

Usability Perceptions of Culturally Adapted Web Pages

Full research paper

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Abstract

The internationalization of websites should lead to highly usable web pages with excellent user experience. As a result, the understanding and implementation of users' preferences for functionality, look, feel and aesthetics in website design has become a fundamental issue that needs to be adequately addressed. This research empirically demonstrates the interaction of user culture with user perceptions of perceived navigability, perceived aesthetics, and satisfaction, using a set of translated Australian and Chinese websites. The results show that by implementing culturally specific design elements it is possible to have a positive influence on these perceptions, but the relationships are more complex than originally hypothesized. This work highlights the importance of accommodating the different information presentation and interaction styles of culturally diverse users to improve their user experience when using websites.

Keywords

Usability, User experience, Task performance, Usability factors, Cross-cultural web.

1 Introduction

Websites enable people to search for online information on products and services and to communicate easily. As people are different, an identical website design for all cannot meet the demands of human diversity (Al-Badi 2009). Website users from different cultures have different psychological and social associations (Collazos and Gil 2011), which lead them to understand, believe, think and respond in different ways (Bahraini et al. 2020). These differences in cultural mentalities and environments lead to different requirements for interfaces across different cultural groups (Fraternali and Tisi 2008), and this will inevitably influence the information processing, interaction style, task performance, and satisfaction with websites (Reinecke and Bernstein 2013). Therefore, designing websites that are usable, understandable, and acceptable to users from different cultural backgrounds is important (Mushtaha and Troyer 2012). Website cultural adaption that incorporates culturally specific functionality, look, feel, and aesthetics is critical for user acceptance and satisfaction with website use (Cui et al. 2015; Yakunin et al. 2018). Culturally competent websites can facilitate companies to lower the cost of entry to an international market, establish a trustworthy professional brand on the Internet and increase sales (Kassim and Abdullah 2010; Yakunin et al. 2018).

Prior research in cross-cultural psychology has discovered many cultural differences. These cultural differences determine the acceptability of websites to different cultural groups and addressing them can improve usability as well as the overall user experience of website users. Much prior research has built on Hofstede et al.'s (2010) and Hall and Hall's (1990) influential work on cultural factors. These cultural factors have been applied in website design and research has found that websites incorporating these cultural factors are linked to higher perceptions of quality (Reinecke and Bernstein 2011), with the designs found to be more acceptable by users of the target culture (Fraternali and Tisi 2008). Users prefer culturally adapted websites (Nantel and Glaser 2008) and find them more attractive (Corbitt and Thanasankit 2002; Reinecke and Bernstein 2011; Yakunin et al. 2018), navigable (Broeder and Gkogka 2020; Cui et al. 2015), and usable (Forer and Ford 2003). Culturally adapted websites have also been shown to improve the efficiency of those they were intended for (Alexander et al. 2021; Fraternali and Tisi 2008; Hsieh 2014; Reinecke and Bernstein 2011).

To provide an inexpensive method to develop culturally adapted websites, Alexander et al. (2017a; 2017b) proposed a Cross-cultural Web Usability Model, which offers cross-cultural web design guidelines and a usability measuring instrument that includes a variety of usability attributes suitable to measure the look, feel, functionality, and aesthetics of website designs. This model may be used to adapt web pages at the presentation level, so that web page layout, complexity, colours, and workflows can change for users from different cultural backgrounds. It is expected that culturally adapted web pages will improve user perceptions of website attributes such as navigability and aesthetics. The research described in this paper builds upon Alexander et al. (2017a; 2017b) to investigate how cultural factors and website design interact to affect user perceptions. Given the importance of culturally specific functionality, look and feel in successful website use (Cui et al. 2015; Yakunin et al. 2018), but the lack of detailed research on user perceptions of aesthetics in cross-cultural website design, this research focusses on perceived aesthetics, along with perceived navigability, and satisfaction to identify potential cross-cultural differences. Two unmoderated, remote usability experiments, using a set of translated Australian and Chinese websites were conducted, where user perceptions of a website from their own country or a translated one from another culture were compared using participants from two culturally distinct countries. Our results highlight that cultural differences in the implementation of web attributes in website design do influence user perceptions but that these relationships are more complex than anticipated.

