The Internationalization of E-Learning Websites: A Methodology

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Abstract. An increasing number of internet users from various countries led to the formation of a group of users that have preferences based on particular cultural background. Indirectly, these users have different need and expectations towards the e-learning website design. This matter triggers the emergence of e-learning website internationalization concept to accommodate the needs of users from the various cultural background. However, e-learning website internationalization concept failed due to the cultural presence in the website’s interface design. Normally, e-learning website developer has a tendency to cultivate their cultural background while designing e-learning website interface without realizing it. Furthermore, the guidelines of e-learning website internationalization are still vague. No doubt, such condition would hinder the acceptance level and reduces the users' satisfaction towards these international e-learning websites. Thus, the main idea of this article is to represent the methodology to propose e-learning website internationalization model that would guide developer to design better interfaces intended for international audiences. In this study, e-learning websites are chosen as a case study. The selection of e-learning websites is justified as it has audiences of various cultural background. The contribution of study can be applied regardless of different domain and cultural background. Furthermore, it would increase the usability of international websites.

Keywords. Human computer interaction, Culture, Interface design, E-learning, Methodology.

1 Introduction

There are two common ways to design e-learning website, either localize or internationalize the e-learning’s interface design. These two concepts of designing e-learn website interface design hold two different meanings and targeted users. Mostly, website localization depends on the cultural background of targeted users while website internationalization focuses on a wider range of users. For example, e-learning website designer should pay extra attention towards user’s preferences, needs and specificities (Tigre Moura, Gnoth, and Deans 2014) of targeted users when designing local e-learning website such as the use of local language, icons and images that are suitable for certain cultures. Meanwhile, the website designer should be
meticulous towards the icons, images and other interface elements to avoid cultural interference in international website interface design.

The differences in cross cultural environments and mentalities lead to different expectations, needs and could influence user’s preferences (C. a. Collazos et al. 2010). Therefore, e-learning website internationalization concept was triggered from cross cultural interface design. However, the various international website of e-learning failed due to the cultural presence in the website interface design. Although the website developers give enormous attention when designing international interface design, but they are still unable to solve the issues of cultural presence in the interface design. It is because the website designer themselves have a strong cultural background (Sheikh, Fields, and Duncker 2009). So, they have a tendency to adapt their culture when designing website interface without realizing it. Besides that, the lack of specific guidelines on e-learning website internationalization also contributes to the failure of international website design (C. A. Collazos and Cauca 2011; Youssef, Hamdi, and Rayan 2012). In addition, the existing guidelines are still vague and it would obstruct users’ satisfaction towards these international websites.

So, the purposes of this article are represent a novel methodology to propose e-learning website internationalization model that would guide designer to design better interfaces intended for international users. A methodology plays important roles in order to make sure the research objectives can be achieved. In this study, e-learning websites are chosen as a case study. The selection of e-learning websites is based on wide range of international students with the various cultural background.

The article describes the methodology for analyzing and comparing the design elements, cultural models and interface design principle. Thus, the article presents a methodology that can support the concept of internationalization in e-learning interface design. The article is organized as follows; Section 2 briefly overview about research background. Then, in section 3 is about research objectives and research questions. Section 4 briefly explains and justifies the proposed methodology. Meanwhile, section 5, 6 and 7 is the detail explanation of each phase. Finally, the conclusion at the end of the article.

2 Research Background

The past researchers have conducted varieties of studies by implementing several methods and theories to discover the relations between interface design and culture. To answer that question, the researchers must know the meaning of culture and its relationship in the area of interface design. Besides that, culture is closely related to the concept of localization and internationalization. The researchers also need to know the definition of both terms and how it affects interface design. The next section focuses on the definition of culture, localization and internationalization.

2.1 Definition of Culture, Localization and Internationalization

Culture is very hard to define as the word culture itself has several meanings. It has been proved through previous researchers by producing hundreds of definitions of the word culture. Culture affects everything in what people do in life because of their ideas, values, attitudes and expected pattern of behaviour (Belshek 2006). Based on Hall (1976), culture may be defined as “the way of life of a people, the sum of their learned behaviour patterns,
“attitudes and material things” (Missana n.d.). However, the best definition perhaps is from Hofstede (1980) who is known to many researchers that relied on his work. He defines culture as “the collective programming of the mind which distinguishes the members of one human group or category of people from another” (Ahmed and Preston 2008). Hofstede (1984) also stated that culture is a complex element but not chaotic and there are clearly defined a pattern that needs to be considered (Bernier and Elise 2010).

