

Analysing the effects of cultural dimensions on the quality of library websites

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The study attempts to assess the effect of the cultural dimensions on library website designing and also tries to establish its connection with library website quality. Content analysis method was adopted to accumulate the data from 85 university libraries. Further, statistical tools were employed to analyse the data. The study has revealed that there is a significant association between cultural dimensions and web site design. The study also established that all the culturally effected web designs [*Power Distance Index (PDI)*, *Uncertainty Avoidance (UA)*, *Individualism (IDV)*, *Masculinity (MAS)*, *Long Term Orientation (LTO)*] are strongly correlated with the website quality. Subsequently, a regression model has been projected to calculate the level of impact of cultural dimensions on website quality. In addition, the checkpoints used in the study can act as guidelines in any similar kind of research.

Keywords: Library website; Cultural dimensions; Web design; Website quality; University library

Introduction

Website of an organization has become its primary communication medium and libraries are not an exception. Library websites play an important role to enhance library's overall outreach and therefore adequate importance should be given to designing library websites. In 2009, Flavian *et al*¹ have suggested web design as a key factor behind the success of the website that helps to strengthen the users' engagement with concerned organization.

Websites embedding the flavour of local culture are expected to provide better user experience through its performance and serviceability² as it has unparalleled potential to allure local as well as the larger community³. Therefore it is necessary for the designer or developer of a website to have a sense of local culture and that should be manifested during the creation of website to facilitate a better interaction between library and its users. Researches on business websites have established mutual connection between web design and quality of the website and reported that website quality enhances engagement of user through better interaction and fulfilment of their needs⁴. This association signifies culture as a strong predictor for designing a quality website. The study attempts to redefine the connection between culture, web design and website quality in the perspective of library websites.

Literature review

Cultural dimension and website design

While discussing culture Hoebel⁵ noted it as a product that continuously gets changed by social interactions. By 2009, Rathje⁶ defined culture as a superior level of internal similarity generally shown in a particular social system. An exhaustive definition of culture has been given by Geert Hofstede⁷ that states, "*In social anthropology, 'culture' is a catchword for all those patterns of thinking, feeling, and acting*" and more precisely it includes usual activities of day to day life. Hofstede's definition has derived the idea that culture is nothing but the consolidation of specific pattern of behaviour which is also corroborated by Merriam Webster's Dictionary as it defined culture as, "*the integrated pattern of human knowledge, belief, and behaviour that depends upon the capacity for learning and transmitting knowledge to succeeding generations*". These patterns seem to get changed with socio-demographic diversity, so culture should be divided into separate dimensions rather building a generalised model⁸. From mid 20th century numerous social psychologists from different countries had argued cultural dimensions as a fundamental issue that individualize each society from other⁹. There are several studies which examined the dimensions of culture; Parsons and Shils¹⁰ devised five pairs of cultural dimensions from facets of human

actions. In 1976, Hall¹¹ unfolded two separate cultural dimensions (high-context and low-context) on the basis of communication process. Later, Hofstede⁷ forwarded five dimensions for national culture comprising *Power Distance Index (PDI)*, *Uncertainty Avoidance (UA)*, *Individualism (IDV)*, *Masculinity (MAS)*, *Long Term Orientation (LTO)*. Compared to other cultural dimensions^{10, 11}, Hofstede's⁷ model is more prominent and widely cultivated by different researchers and has been used in the present study.

Researches on the applications of cultural dimensions in website¹²⁻¹⁵ that are carried out so far assured its firm association with web design. Furthermore, studies on this area have identified a strong engagement between culture and user experience^{1, 16, 17}. Hsieh¹⁸ has studied the communication pattern of the user to gauge their experiences towards website and concluded that for achieving the effective communication, users always prefer such a web design which has the influence of particular culture on it, although badly designed website "frustrate users and cause them to leave as they cannot find what they need"¹⁹. Kanga and Mastin²⁰ have categorically described culturally effected web design as a tool to develop public relations, which is also affirmed by Shneur²¹ and Snelders *et al*²² as they mention culture as a strong predictor for localization of the website that helps to attract a certain group of people to use the website²¹. Therefore, it has observed that inclusion of cultural aspect in the website design becomes necessity to increases the accessibility and usability of the website.

