

Learning language with pedagogical principles and culture learning as Web activities need to be embedded in three aspects, user interface, learning activities and learning objectives (Laurillard, 2002). Although pedagogical principles and culture learning dimensions do not directly discuss the cultural aspects of Web-based SLL, their focus on learning quality builds a conceptual connection between the cultural aspects and the three design components. The principles can be re-categorized with language learning (pedagogical principles) and cultural activities (culture learning dimensions). In line with the three design components, language

learning and cultural activities need to be conceptualized at the concept design stage and later formulated as cultural usability. In the design process, in general, concept design determines mental model (the context of use) and interface metaphor (users' cultural background) (Clemmensen et al., 2009) and is materialized with the three design components (Kamaruddin et al., 2009). In other words, the cultural user interface can be developed through input of the concept design and output of the three design components.

Figure 1 presents a cultural user experience (CUE) framework for Web-based SLL. In human-computer interaction (HCI), user interface design is the key to the success or failure of learning experience because it facilitates user interactions in line with information design (content) (Clemmensen et al., 2009). Further, it plays an important role for (pedagogical) usability to the extent that graphical interface determines look and feel of a Web site and encourages users to communicate with content and other users (Vatrapu & Pérez-Quiñones, 2006). In Web-based SLL environments, the user interface focuses on learners' attention and facilitates their learning and cultural activities. As a result, the identified cultural dimensions or features are conceptually and functionally integrated into interface, information and interaction design, which results in cultural usability.
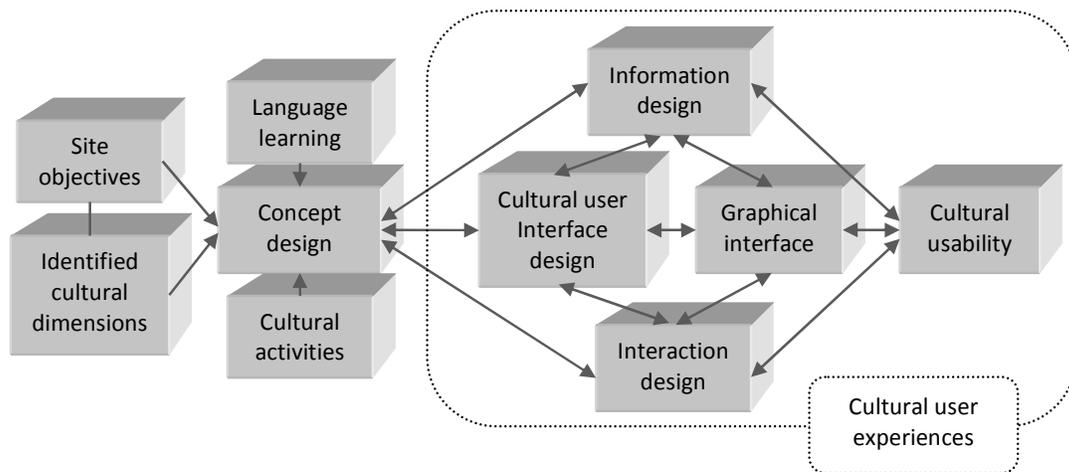
Figure 1 A cultural user experience framework for web-based SLL

In particular, the conception of cultural usability is associated with the pedagogical principles and the culture learning dimensions to the extent that it aims to facilitate learners' quality of cultural experience through a Web site in line with language learning. Cultural usability has been mostly concerned in language learning Web sites unlike general e-learning sites (Evers,

Kukulska-Hulme & Jones, 1999; Marcus & Gould, 2000). Cultural emphasis in modern language learning highlights cultural usability, yet there is little discussion in both e-learning and language learning Web sites (Liu et al., 2008). In this context, the CUE framework indicates designers and educators how cultural usability can be systematically considered within the design process. It also shows that cultural usability can be evaluated by categorizing with the concept design (built on language learning – pedagogical principles and cultural activities – culture learning dimensions) and the cultural user interface via graphical interface, information design, and interaction design.

An exemplary matrix of the cultural user experience framework

Since multiple disciplines are engaged in Web-based SLL, stakeholders need a coherent framework for discussing what they know and how it can contribute to a successful Web site design. The CUE framework suggests how to approach to this sharing of knowledge and experiences from various disciplines.