2 Cross-cultural User Experience Design

Website usability relates to the ease with which users can interact with websites, the efficiency of their interaction, and their satisfaction with these interactions (Nielsen 1993). User experience is defined as a user's perceptions and responses resulting from the use or anticipated use of websites (Bevan et al. 2015), and usability is part of user experience. Usability is more concerned with the tasks that users must perform and their level of accomplishment; in terms of the user and website design relationship, it is on the pragmatic side (Hassenzahl and Tractinsky 2006). User experience aims to find a balance between the pragmatic and hedonic (e.g. beauty, stimulation, challenge, and self-expression) aspects of website use and possession, hence requiring a more holistic approach (Yeratziotis and Zaphiris 2018). Realising this, research evaluating website usability has also included more subjective measures to evaluate levels of user experience. Enhancing user experience is important for website acceptance (Reinecke and Bernstein 2011).

Users satisfaction with website design has also been shown to be influenced by cultural variables (Al-Khalifa and Garcia 2014). Web design preferences differ between countries (Hsieh and Hong 2013) and national culture influences the perception of usability (Barber and Badre 1998). Thus multinational companies develop culturally adapted websites that build on the connection between web design preferences, culture and usability as opposed to just utilising a standardized website (Reinecke and Bernstein 2011). Culturally adapted websites can provide a significant competitive advantage by maintaining full functionality, but adapting the look, feel, and aesthetics of web pages, according to users' cultural values and attitudes (Bernstein & Reinecke, 2013).

To understand the cultural values and attitudes of users, prior research has largely relied on Hofstede et al.'s (2010) and Hall and Hall's (1990) cultural factors, which are dominant in HCI research (Hsieh, 2014). These cultural factors have been incorporated into website designs and research has shown that doing so is associated with higher website quality perceptions, with the design considered more acceptable by users of the target culture. Users prefer culturally adapted websites (Nantel and Glaser 2008), rating them as more reliable (Chu and Yang 2010), navigable (Cui et al. 2017; Cui et al. 2015), and appealing (Corbitt and Thanasankit 2002).

Some prior studies of the role of culture in web usability have considered user perceptions together with user performance. Fraternali and Tisi (2008) showed that both user performance and satisfaction increase on e-commerce websites that incorporate the cultural factors from Hall and Hall (1990). Alostatha et al. (2011) and Hsieh (2014) conducted studies that showed culturally adapted web pages increase different aspects of both user performance and satisfaction. Reinecke and Bernstein (2011) and Reinecke and Bernstein (2013) measured user performance and perceptions of aesthetics, showing that most users prefer culturally adapted web pages, consider them to be better aesthetically and have better performance with them. Cui et al. (2015) also found that culturally specific navigation structures minimise errors, improve perceived navigability and satisfaction and as a result improve user experience.

Since the empirical basis for a cross-cultural web usability model was limited, Alexander et al. (2016) conducted a large-scale study to compare web design preferences of Australian, Chinese, and Saudi Arabian users. This study identified many prominent design elements or cultural markers that are highly prevalent within a particular cultural group. These prominent design elements can be used to match the cultural needs, expectations, and preferences of users from different cultures. The prevalence of these design elements was also mapped to Hofstede et al.'s (2010) and Hall and Hall's (1990) cultural factors, and to HCI factors that determine information presentation and interaction style. This mapping focused on differences in user intentions and behavioural patterns, which are essential for a culture-centred design process (Shen et al. 2006), and this work informed the development of cross-cultural web design guidelines (Alexander et al. 2017a).

Websites can be designed for a particular culture using the cross-cultural web design guidelines proposed by Alexander et al. (2017a). These guidelines use relationships among cultural factors, HCI factors and web design to better support web developers. The guidelines consider Hofstede et al.'s (2010) cultural factors (including power distance, individualism, uncertainty avoidance, and long-term orientation), and Hall and Hall's (1990) cultural factors. The HCI factors in the guidelines include information speed, information density, information frequency, information redundancy, information sequentiality, interaction sequentiality, interaction exactness, interaction speed, and interaction frequency. The mechanism that websites use to deliver on the HCI factors can be modulated through the presentation of web pages, using web design attributes such as layout, navigation, links, multimedia, colour, text, and visual representation. Decisions about these design attributes can also guide choices about web features such as when to use a hierarchical structure and determining a suitable level of information complexity. This cross-cultural web usability model can thus be used to adapt web pages at the presentation level, so that in most cases, the web page layout, complexity, colours, and workflows can be changed for users from different cultural backgrounds. The research described in this paper contributes to the understanding of cross-cultural user experience design by clarifying how perceived navigability, perceived classic aesthetics, perceived expressive aesthetics and satisfaction are influenced by how cultural factors and website design interact.