The concept of cultural localization or internationalization of website design is the strategy to manage cultural differences that appear on the interface design. People in different cultures have different behaviours, preferences and expectations towards the website design. A website developer has to adapt the interface based on the user’s cultural background to develop a good website design (Punhani and Batra 2014). When it comes to developing a cross cultural website, the concern should be on localization and internationalization process. Website localization is the process of adapting the contents of the website to meet the preferences and expectation of culturally diverse groups. For example, translating English text and messages files into the Arabic language for Arabic users. Meanwhile, website internationalization is the process of generalizing interface design to handle multiple languages or cultural conventions without redesigning the whole website for the users from various countries or cultures (Khaddam and Vanderdonckt 2011; Youssef, Hamdi, and Rayan 2012).

2.2 Issues Regarding Website Internationalization

Interest in website internationalization is growing rapidly where organizational websites are being internationalized. However, there are certain issues regarding website internationalization. One of these issues that needed extra attention concerns on the usage of language. Website internationalization is difficult because there are many languages that must be consider. Various languages use a different alphabet, spacing, text direction, date and sort orders (Müldner, Wang, and Benoit 2004; Zontar et al. 2010). Research conducted by (Vanderdonckt and Beirekdar 2003) about the global user interface that was used in French speaking countries and Arab countries. They state that there is a problem of availability of the language whereby certain words or expression that exist in the initial guideline statement or definition may not exist in another language. For example, the most important word in HCI “user interface” does not exist per se in Arabian language and must be replaced by an equivalent expression representing the same concept and meaning (Vanderdonckt and Beirekdar 2003).

Sometimes, the developer of the international website uses translation tool instead of using multiple languages in the websites. Such condition triggers certain issues. For example, the character sets. Every language requires different of character sets. Many European languages have a variety of character with diacritical such as á, é and ñ (Russo and Boor 1993). So, the website designer should pay more attention towards translation because of language differences. Besides that, some words do exist in the target language but do not convey the same meaning in English (Vanderdonckt and Beirekdar 2003; Al-amoudi et al.
In addition, the use of jargon words is confusing and must be eliminated in international websites.

Besides that, reading and layout direction also influence the success of website internationalization (Khaddam and Vanderdonckt 2011). Central and Eastern European and Asian countries have the same text direction so it does not require any changes in global interface design (Zontar et al. 2010). Helen Petrie (2009) conducted a study about the importance of navigational layout or Chinese and English language speaker. The result shows that there were massive differences between Chinese and English native speaker about navigational layout (Petrie, Power, and Song 2009).

Cultural differences have become an important issue in international website design. For example, in a study conducted by (Punhani and Batra 2014) states that there are cultural issues in international websites that are not clearly understood by the users. Various research works focus on cross cultural website design and model for website localization. However, most of the research works have less focus on guidelines for international websites. A research conducted by (Callahan 2007) states that cultural issues in international websites have been narrowed down on guidelines for international interface design. Therefore, the lack of design guidelines also contributes to the failure of website internationalization (Callahan 2007; Youssef, Hamdi, and Rayan 2012). Website designers have to be aware of cultural differences when designing the interface for international users. Design guidelines mostly concentrated on culturally acceptable design elements such as date and time formats, text flow and numeric formats (Callahan 2007).

Based on the previous study, there are many reasons why international websites are still not fully accepted by people from various countries and cultures. However, we learn from past research works to discover the importance of international websites interface design.

The next section would describe the research objectives and research questions based on the proposed methodology.

3 Research Objectives and Research Questions

This study mainly focused on user interface design and developing a model. To address the research objectives, three research questions were raised as described in Table 1:

<table>
<thead>
<tr>
<th>Research Objectives</th>
<th>Research Questions</th>
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<tbody>
<tr>
<td>To conduct a comparative analysis on the local and international interface design elements.</td>
<td>What are the local and international of interface design elements?</td>
</tr>
<tr>
<td>To develop E-Learning Websites Internationalization of Model.</td>
<td>Which elements should be applied into E-Learning Websites Internationalization of Model?</td>
</tr>
<tr>
<td>To validate and refine the proposed model.</td>
<td>How to justify the proposed model?</td>
</tr>
</tbody>
</table>
4 Research Approach

The proposed methodology is aimed at producing an e-learning website internationalization model as illustrated in figure 1. The proposed methodology is an innovate approach that explores novel interface design elements that form the foundation of the proposed internationalization model of e-learning websites. It consists of 3 phases whereby the role of each are explained in section 5, 6 and 7. Each phase follows a linear sequence whereby the output of each phase would be the input of the subsequence phase. Furthermore, having three (3) phases is sufficient as the similar approach is widely adopted in related research works in the area of interaction design.