The following table presents the cultural indices of East Asian countries such as China, Japan and South Korea in comparison with Western countries. As East Asian languages share a collectivistic culture, the Web-based SLL may need to facilitate community-driven cultural learning experiences.

Table 3
Hofstede's cultural dimensions (Hofstede, 2001; 1991)

Countries	PDI	IDV	MAS	UAI	LTO
China	80	20	66	40	118
Japan	54	46	95	92	80
South Korea	60	18	39	85	75
Australia	36	90	61	51	31
United Kingdom	35	89	66	35	25
United States	40	91	62	46	29

According to Hofstede (2001; 1991);

- PDI (Power Distance) refers to the degree of inequality within organizations and institutions that indicate a power distance between the followers and the leaders.
- IDV (Individualism) refers to the degree to which individuals are integrated into groups. A low IDV means a high collectivistic culture that people are integrated strong and cohesive in-groups.

- MAS (Masculinity) is equated with assertiveness, while femininity is synonymous to modesty. The target languages have more feminine features such as modesty and caring rather than assertive and competitive.

- UAI (Uncertainty Avoidance) refers to the degree of people's tolerance for uncertainty and ambiguity. In a high UAI, people are more emotional and motivated by inner nervous energy and applied for more norms, values, and beliefs to minimize uncertainty.

- LTO (Long-Term Orientation) refers to how much society values long-standing – as opposed to short term – traditions and values. A high LTO society puts more weight on Virtue rather than Truth, so that people are respected for their willingness to subordinate themselves for a purpose.

Based on the cultural indices and the CUE framework, Table 4 below presents an exemplary matrix of Web-based Asian language as SLL. The flexibility of CUE framework allows the adopted cultural dimensions to be substituted and/or merged with other cultural dimensions or characteristics that educators (and learners) will determine.

Table 4
An exemplary cultural user experience matrix for a second language learning website (Target languages: Chinese, Korean and Japanese)

| Cultural dimensions | Design process | | | | | |
| | Concept design | Cultural user interface | | | Cultural usability | Cultural user experiences |
		Information design	Interaction design	Interface design		
High PDI	A hierarchical structure of interaction depending on levels of participation	A hierarchical and linear way of content arrangement	Various levels and types of participation in learning content and communication	Visualization of distance between content and content and between group and group	Functionality of depth and breadth of navigational structure	Contribution and benefit / recognition based engagement
Low IDV	More collectivistic and collaborative driven	Categorization of content for levels and/or types of learning groups	Small group based interactions and communications	Visual appeal of group driven activities	Appropriateness of categorisation of content and pages and look & feel	Community solidarity through group activities
Low MAS	More equality (less competition) and relationship driven	More breadth but less depth of content presentation / navigation	Group to group interactions and communications	Promotion of a sense of belongings to the groups	Efficiency of labels of titles, heading, captions and links	Manners and etiquette driven learning experience
High UAI	More structured situations and organised communication	Visually outstanding of Q &A, FAQ, and contact information	Goal and task oriented driven activities and communications	Visual conspicuousness of key information in a page	Accessibility of individuals' and groups' participation	Collaborative goals and group members' leading and assisting
High LTO	Emphasized relatively long term oriented mission, vision and values	Presenting expected purposes and outcomes of participation	Participating in the development of values for the learning community	More conservative look and feel	Flexibility of learning progress and user-to-user interactions	Cooperative learning by encouraging each other

The benefit of the CUE framework for Web-based SLL is that educators and Web practitioners do not have to restrict cultural aspects within either anthropologists' cultural models or interface design elements. Further, educators do not have to fully rely on design practitioners' capability of cultural understanding and production. In other words, a (customized) cultural matrix can be developed (or extended) in collaboration between educators, designers and learners, so the design process ensures active participation by educators and learners, and leads to the cultural integration. In addition, the cultural usability can be prepared based on the cultural user interface which will enrich general functionality and pedagogical usability by anticipating the cultural user experiences in the Web site.

Evaluation results

To evaluate the effectiveness of the CUE framework (Figure 1) and the exemplary matrix (Table 4), 15 participants (five learners, five teachers and five Web designers) were invited to respond to a case scenario-based evaluation. The evaluation was implemented in a confidential and anonymous way via an online survey method. Before undertaking the evaluation, the participants needed to understand the research background and questions and the frameworks in line with a given case scenario. In short, the participants were asked to develop a culturally integrated Web site for SLL without considering time and budget constraints. The target language was an Asian language as the matrix represents. The participants were also asked to presume that they will be utilizing the matrix in the Web site development process for their effective communication and collaboration with the partners (learners, educators or Web designers).