3 Hypotheses

Prior research from Cui et al. (2015) and Reinecke and Bernstein (2011) was reviewed to identify key website usability attributes that may be important in determining user perceptions of website design. Each user perception considered in this study is described in the following sections along with the hypotheses associated with it.

3.1 Perceived Navigability

Ease of navigation, or navigability, is essential to ensure that users experience websites in a functionally effective way with minimal effort. Navigation is usually implemented through a handful of well-known design elements such as links and menus. A common variation in navigability is whether specific information is placed in a “deep” hierarchical menu structure of several levels, or in a “broad” structure where a greater number of options are presented at the same level.

User interface research has shown that Westerners, such as those from the US, Europe and Australia, and Easterners have distinct perceived navigability preferences for “broad” vs “deep” navigation. Cui et al. (2017 and Cui et al. (2015 showed that Chinese users, with a predominantly holistic cultural cognitive style, had higher perceived navigability with designs that adopted a “broad” navigation structure. Whereas, US users, who are more likely to have an analytic cultural cognitive style, had higher perceived navigability with Western designs using a “deep” structure. Given this cultural difference in perceived navigability, it was proposed that:

H1: Cultural factors, HCI factors, and website design interact to affect perceived navigability.

H1a: Users from Australia have higher perceived navigability on Australian culturally specific website designs as opposed to Chinese culturally specific website designs.

H1b: Users from China have higher perceived navigability on Chinese culturally specific website designs as opposed to Australian culturally specific website designs.

3.2 Perceived Aesthetics

There has been little research on user perceptions of aesthetics in cross-cultural website design. However, some authors suggest that two levels of aesthetics, classic as well as expressive aesthetics, are particularly important in the context of the web (Lavie and Tractinsky 2004; Lorenzo-Romero et al. 2013). The classic aesthetics attribute corresponds to the “visual clarity” dimension (e.g. clean and clear designs), while the expressive aesthetics attribute corresponds to the “visual richness” dimension of website design (e.g. sophisticated and original designs) (Nasar 2016). These are important in enhancing user perceptions about website quality even after very short exposures (Lorenzo-Romero et al. 2013). In studies by Reinecke and Bernstein (2011 and Reinecke and Bernstein (2013, users’ perceptions of classic as well as expressive aesthetics were improved with culturally adaptive user interfaces. It is therefore hypothesised that classic, as well as expressive aesthetics, are likely to be perceived as higher for culturally adaptive web pages than for non-adapted web pages.

H2: Cultural factors, HCI factors, and website design interact to affect perceived classic aesthetics.

H2a: Users from Australia have higher perceived classic aesthetics on Australian culturally specific website designs as opposed to Chinese culturally specific website designs.

H2b: Users from China have higher perceived classic aesthetics on Chinese culturally specific website designs as opposed to Australian culturally specific website designs.

H3: Cultural factors, HCI factors, and website design interact to affect perceived expressive aesthetics.

H3a: Users from Australia have higher perceived expressive aesthetics on Australian culturally specific website designs as opposed to Chinese culturally specific website designs.

H3b: Users from China have higher perceived expressive aesthetics on Chinese culturally specific website design as opposed to Australian culturally specific website designs.

3.3 Satisfaction

Satisfaction relates to a user’s subjective comfort with a website and the acceptability of its use (Nielsen, 1993), and it is an important indicator of website success (Cui et al. 2015). User satisfaction is composed of perceptions of both usability and aesthetics (Reinecke and Bernstein 2011). Dianat et al. (2019 found that user satisfaction is influenced by web design characteristics. Previous research has shown that users exhibit high levels of user experience and satisfaction with their culturally specific website design. For example, Chinese users have higher levels of satisfaction with Chinese website designs, than with Western designs (Fraternali and Tisi 2008). It is therefore hypothesised that users will experience a higher level of satisfaction with culturally adaptive web pages than with non-adapted web pages.