![Figure 1. Phases of research methodology](image)

Thus, research is conducted to develop a model for international websites design whereby e-learning’s websites is chosen as the case study. According to (Leimeister 2014), e-learning can be considered as an ideal genre to internationalize the website design. Various students from different countries and cultures so, that means each student has their cultural background. Figure 2 below show the methods of data collection that would be used in this study.

![Figure 1. Data Collection Methods](image)

5 Phase 1: Comparative Study

Phase 1 consists of five sub-phases as illustrated in Figure 3. These sub-phases are linear in sequence aimed at extracting cultural markers associated with interface design elements for international e-learning websites.
5.1 Phase 1a: Comparative Analysis of Cultural Markers

The data collection method in phase 1a is based on systematic literature review. Every journals and conference articles are studied carefully. It is because the goal of this phase is to understand the function of each cultural marker in local and international websites. We need to understand the reason why each cultural marker is being applied on the website for both local and international websites.

In addition, this phase also seeks to compare cultural markers of local and international websites. Cultural markers refer to interface design elements that are prevalent within a given cultural group (Fraternali and Tisi 2008; Zhou 2014). The examples of cultural markers are shown in Table 2. A content analysis would be conducted to examine the local and international cultural markers. Besides that, universities’ students would be asked to join this study to evaluate international e-learning websites. Local and foreigner students would be required to evaluate local and international websites (Mushtaha and Troyer 2009). The reason is to identify the international cultural markers that are always being applied in the e-learning website design for local and international websites.

5.2 Phase 1b: Extraction of Cultural Markers from Websites and Literature Review

A detail inspection would be performed on interface design elements of the chosen websites. Then, interface design elements would be clustered based on the frequency of use that each element in the international websites (Zhou 2014). By clustering it, we can identify the cultural markers been used on international websites. As a reassurance, the cultural markers from international websites and literature review sources would be compared and analysed. After identifying cultural markers in the international websites, international cultural markers would be extracted from the websites. Besides that, international cultural markers would also be extracted from the literature review where there are previous researches regarding localization and internationalization website design issues.
Table 2. List of cultural markers in website design

<table>
<thead>
<tr>
<th>Cultural Markers in Website Design</th>
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<tbody>
<tr>
<td>Image / Graphics</td>
<td>Text / Typography</td>
</tr>
<tr>
<td>Color</td>
<td>Text Direction</td>
</tr>
<tr>
<td>Icon / Symbol</td>
<td>Sound</td>
</tr>
<tr>
<td>Page Orientation</td>
<td>Links</td>
</tr>
<tr>
<td>Navigation</td>
<td>Language</td>
</tr>
</tbody>
</table>

Table 2 above shows the list of cultural markers for the website design that are usually used in website localization and internationalization. In websites localization, every cultural marker has specific features in order to adapt it to the specific countries or cultures. For examples, website features include web layout, the arrangement of text, images and headlines. Therefore, based on general features of the website, specific features of website internationalization must be searched and extracted. The specific features of cultural markers for international websites must be discovered, for example in our case study, the position of the logo in the main page.

5.3 Phase 1c: Comparative Analysis of Previous Model

Besides comparing cultural markers for local and international websites, previous cultural interface design model can be compared. There are many cultural models in the area of interaction design which could help the website developer in tackling the challenges in designing local and international websites.

Besides that, the cultural dimensions of each model would be analysed individually because each dimension has its characteristic. Hofstede and Hall’s cultural dimension have been extensively used for cultural studies (Callahan 2007; Hsieh 2008; C. A. Collazos and Cauca 2011). Besides cultural dimensions from the model such as Hofstede and Hall, other cultural models such as Trompenaars and Schwartz would also be used in the comparative study (Callahan 2007). In the end, the suitable dimensions from these models would be extracted and used in the proposed model. Table 3 shows cultural models and their dimensions.

Table 3. Cultural models and associated dimensions

<table>
<thead>
<tr>
<th>Cultural Model</th>
<th>No. of Dimensions</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostede</td>
<td>6</td>
<td>• Power Distance (PD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Individualism – Collectivism (IDV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Uncertainty Avoidance (UA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Masculinity – Femininity (MAS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Long – Short Term Orientation (LTO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Indulgence (IND)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Speed of Messages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Context</td>
</tr>
</tbody>
</table>
5.4 Phase 1d: Conducting Pilot Study

From the literature review that has been investigated in phase 1 (a, b, c), it shows that there are issues related to website internationalization such as inaccurate translation by using translation tool and cultural presence in certain website design. Therefore, an initial survey would be conducted to support the research issues and validate the experimental instruments. The initial survey would be carried out that consists four parts which are: demographic information, e-learning website interface, language translation and lastly, user’s cultural background on e-learning websites (Konecny 2006; Reinecke 2010; Mushtaha 2012).