A questionnaire was designed based on the six design components and the cultural dimensions were proposed in the matrix. The first two questions were about their profession and general perception to a culturally integrated Web site for SLL, the question 3 - 8 were paralleled with the six components and asked the appropriateness of the cultural interpretations of the components. The last two questions were open-ended questions that requested to describe any components in line with the cultural dimensions that have been inappropriately interpreted or can be differently described. All the questions were compulsory.

As presented in Table 5, the most participants chose that "Quality of communication and collaboration between educators and Web designers" (Barrier 4) is the biggest obstacle to development of a SLL Web site in which the cultural (learning) features are integrated.

Table 5
Identities and perceptions (multiple answers)

Barrier	All participants	Learners (L)	Educators (E)	Web designers (WD)
Barrier 1. Web designers' competency in understanding and visualization of the cultural features	53.33% (8)	40.0% (2)	80.0% (4)	40.0% (2)
Barrier 2. Educators' understanding of web design and the cultural features	33.33% (5)	40.0% (2)	20.0% (1)	40.0% (2)
Barrier 3. Flexibility of processes and procedures of web site design and development	26.66% (4)	20.0% (1)	20.0% (1)	40.0% (2)
Barrier 4. Quality of communication and collaboration between stakeholders (learners, educators and designers)	80.00% (12)	60.0% (3)	60.0% (3)	100.0% (5)

Interestingly, however, 80 percent of the educators chose "Web designers' competency in understanding and visualization of the cultural features" (Barrier 1), whereas all the designers chose the barrier 4. This result implies that there is a perceptual gap towards Web site design between the professionals. This gap was also identified in the open-ended comments. All of the Web designer participants agreed the frameworks and matrix are practical and effective and they acknowledged that the understanding of the cultural background of the target user groups is critical in the design processes. The designers responded:

> *Depends on its cultural background has different approach and understanding of the interface design, far more its colour, spaces and layouts. So it should be considered (Designer participant #2).*

> *A lot of understanding and consideration of culture difference is required to develop a well structured learning website. Without it, the website can easily be misleading and confusing. The most important matter is to have a background understanding of the subject culture, to get a sense of what works and what's not (Designer participant #5).*

In contrast, the educator participants raised some concerns about the end-product and designers' capability rather than the development process. The participant # 1 said, "... *like to see a model of a finished website that is developed using this framework*". The participant #4 also stated:

The framework is a useful reference for cross-cultural web design. In terms of usability, is it possible to outline specific strategies for web designers who have little knowledge about cross-cultures to follow?

As discussed, the data proves that the barrier 4 is the fundamental problem for a culturally integrated SLL Web site development. In other words, the barrier 1, 2 and 3 can be resolved throughout overcoming the barrier 4. The result is consistent with the arguments from this study.

As Table 6 shows, more than 80 percent of the participants responded that the exemplary matrix presented the cultural interpretations for the design components and the cultural dimensions in a practical and functional way. Table 7 re-presents the appropriateness according to the participant groups.

Table 6
The appropriateness of the cultural interpretations against the components and cultural dimensions

Scale	Concept design	Information design	Interaction design	Interface design	Cultural usability	Overall effectiveness
Strongly agree	20.0% (3)	26.66% (4)	26.66% (4)	26.66% (4)	40.0% (6)	33.33% (5)
Agree	66.66% (10)	53.33% (8)	53.33% (8)	66.66% (10)	46.66% (7)	60.0% (9)
Neutral	6.66% (1)	13.33% (2)	13.33% (2)	0.0% (0)	0.0% (0)	0.0% (0)
Disagree	6.66% (1)	6.66% (1)	6.7% (1)	6.66% (1)	13.33% (2)	6.66% (1)
Strongly disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total	100.0% (15)	100.0% (15)	100.0% (15)	100.0% (15)	100.0% (15)	100.0% (15)

Table 7
The appropriateness of the cultural interpretations according to the participant groups