H4: Cultural factors, HCI factors, and website design interact to affect satisfaction.

H4a: Users from Australia have higher satisfaction on Australian culturally specific website designs as opposed to Chinese culturally specific website designs.

H4b: Users from China have higher satisfaction on Chinese culturally specific website designs as opposed to Australian culturally specific website designs.

4 Methodology

To test the hypotheses, two existing websites were adapted for user testing. Design elements and cross-cultural design guidelines (Alexander et al. 2017a; Alexander et al. 2017b) were consulted and used to identify Australian and Chinese websites that display Hofstede et al.'s (2010) and Hall and Hall's (1990) cultural factors and HCI factors. The Department of Finance - Western Australia (2016 website and the Beijing Municipal Government Portal (2016 website were chosen. These websites provide government services for local audiences and were considered to be representative of the target cultures.

Each website was professionally translated so that English speaking Australian participants could complete tasks on Australian and Chinese designed web pages. Similarly, Chinese participants were able to complete tasks in Mandarin (Simplified Chinese) on Australian and Chinese designed web pages. The websites used were:

- Australian website in English, for Australian participants (AU-AUWeb)
- Chinese website in English, for Australian participants (AU-CNWeb)
- Australian website in Mandarin, for Chinese participants (CN-AUWeb)
- Chinese website in Mandarin, for Chinese participants (CN-CNWeb).

Participants were recruited using the participant recruitment platform Cint (2018). A total of 200 users (100 Australians living in Australia and 100 Chinese living in China) participated in the research. A between-subjects approach was used where each participant was randomly assigned to evaluate either an Australian or a Chinese design web page. Each participant was asked to complete four information-seeking tasks, followed by a questionnaire. This questionnaire was used to collect demographic details (such as age, gender, education, and Internet experience) as well as responses to the user perception items for perceived navigability, perceived classic and expressive aesthetics, and satisfaction. Items were drawn from previously validated scales for all constructs: perceived navigability (McKinney et al. 2002; Palmer 2002), perceived aesthetics (Lavie and Tractinsky 2004; Lee and Koubek 2010) and satisfaction (Cui et al. 2015; McKinney et al. 2002; Palmer 2002). These items were measured on a 7-point Likert scale, with 1 labelled "Strongly Disagree" and 7 labelled "Strongly Agree". Reliability testing showed each scale to be reliable (Nunnally and Bernstein 1994) with Cronbach's alphas of 0.88 for perceived navigability, 0.97 for classic aesthetics, 0.87 for expressive aesthetics and 0.94 for satisfaction. A composite variable was calculated for each user perception attribute for each participant as the mean of their responses to items.

A web-based remote usability research tool, Loop11 (2018), was used to record participants' interaction with the test websites. Before undertaking the real test, a pilot test was conducted to identify and fix any procedural problems, finalize the manipulation, and refine the experimental procedure and instructions. Before starting the experiments, users performed a training task to familiarise themselves with the test environment.

5 Results

A total of 200 valid responses, 100 from Australia and 100 from China, were obtained. The demographic profile of the participants is presented in Table 1 and Table 2 provides descriptive information about perceived navigability, perceived aesthetics and satisfaction for the different websites. As the data did not meet the assumption of normality, non-parametric Mann-Whitney U tests, were used to test H1, H2, H3, and H4.

H1 hypothesized that users have higher perceived navigability when using their culturally specific web design. Our results (see Table 3 and Table 4) confirm that Australian participants had significantly higher levels of perceived navigability with the Australian website design than with the Chinese website design (median 4.00 vs 3.00; $U = 901$, $z = -2.410$, $p < .016$). H1a was therefore supported. H1b hypothesized that Chinese users have higher perceived navigability with Chinese website designs, as opposed to Australian website designs, and this was also found to be the case (median 4.75 vs 5.00; $U = 1553.5$, $z = 2.098$, $p < .036$). H1b was therefore supported.

