

Bringing Consistency in the Websites of Higher Educational Institutes (HEIs) of Pakistan

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Abstract : The aim of this research is to bring consistency in the Higher Educational Institute's (HEI's) websites of Pakistan through a framework for designing HEI's websites. HEI's websites have a lot of contents to be placed at the right corner. These intend to offer information for prospective students, their parents, existing students, alumni, faculty members and staff. Our results show that majority of HEI's websites in Pakistan are not designed by following specific framework. These websites show inconsistent information which makes it difficult to search the required information. Major problem of inconsistency was observed through comparative analysis and survey. The basic methodology for this research work was interviews, questionnaire and usability evaluation. Experimental results show that consistency in websites promotes usability which will make the websites easy to use and easy to learn. We concluded that standards, conventions, templates and patterns should be designed and applied during the design, development and maintenance of HEI's websites.

Keywords: Consistency, Higher education, Human computer interaction, Usability engineering, Websites in Pakistan.

I. INTRODUCTION

The main aim of HEI's websites in Pakistan is to show information regarding institute and to provide services to students, parents, faculty members and staff. The students and faculty members explore these websites to get necessary information. The major challenges are to access this information effectively and efficiently by all stakeholders. Students start accessing these websites for seeking admission and continue till their graduation as well as after graduation. If website is not easy to use and learn, then visitors may immediately switch to other website [1]. Before using any system, user always develop some understanding about the behavior of the system which is called Mental Model. The success of this mental model depends upon many factors i.e. consistency etc, which relates performing actions based on previous experiences [2]. Consistency is considered to be one of the most important usability characteristics which will make the product easy to use and learn. In a website, consistency means that the same sequence of actions results in the same output [3].

Conventional marketing wisdom would say that all materials within a brand should have a similar look and feel to maintain the brand. Under this wisdom, the web should not be treated differently than maintaining a similar look and feel throughout the websites. The scheme of consistency on websites is quite straightforward when users navigate from page to page, related contents or services should be accessible in comparable fashion and on similar location. A consistent user interface always presents related information similarly everywhere on the site. Moreover, consistency also improves productivity as user can always predict system behavior [4].

Usually, the consistency in the websites is measured in the form of features like color (background and font), font-size, typography and standard navigation bar [5]. Therefore, a website is considered to be consistent if the similar standards for the maximum features have been used in the entire website.

This research aims to examine the consistency with respect to perceptions and expectations of both the stakeholders of Higher Education Commission (HEC), and the HEI's of Pakistan, in relation to functionality/services provided in their websites. The ultimate goal of this research is to propose a framework for the development of HEI's website in Pakistan.

The rest of the paper is structured as follows: Related work has been discussed in section II, methodology and data analysis is presented in section III, findings are elaborated in section IV, section V describes complete framework of websites design, section VI presents discussion, the paper is concluded in section VII along with future work and the acknowledgments are presented in section VIII.

II. RELATED WORK

Literature on a website's design and development shows that the quality of educational websites mainly depends on its consistent interface [6-9]. Better the quality of the interface of the education related software better will be the learning progress of the students [10, 11]. Crowther *et al.* [12] affirmed that improper

interface design has more serious effects on educational systems than business related. It not only effect student's impression but also has serious impacts on the whole progress and everyday learning. In crux, to improve the quality of any e-learning system there is a need to improve its interface [7, 10, 13, 14].

Significant work has been done to propose various principles and standards to build easy to navigate websites [15, 16]. One of these principles is to have consistent navigational system, which is of course most important consistency design feature [17, 18]. For example, users cannot perform efficiently if navigation bar is on right hand side against recommendations of left hand side [19, 20]. Interface consistency always relates to interface design. Increasing consistency results in decrease error rate in web based tasks [21, 22]. Improved consistency helps students to get familiar with the system immediately [23]. Consistent software systems always behave in expected manner [8].

Usability evaluation and recognition of the role of user are important in the construction of websites [24]. Powell, [25] described websites composed of two structures; first is logical, which related to the way the information linked and how the user navigate and the second is physical, which relates to the localization of information. The logical structure depends on layout of the page, navigation, links, search, structure and interactivity [25]. The best practice to assess the usability of website is to have usability analysis in an iterative design process [26].

Developing online services for the students which can be used conveniently and comfortably are the need of the time. Studies tell us that students always seeks for a well-organized, easy to use technology that allows them to efficiently complete their tasks, locate information, and communicate electronically [27]. A university is considered to be technological advanced which promotes education through virtual learning system [27]. Most of studies show the significance of interface consistency in web based applications; however they are either case studies or academic in essence. Good educational website can significantly contribute toward improvement of interaction between students and faculty members.