Scale	Concept design			Information design			Interaction design			Interface design			Cultural usability			Overall effectiveness		
	L	E	WD	L	E	WD	L	E	WD	L	E	WD	L	E	WD	L	E	WD
Strongly agree	20.0% (1)	20.0% (1)	20.0% (1)	20.0% (1)	20.0% (1)	40.0% (2)	20.0% (1)	20.0% (1)	40.0% (2)	20.0% (1)	20.0% (1)	40.0% (2)	40.0% (2)	40.0% (2)	40.0% (2)	60.0% (3)	20.0% (1)	20.0% (1)
Agree	40.0% (2)	80.0% (4)	80.0% (4)	20.0% (1)	80.0% (4)	60.0% (3)	60.0% (3)	60.0% (3)	40.0% (3)	60.0% (3)	80.0% (4)	60.0% (3)	40.0% (2)	60.0% (3)	40.0% (2)	20.0% (1)	80.0% (4)	80.0% (4)
Neutral	20.0% (1)	0.0% (0)	0.0% (0)	40.0% (2)	0.0% (0)	0.0% (0)	0.0% (0)	20.0% (1)	20.0% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Disagree	20.0% (1)	0.0% (0)	0.0% (0)	20.0% (1)	0.0% (0)	0.0% (0)	20.0% (1)	0.0% (0)	0.0% (0)	20.0% (1)	0.0% (0)	0.0% (0)	20.0% (1)	0.0% (0)	20.0% (1)	20.0% (1)	0.0% (0)	0.0% (0)
Strongly disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)	100.0% (5)

One significant phenomenon here is that a learner participant (#1) constantly disagreed to the questions. Unlike the other learner participants, for example, the learner participant # 4 stated, *"...the framework depicts an ideal and organic process at addressing the cultural dimensions necessary for appropriate web design*", the participant #1 pointed out:

> *It requires a lot of really deep thinking and I think analysis, it should be able to be easily understood from the lay person to the academic, basically anyone that seeks to understand and interpret this....Yes I agree with that, I understand it ... You think that it is something that I as a person can identify with, and it is very interesting and valuable that I have not thought of before.*

The learner participant # 3's comment is helpful to articulate the participant # 1's feedback.

> *What has been written is fine for the educator and design practitioners, but not for the user [learners]...To understand your concept [and framework], I had to [re]visit the theories [the cultural dimensions].*

For the learner participants, particularly, the given scenario and theories were required much endeavor to understand. This suggests at least two practical implications for learners' active engagement: 1) terminologies and concepts on the matrix need to be explained in plain English and 2) ineffective communication between educators and Web designers may exclude learners' participation in the development process (Park, 2012).

In summary, the participants agreed that the proposed framework and matrix are functional and practical to develop a culturally integrated SLL Web site. In particular, the evaluation results showed a possibility that the matrix facilitates effective communication between Web designer and educator/learner. They also discovered a perceptual gap between the participant groups. That is, both the learners and the designers were concerned with the design components and functionality in line with cultural aspects, whereas the educators tended to focus on the cultural interpretation and designers' capacity. The educator participant #4 stated:

> *Low IDV-Concept design; Low MAS-Interface design; High LTO-Interface design should be described more specific as action guides for non-experienced designers.*

For effective communication and collaboration between educators and Web designers, both the participants must endeavor to meet the end-user needs as the educator participant #5 pointed out:

Overall, the framework is well planned and carefully modeled in context with cultural dimensions. The needs of user, age and gender roles need to take into account as well as user experiences.

Conclusion

This paper argued that none of the anthropologists' cultural models and the cross-cultural user interface elements can fully integrate culture into Web sites, and the cultural integration should be pedagogically and functionally considered in understanding of end users' cultural experiences throughout the design process. It identified a need of a coherent framework for effective collaboration and communication between educators and designers that can be used in the design process, which is the key to success in the cultural integration of a SLL Web site. The evaluation results of the framework revealed a perceptual gap between the stakeholders that both the learners and the designers focused on their own understanding, whereas the educators tended to pay close attention to designers' capacity and learner needs. Conversely, this re-emphasizes the necessity of the communication framework. This is the right point that anthropologists' cultural dimensions can be used in a more practical and functional way if they are openly utilized by the stakeholders within the design process. In other words, the framework needs to be flexibly and adaptably adjusted in collaboration between educators and Web designers in order for learners to participate in the cultural integration.

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