Impact of each cultural dimension on web design

Early literatures on culturally influenced web design mainly stressed upon its features, while some researches focussed on how culturally effected web design affected the user experience. Studies reviewed here are basically application oriented works, providing an overview that how each dimension of culture influenced web design separately. Marcus and Alexander¹⁶ have argued that PDI index bears high level of proficiency to increase the usefulness of website and established online relationship through direct connection with user²³. Yu *et al*²⁴ opined that IDV ensures the localization of website by harnessing dedicated applications and user oriented services. Moreover, Shneur²¹ revealed that localization through web design is positively correlated with user

specificity. MAS index truly measures the approachability of a website to the user²⁵. Moreover, Cyr and Head²⁶ ascertained website having high MAS index includes different user communities through wide range of web applications and cordial web design. Meanwhile, effects of UA on web design have indicated that convenient arrangement of information increases users' reliability towards website²⁷. Karahanna *et al*²⁸ have further argued UA as a predictor to reduce anxiety in web-user relationship by increasing reliability of the website. LTO index always enables some facilities like quick activities and immediate results^{13, 23}, which has worked as an aggregator to elongate users' bonding with the website²⁹.

Previous researches have discussed the effects of each cultural dimension on web design and also have highlighted the intervention of culture on web design that helps to build a firm user-website relationship. Though, effects of cultural dimensions have been investigated on digital library development^{30,31}, but there are no major studies carried out yet to measure the relationship between the culturally influenced web design and website quality from the perspective of library websites. Hence, the study tries to find the association between these two factors; moreover gives emphasis to visualize the impact of each component of web design on website quality. The research employs Hofstede's⁷ five cultural dimensions [*Power Distance Index (PDI)*, *Uncertainty Avoidance (UA)*, *Individualism (IDV)*, *Masculinity (MAS)*, *Long Term Orientation (LTO)*] and attempts to seek their effects on library website quality.

Objectives of the study

- To study how far the Hofstede's⁷ cultural dimensions penetrate the web design of the library website;
- To develop a model to calculate the level of impact of web design on library website quality; and
- To explore the level of impact of each component of the web design on the quality of the library website.

Methodology

Sampling technique

The sample consisted of 85 university libraries from across the world selected through non-random convenience sampling. De Sarkar³² has also performed this type of sampling for his study to choose universities from different part of the world. Here the samples are collected from three continents on the basis of ease of access: 1) North America-30 University library websites, 2) Europe-30 University library websites, 3) Australia-25 University libraries. Thereafter, universities are classified according to the countries for further analysis. Meanwhile, a pilot study on university library websites of India revealed that many library websites are neither dynamic nor exhaustive and therefore Indian library websites were not considered.

The universities were selected from recognized sources such as QS World University Rankings (2015), Times Higher Education World University Rankings (2015) and Center for World University Rankings (2015). Appropriate measures were also taken during the selection of university libraries to accommodate socio-demographic variations in order to make the sampling frame exhaustive and minimize possibilities of any systematic biasness.

Data collection methods

Data were collected during 1st June, 2016 and 31st July, 2016. Holsti³⁵ defined content analysis as ‘...any technique for making inferences by systematically and objectively identifying specified characteristics of messages.’ Content analysis method has been used by previous researchers^{14, 15} to measure

cultural dimension’s influences on website design, which acted as a justification behind the selection of this method. Selected university library websites have been searched and accessed through Google search engine.

Research instrument

Relevant literatures¹²⁻¹⁵ was consulted to design 5 checklists on culturally effected web design (considered as the independent variables). Related works of De Sarkar³², WebQualTM³³ and Chua and Goh³⁴ were studied to rebuild a checklist on website quality (considered as the dependent variables). Each checklist is framed by 5 checkpoints and each checkpoint is corroborated by 5 points Likert scale (*Strongly agree*=5, *Agree*=4, *Neutral*=3, *Disagree*=2, *Strongly disagree*=1).