5.5 Phase 1e: Conducting Survey: Questionnaire

After the pilot study has been conducted, it would provide an indication of the existence research issues. Furthermore, it would also aid us in understanding the nature of the study. In this research, the questionnaire is chosen as the primary data collection method. The conducting questionnaire is the appropriate way to collect data where a large sampling would be needed. So, the sample of target population would be chosen randomly in universities whereby a large community of local and international student exists.
In this phase, the result from phase 1 (a, b, c) would be used to develop a questionnaire for the actual study. The survey questions are centered around international cultural markers with specific features aimed at local and international university students. In addition, the questionnaire’s announcement would be posted on the university’s website.

6 Phase 2: Propose & Validate Internationalization Model

After phase 1 has been completed, then phase 2 would be carried out immediately. Phase 2 aims to propose and validate the cultural marker model. The validation process would involve expert review sessions. The detail explanation is explained in section 2a and 2b.

6.1 Phase 2a: Propose a Model

Based on previous research, there is various website localization model compared to website internationalization model (Callahan 2007). This happens because many of previous researches are more focused on localization of website design instead of internationalization of the design of the website. Therefore, the website internationalization model would be proposed in this phase. The result from the previous phase 1 would be applied to propose the website internationalization model. In addition, the proposed model is based on the international cultural marker, hybrid cultural model and interface design principles as well. The dimensions of cultural model show differences in characteristics of cultural markers (Oh, Lee, and Moon 2011) and would be adapted into interface design principle in order to guide web application designers. Figure 4 shows components of the proposed model.

![Proposed Model Diagram]

**Figure 4.** Proposed Model

6.2 Phase 2b: Model Validation

After the internationalization model for website design is proposed, the next step is to validate the model. The experts would validate the model. The selection criteria of experts are:

- Extensive knowledge and experience in designing international websites.
- Conducted previous research on cultural models.
The experts would evaluate the cultural dimensions of the proposed model which were an extract from the previous models. Besides that, experts could provide views and perspectives on the proposed hybrid model. The reviews from these experts would be used to further refine the proposed model. Figure 5 below shows the category of experts for validation purpose.

Figure 5. Three categories of experts to validate the model

7 Phase 3: Refinement of Model

The proposed model would be completed after the refinement process. Then, a prototype would be developed as a proof of concept. Prototype development would be discussed in detail in section 3a, 3b and 3c.

7.1 Phase 3a: Prototype Development

Based on the results of the proposed model validated by experts in phase 2b, a prototype of website internationalization model would be developed. All the characteristics or elements of the proposed model would be applied into the prototype. The prototype would be focused on interface design principles and international cultural markers that form the hybrid cultural model. The hybrid cultural dimension would be adapted into the prototype’s website interface design. Indirectly, the proposed model’s features and characteristics are cultivated into the prototype.

7.2 Phase 3b: Validate the Prototype

After completing the prototype development, it would be validated in term of the effectiveness of proposed model. The prototype validation process includes acceptance testing among the university students. The participants would use the prototype. The reason for prototype testing is to verify the feasibility of the proposed model. The participants would provide their response through a questionnaire. Indirectly, the questionnaire is used as a measurement tool for model’s dimension.
7.3 Phase 3c: Model Refinement

Therefore, feedback obtained during prototype testing would be used to refine the website internationalization model. The refinement process would improve the proposed model. The refined model in phase 3c would be represented as the primary research contribution.

8 Conclusion

The rapid development of information and communication technology has a tremendous impact towards human computer interaction especially in the area of interface design. The chaos in cross cultural interface design has led many researchers to focus on the concept of website internationalization. There are various difficulties while designing cross cultural website where every user’s cultural background must be taken into consideration and adapted into interface design process. So, to overcome the cross cultural interface design issues, past researchers has proposed various website internationalization approach. However, there are still various challenges pertaining the concept of website internationalization. The biggest issue is concerned with a cultural presence in international websites. Based on previous research, cultural presence in international interface design still exist due to the adaption of local cultures in the process of interface design by web developers. In other words, web developers have a tendency of cultivating their own culture into website’s interface design. Furthermore, vague and lack of specific guidelines to design international websites are also considered as the contributing factor. Therefore, a novel method must be proposed to overcome the website internationalization guidelines deficiency.

Thus, the purposes of this article are to outline methodology in proposing the model for website internationalization. At the end of this study, the proposed model could be used to guide website developer in designing better international websites. The consumption of international websites would have a wider range of acceptance among users with a various cultural background in different countries.

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