		Australian participants		Chinese participants	
		Australian website design	Chinese website design	Australian website design	Chinese website design
Gender	Male	15	20	31	28
	Female	35	30	19	22
Age	18-24	5	7	11	6
	25-34	9	10	26	33
	35-44	6	6	8	9
	45-54	13	10	4	2
	55+	17	17	1	0
Internet usage	1-5 years	1	1	3	1
	5-10 years	4	6	17	14
	10 years or more	45	43	30	35
Level of school	No schooling completed	3	2	0	0
	High school graduate	12	16	1	1
	Trade/ technical/ vocational training	16	17	7	1
	Bachelor's degree	15	10	37	38
	Master's degree or higher	4	5	5	10

Table 1: Demographic profile of participants

Usability Attribute	User Test	Mean	Median	SD
Perceived Navigability	AU-AU Web	3.91	4.00	1.41
	AU-CN Web	3.29	3.00	1.44
	CN-AU Web	4.61	4.75	1.29
	CN-CN Web	5.12	5.00	1.08
Classic Aesthetics	AU-AU Web	3.86	3.58	1.39
	AU-CN Web	2.75	2.33	1.64
	CN-AU Web	4.77	4.92	1.24
	CN-CN Web	4.52	4.58	1.24
Expressive Aesthetics	AU-AU Web	3.04	3.00	1.23
	AU-CN Web	2.95	2.70	1.55
	CN-AU Web	3.98	4.00	1.06
	CN-CN Web	3.99	4.10	0.95
Satisfaction	AU-AU Web	3.67	3.33	1.67
	AU-CN Web	2.85	2.50	1.53
	CN-AU Web	4.46	4.42	1.27
	CN-CN Web	4.51	4.42	1.32

Table 2: Descriptive information about user perceptions

H2 hypothesized that users have higher perceived classic aesthetics when using their culturally specific web design. Table 3 confirms that Australian participants had significantly higher levels of perceived classic aesthetics with the Australian website design than with the Chinese website design (median 3.58 vs 2.33; $U = 735, Z = -3.555, p < .000$). H2a was therefore accepted. It was also hypothesised that Chinese users would have higher levels of perceived classic aesthetics when using a Chinese website design as opposed to an Australian website design. Contrary to expectations, there was no significant difference for Chinese participants in perceived classic aesthetics between the Australian and Chinese website designs (median 4.92 vs 4.58; $U = 1089.5, Z = -1.108, p = .268$), and H2b was therefore not supported.

	Australian website design		Chinese website design		Mann-Whitney <i>U</i>	<i>z</i> -score	<i>p</i> -value
	Median	Mean rank	Median	Mean rank			
Australian participants							
Perceived Navigability	4.00	57.48	3.00	43.52	901.00	-2.410	.016
Classic Aesthetics	3.58	60.80	2.33	40.20	735.00	-3.555	.000
Expressive Aesthetics	3.00	52.16	2.70	48.84	1167.00	-0.573	.566
Satisfaction	3.33	57.62	2.50	43.38	894.00	-2.457	.014
Chinese participants							
Perceived Navigability	4.75	44.43	5.00	56.57	1553.50	2.098	.036
Classic Aesthetics	4.92	53.71	4.58	47.29	1089.50	-1.108	.268
Expressive Aesthetics	4.00	49.99	4.10	51.01	1275.50	0.176	.860
Satisfaction	4.42	50.16	4.42	50.84	1267.00	0.117	.907

Table 3: Mann-Whitney *U* test results for perception attributes

H3 hypothesized that users have higher perceived expressive aesthetics when using their culturally specific web design. Contrary to expectations, as can be seen in Table 3, there was no significant difference for Australian participants in perceived expressive aesthetics between the Australian and Chinese websites (median 3.00 vs 2.70; $U = 1167, Z = -0.573, p = .566$); H3a was therefore not supported. It was also proposed that Chinese participants would have higher perceived expressive aesthetics with Chinese website designs as opposed to Australian website designs. Contrary to expectations, there was no significant difference for Chinese participants in perceived expressive aesthetics between the Australian and Chinese website designs (median 4.00 vs 4.10; $U = 1275.5, Z = 0.176, p = .860$), so H3b was not supported.