Power distance

Hofstede⁷ observed that Power Distance Index (PDI) resembles the inequality of the distribution of power in a society. If, PDI is used in context of library, we can assume that through wide range of innovative web-based applications, a library enables the direct participation of the user in library website. For example, social networks like blogs, wiki, etc., provides ample opportunity to library users to create and share user generated contents. “Suggestion for purchasing” link serves as a conduit for the users to directly interact with the library and provide valuable input to purchasing library resources. Users’ involvement in such a distributed power enabled library may be assessed by employing the checklist (Table 2).

Table 1—Distribution of the universities according to the countries

Country	Universities
U.S.A.	23
Australia	18
U.K.	16
Canada	7
New Zealand	7
Switzerland	5
Germany	2
Netherland	2
Ireland	2
Denmark	1
Austria	1
Finland	1

Table 2—Website Design

Checklist 1—Power Distance

- 1 Create content through social networking sites
- 2 Enable the provision for resource organization
- 3 Website enables wiki facility
- 4 Library provides blogging facility
- 5 User can provides suggestion for purchasing the resources through website

Checklist 2—Individualism

- 6 Reservation of the resources through website
- 7 Library website provides citation tools
- 8 Online chat with Librarian
- 9 Interaction through Email
- 10 Send query by Electronic Form

Checklist 3—Masculinity

- 11 Embedded library catalogue link in social networking sites
- 12 Various ways of contact (Flickr, YouTube, Picasa, Blog)
- 13 Library website option is linked in institutional home page
- 14 Library services provided through mobile applications
- 15 Use of colour, layout, font always maintain the formal look

Checklist 4—Uncertainty Avoidance

- 16 Embedded Site map on home screen for better navigation
- 17 Provides FAQ to facilitate the use
- 18 Customized Search facility within library website
- 19 Navigation oriented to exploration (for example, links might open new windows leading away from the original location)
- 20 Website provides virtual tour to make user aware of the library

Checklist 5—Long-Term Orientations

- 21 Provide Search widget in every webpage
- 22 Library website provides browser plug in
- 23 The category label should be clear to general user
- 24 Library enables Podcast facility
- 25 Find required information in an easy way

Individualism

Hofstede⁷ opined that a society with high individualism reflects the distinctive self-reliant attitude of its people leading to their self development. Individualism fits in context of the library as well. Library website plays a pivotal role to cater to the individual needs of its user group thus enhancing individual user empowerment with regard to searching, interacting, sharing, community building and so on. For example, enabling one to one communication facility with the librarian, making provisions for the online reference service through online chat, email and online form will improve the individual capacity of library users. Access to research and academic tools and facility for accessing library materials etc., through websites also falls under this.

Masculinity

Societal masculinity primarily emphasises on positivity, toughness and dynamic nature of a society. In context of library, masculinity refers to its vastness of applicability. For example, to accommodate a wide range of mobile (Smartphone, Tab, PDA, etc.) savvy users, the library website should provide mobile optimized services. Moreover, to draw the attention of the users, a prominent link of the library website may be given to the institutional homepage.

Uncertainty avoidance

Uncertainty avoidance is a tendency to deal with the anxiety. Viewing from the perspective of library, some features/services may be added to the website by which anxiety of not getting required information

will be reduced. Features like site map, FAQ, customized search facility etc., enable users to assimilate the required information quite efficiently. Proper navigational tools may be added to the website to minimize the chance of getting lost in the website. Virtual tour provided by the library website will help users to get acquainted with the library.

Long term orientations

A well-presented website serves as a face of the library. Therefore, ease of using a website will ensure that user's re-visit the library website. As a result, a firm engagement may be established between the user and the library website. So, the dimension mainly orients library website to ensure a long term relationship with its user.

Website quality

Chua and Goh³⁴ have instrumented the three distinct facets of website quality: *System Quality*, *Service Quality* and *Information Quality* which was also used by De Sarkar³² to investigate the library website quality against the online interactivity dimensions. System quality has been constructed to assess the functionality of the web site. Service quality mainly deals with the prospect of the website and measures the expectation levels of the users. The

quality of information and resources served by the website has been calculated by the quality of information available.