Attributes	Hypotheses	Results
Perceived navigability	H1a: Users from Australia have higher perceived navigability on Australian culturally specific website design as opposed to Chinese culturally specific website design.	Supported
	H1b: Users from China have higher perceived navigability on Chinese culturally specific website design as opposed to Australian culturally specific website design.	Supported
Perceived classic aesthetics	H2a: Users from Australia have higher perceived classic aesthetics on Australian culturally specific website designs as opposed to Chinese culturally specific website designs.	Supported
	H2b: Users from China have higher perceived classic aesthetics on Chinese culturally specific website designs as opposed to Australian culturally specific website designs.	Not Supported
Perceived expressive aesthetics	H3a: Users from Australia have higher perceived expressive aesthetics on Australian culturally specific website designs as opposed to Chinese culturally specific website designs.	Not Supported
	H3b: Users from China have higher perceived expressive aesthetics on Chinese culturally specific website designs as opposed to Australian culturally specific website designs.	Not Supported
Satisfaction	H4a: Users from Australia have higher satisfaction on Australian culturally specific website designs as opposed to Chinese culturally specific website designs.	Supported
	H4b: Users from China have higher satisfaction on Chinese culturally specific website designs as opposed to Australian culturally specific website designs.	Not Supported

Table 4: Summary of hypothesis testing

H4 hypothesized that users have higher satisfaction when using their culturally specific web design. Table 3 confirms that Australian participants had significantly higher levels of satisfaction with the Australian website design than with the Chinese website design (median 3.33 vs 2.50; $U = 894$, $Z = -2.457$, $p < .014$). H4a was therefore supported. H4b hypothesized that Chinese participants have higher satisfaction with Chinese website designs, as opposed to Australian website designs. Contrary to expectations, there was no significant difference in satisfaction for Chinese participants between the Australian and Chinese website designs (median 4.42 vs 4.42; $U = 1267$, $Z = 0.117$, $p = .907$); H4b was therefore not supported. Table 4 summarises the results of the hypothesis testing.

6 Discussion

This research investigated how cultural factors and website design interact to affect user perceptions. Positive differences were identified in perceived navigability, perceived classic aesthetics and satisfaction when users from Australia were using Australian culturally specific website designs, suggesting that integrating cultural factors and HCI factors into website design provides a culturally specific functionality, look, and feel that improve user perceptions. The differences for Chinese users were less substantial, with only perceived navigability being significantly higher.

Regarding navigability, websites can either be designed with a “broad” or “deep” navigation structure (Galletta et al. 2006). Our results extend previous understanding by demonstrating that analytic Westerners, including Australian users, and holistic Easterners, including Chinese users, have distinct perceptions and preferences for “broad” vs “deep” navigation designs (Cui et al. 2017; Cui et al. 2015). Chinese participants, who were more likely to have a holistic cultural cognitive style, had higher perceived navigability with the Chinese design that adopted a “broad” navigation structure. Australian participants, who were more likely to have an analytic cultural cognitive style, experienced higher perceived navigability with the Australian design that adapts a “deep” structure. These findings were consistent with Cui et al. (2015 and Cui et al. (2017 who found that Chinese participants had higher perceived navigability with a “broad” navigation structure design and US participants had higher perceived navigability with a “deep” structure design.

Classical aesthetics is the “visual clarity” dimension (Nasar 2016) of the website. This attribute is characterised by order (regular or harmonious arrangement) and familiarity, increases understanding and sense-making, and reduces ambiguity (Van Schaik and Ling 2009). This notion emphasises orderly and clear design, which are closely related to many of the design rules advocated by usability experts (Lavie and Tractinsky 2004). The results of our study suggest that Australian users perceive a higher classic aesthetic in Australian website designs as opposed to Chinese website designs. However, there was no significant difference in perceived classic aesthetic for Chinese users between the Chinese website design and the Australian website design. This lack of difference for Chinese users could result from the greater exposure Chinese users have had to major global Internet sites that were originally designed for Western audiences. Australian Internet users, however, rarely see Chinese designed websites. Chevalier et al. (2014 found that poorer performance at web tasks negatively influenced perceptions of classic aesthetics; therefore, the lower perceived navigability of Chinese website designs for Australian users may have impacted perceived classical aesthetics for this group. Although the Chinese users also considered the perceived navigability of Australian website designs to be lower, their greater previous exposure to these designs may have mitigated the effect on perceived classical aesthetics.

Expressive aesthetics is the “visual richness” dimension (Nasar 2016) of websites, which goes beyond the classical principles and tests the designer’s creativity and expressive power (Lavie and Tractinsky 2004). This attribute is characterised by complexity and increases arousal and involvement (Van Schaik and Ling 2009). It captures users’ perceptions of design properties including creativity, special effects, originality and sophistication. In their study, Reinecke and Bernstein (2011 found that expressive aesthetics was rated significantly higher for the culturally adapted website version. However, no differences in the levels of perceived expressive aesthetics were found in either cultural group in our study. This may be because classic aesthetics are considered to be more important than expressive aesthetics in judging information-oriented pages (Van Schaik and Ling 2009), and the websites and activities used in this study were more task-oriented than those in Reinecke and Bernstein (2011. Nevertheless, though not statistically significant, the mean scores were in line with our expectations. Chinese users had a slightly higher median perceived expressive aesthetics in Chinese design (4.1), than in the Australian design (4). Similarly, Australian users had a higher median perceived expressive aesthetics when they used the Australian website design (3) than with the Chinese design (2.7). This suggests that users may have a better “feel-good factor,” typically expressed as expressive aesthetics (De Angeli et al. 2006) in their culturally specific website design. Further studies, if conducted with higher

statistical power may potentially discern significant results in this relationship in a broader range of web pages.

Our results regarding the two types of website aesthetics confirm that although expressive aesthetics are related to engagement and fun (De Angeli et al. 2006), they have a lesser impact than classic aesthetics (i.e. clarity of design) in some contexts. A potential explanation would be to understand the classic aesthetics as a form of “visual” usability (Hassenzahl and Monk 2010), complementing the usability of interaction (Tuch et al. 2012), which is important to engage the users in fulfilling interaction and generating affective responses (Lorenzo-Romero et al. 2013). This is also consistent with van Schaik et al. (2009), who found that after brief exposure of website use, classically aesthetic pages that are information-oriented are rated as more attractive than expressively aesthetic pages.

It has been suggested that users will be more satisfied with their culturally specific website design (Hsieh, 2014; Reinecke & Bernstein, 2011). Consistent with expectations, Australian users have higher satisfaction when using Australian website designs as opposed to Chinese website designs. However, there was no significant difference for Chinese users, no matter which website design was used. This lack of difference in satisfaction for Chinese users, consistent with the lack of difference in perceived classical aesthetics, could result from the greater exposure Chinese users have to major global Internet sites that have been designed originally with a Western audience in mind. Chinese users are more likely to have experience interacting with Western layouts and designs and thus their satisfaction is not as negatively impacted when they are asked to perform an information-seeking task using a website designed for an Australian audience. Australian Internet users, however, rarely see Chinese designed websites and therefore their perceptions are impacted more when they are asked to interact with a nonfamiliar culturally specific website.

Finally, this research complements the recent findings of Alexander et al. (2021 where the cross-cultural dimensions of user task performance metrics were established. Taken together, these findings support the proposition that targeting aesthetics in cross-cultural websites may improve user performance and perceived usability (Reinecke & Bernstein, 2011).

7 Conclusion

Drawing from prior research in the cultural preferences in website design, our work has developed and conducted evaluations of a set of English and Chinese websites with users from two countries. Our results demonstrate that usability attributes for user perception differ between cultures and that culturally specific websites are perceived more favourably by users with low familiarity with culturally different website designs. The clearest support for cultural differences was found in the site navigation suggesting that this dimension be prioritised when developing websites for a global audience. Australian users also reported higher satisfaction and perceptions of classic aesthetics on culturally adapted websites. Our work also sheds new light on usability-aesthetics relations. Since the term “aesthetics” is often used to describe a beautiful or pleasing appearance of an interactive system (Lavie and Tractinsky 2004), the notion of “what is beautiful is usable” (Hassenzahl and Monk 2010; Tuch et al. 2012) as well as “what is usable is beautiful” (De Angeli et al. 2006; Hamborg et al. 2014) should be considered in a cultural context. In summary, these findings confirm the central hypothesis that localised website designs can improve user experience. Thus, it is expected that practical implementation of these design concepts, while not expensive or technically complex, has the potential to increase website usability.

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