The web design checklist (Table 2) and web site quality checklist (Table 3) were finalized after vetting by a Professor of Library and Information science and two Assistant Librarians.

Reliability of research

Kothari³⁶ noted, "A measuring instrument is reliable if it provides consistent results". To test the instrument's reliability three experts carried out a pilot study on 20 library websites from the list of 85 websites. The three separate coding were compared and as three codes were involved, inter reliability of the data was checked through Cronbach's Alpha. The value of Cronbach's Alpha is .808, which indicates a good internal reliability among the datasets of the experts.

Analysis

Since data were collected from more than three independent groups. One-way ANOVA is used to calculate differences among them. Result of one way ANOVA (Table 4) shows masculinity has most significant difference between twelve countries.

Table 3—Website Quality

Checklist 6

System quality

- 1 Level of importance should be maintained in resource organization
- 2 Satisfactory response time for the website
- 3 Precision should be high in the embedded search engine
- 4 Responsiveness of the website
- 5 ID/ Password for authentic login

Service Quality

- 6 feedback mechanism is quite potent for give response to all the query
- 7 User guidance to use various online application
- 8 Enable Off campus accessibility for library resources
- 9 Multi lingual approach to serve international patron
- 10 Events and programmes are notified through the bulletin board of website (Information alerting services)

Information Quality

- 11 Institutional provided Information are error free
 - 12 Currency of information is maintained in the website
 - 13 Non- ambiguity in the information
 - 14 Information should be highly relevant with the context of website
 - 15 User generated content are check thoroughly
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Table 4—ANOVA Test of the data collected from 12 different countries

Cultural dimensions	MeanSq	F	Sig
PDI	18.744	1.138	.232
IDV	16.368	1.584	.122
MAS	6.866	1.105	.370
UA	14.040	1.186	.312
LTO	20.862	2.325	.016

Table 5—Correlation analysis between the cultural dimensions and the website quality

	PDI	IDV	MAS	UA	LTO	Website quality
PDI	1					
IDV	.299	1				
MAS	.313	.368	1			
UA	.296	.344	.276	1		
LTO	.374	.368	.304	.438	1	
Website Quality	.519	.558	.575	.646	.661	1

Table 6—Regression analysis between the cultural dimensions and website quality

Model	Unstandardized Coefficients		Standardized Coefficients	
	B	Std. Error	Beta	t
(Constant)	10.526	2.318		4.542
PDI	.277	.102	.169	2.562
IDV	.348	.121	.184	3.534
MAS	.686	.156	.273	1.601
UA	.588	.116	.324	2.828
LTO	.594	.129	.305	2.432

However, overall result indicates the level of difference in the study is satisfactory.

Correlation analysis has been employed in order to examine a relationship between cultural dimensions and the website quality. Table 5 reveals that there are 21 positive correlations at .01 level.

Finally regression analysis has been introduced to calculate the effect of cultural dimensions on library website quality. The generalized regression model can be represented as

$$y = mx + C$$

For 'n' number of variables,

$$y = C + m_1x_1 + m_2x_2 + m_3x_3 + \dots + m_nx_n$$

Here y is the dependent variable and x1, x2, x3 are the independent variables. Meanwhile, C is the constant and m₁, m₂, m₃ ... m_n are the coefficients derived from the regression analysis.

The results of the regression analysis have been plotted in the Table 6 that indicates all five

dimensions of culture have significant engagement with library website quality; concluding that a model equation has been built with the coefficients of cultural dimensions. The model is represented as,

$$y = 10.526 + (0.277 X x_1) + (0.348 X x_2) + (0.686 X x_3) + (0.588 X x_4) + (0.594 X x_5)$$

where, x₁ = PDI, x₂ = IDV, x₃ = MAS, x₄ = UA, x₅ = LTO and y is denoted as website quality. The deriving facts from the equation have indicated that *Masculinity* has most of its influence on the website quality, followed by *Uncertainty Avoidance*, *Long Term Orientation* and *Individualism* respectively. The *Power Distance* has least influence out of the five dimensions.

Findings and discussions

Power Distance Index (PDI) helps to develop relationship between library and user. Social networking sites (Facebook, Twitter, LinkedIn) are being increasingly used by libraries to get users involved with library. Blogging sites are more

prevalent in USA and UK. Wiki based library website is uncommon. Purchasing suggestions facility is being widely used by libraries to ensure user intervention in the website. A library having these web-based applications allows user to participate, which direct them to get connected with the library website.

Individualism (IDV) is confirmed as a significant determinant of library website quality. It evolves through the reciprocal communication between a user and the librarian by interactive services such as reservation of resources, citation tools, online chat, email and sending queries through electronic form. All these dedicated communication services under IDV index have facilitated educational empowerment to every individual patron through library website. Countries like Sweden, UK and Canada have given more emphasis to the reservation of resources compared to others; where as Germany, USA, Sweden and UK provide more citation tools to strengthen research. Increasing popularity of synchronous communication has made almost all libraries to harness online chatting facility for increasing users' engagement. Compared to other countries, Australian library websites have provided more detailed and structured electronic forms to receive queries from users.

Masculinity (MAS) index helps to increase inclusiveness of library by enabling some definite applications for users. Social networking, instant messaging, video streaming and photo sharing sites are cited as the checkpoints of MAS index in this study. Prevalence in use of these applications has been observed particularly in library websites of North American universities. Participation of mobile/i-phone users in library website has become more spontaneous due to the dissemination of resources through mobile applications. Dominancy in use of this service has been observed in university libraries of USA and New Zealand. Besides this, UK and Australian websites have tried to impress more users by maintaining a formal appeal through the use of colour and layout. So, this wide range of services and web-applications have allowed libraries to serve different sections of users through their websites.

The study has established uncertainty avoidance (UA) index as a contributing factor of library website quality, which reduces anxiety by enabling the user to explore the website properly. Featured checkpoints like sitemap, FAQ, virtual tour etc have also been

driven from this basic idea. Majority of the universities have included sitemaps in their libraries' homepages. Prevalence in use of Frequently Asked Questions has been noticed in USA and Canada. The number of questions in FAQs is much higher in number compared to other continents. A search engine on the library website enables users to search the entire website in a simple way. Navigation tools provide the guidance to the users and help them to explore the website in a friendly way. Virtual tour of the library is a service provided by the website to acquaint users with the library. Some of the universities in North America and Europe have enabled this service. Checkpoints under UA index have ensured their strong association with user friendliness by alleviating anxiety.

Result of the ANOVA test indicates that there is no significant difference in use of long term orientation (LTO) index among selected countries. All library websites have tried to ensure the revisit of the users by their services like embedding chat widget in all the pages, providing browser plugins (Libx, GoogleDocs, NoodleBib, Delicious, CiteMe, Bibtext, Bookmarklet), podcast service and easily understandable category labels. These services have helped to draw positive impression from the users' side, which has established a positive correlation between LTO index and library website quality.

Conclusion

Culture always penetrates the cognitive side of the user. The study has tried to investigate the level of impact of the culturally effected web design on library website quality. The study shows that the five cultural dimensions of Geert Hofstede exert influence on the web design of library website and all of them are strong predictors for website quality. Further, regression analysis has been used to measure website quality in respect to web design. In addition, correlation analysis has deduced that LTO has strongest connection with website quality among five of the cultural dimensions, followed by UA, MAS, IDV and PDI. The potentiality, performance and presence of each element (checkpoints) has been described in detail and their internal cohesiveness has also been portrayed by the study. Meanwhile, the study has covered 85 universities throughout North America (30), Europe (30) and Australia (25) and devised 25 culturally effected web design checkpoints and 15 website quality checkpoints for this purpose.

Further qualitative studies on the area of social psychology and web design with regard to library websites need to be carried out. There is further scope to redefine the proposed checklists. Above all, the study is based on select websites of 12 countries. Including more socio-demographic variations in future studies could reveal interesting results.

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