III. METHODOLOGY AND DATA ANALYSIS

The methodology adopted for this research was interviews, questionnaire and usability evaluation. The interviews were conducted with the stakeholders of HEC and some public sector universities of Pakistan. In interview, more focus was on the faculty members and students who are considered to be the major stakeholders. A questionnaire (88 questions) was designed and distributed amongst the major stakeholders of HEI's websites. The questionnaire was based on the functionality/services provided by the university's website. Most of the questions were asked about function and service which are required by the user and also for its usability attribute.

The data collected through interviews and questionnaire was analyzed statistically and manually to generate results which are presented in following section.

IV. FINDINGS

A. Interview of Stakeholders in HEC and HEIs

To evaluate the expectations and needs of HEC, Pakistan for HEI's websites, interviews were conducted with

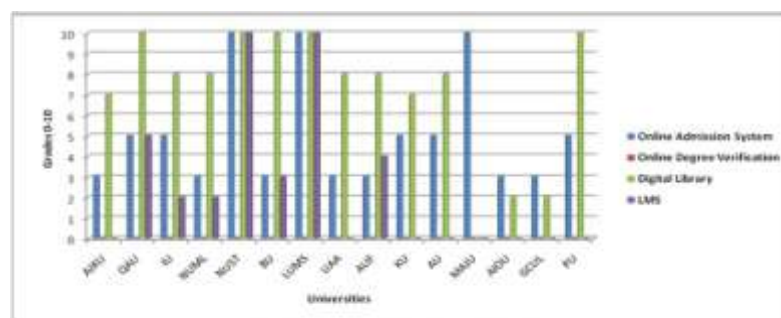


Figure 1 Scale points of University website's utilities.

the stakeholders of HEC and HEIs. In each interview, different aspects related to service provision were discussed and major utilities and functionalities were highlighted. Utilities and functionalities discussed in previous section were identified in almost 15 different universities' websites of Pakistan. Scale from 0 to 10 was given to each utility discussed in interview while analyzing websites of respected universities. The scales were compiled and the results are shown in Figure 1.

The other information like complete name of University for each abbreviation and their URLs are given in Appendix 1.

B. Measuring consistency through questionnaire

A questionnaire was developed to evaluate consistency in different universities websites. The Questions were organized in different categories of related features. The first portion of questionnaire was divided into two groups; common features and highly recommended features as shown in Appendix 2. This

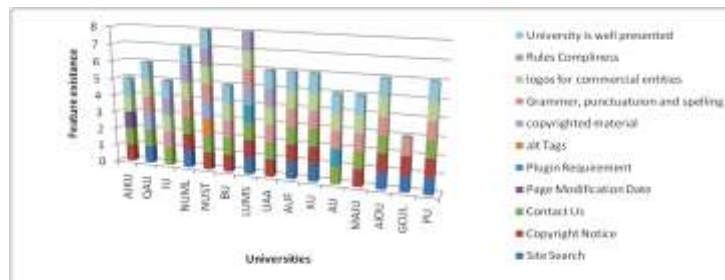


Figure 2 Consistency in common features

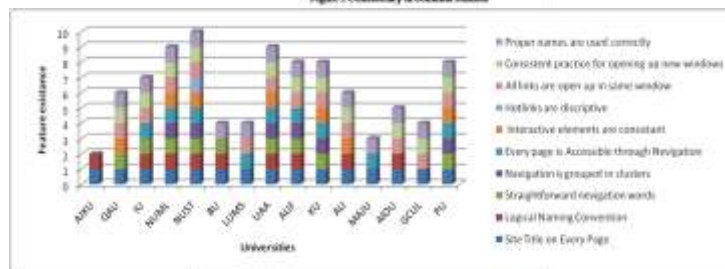


Figure 3 Consistency in Highly recommended features

questionnaire was distributed to several students and faculty members of various universities and age groups. After results computation and data analysis, the results are shown in Figure 2 and 3.

Five different universities were compared with respect to certain features by each student (S1, S2: average scores) and faculty member (T1: average scores). Score to each web site was given using a number from -10 to +10, including 0. 0 means that the criterion is not available at all to score. Scores from +1 to +10 relate to the how well the criterion is being represented, where +1 indicates that the criterion is represented, and +10 indicate that the criteria is extremely well represented. Scores from -10 to -1 relate to how distracting or irritating the criterion is where -10 indicate a major distraction/irritant and -1 a minor distraction/irritant. The

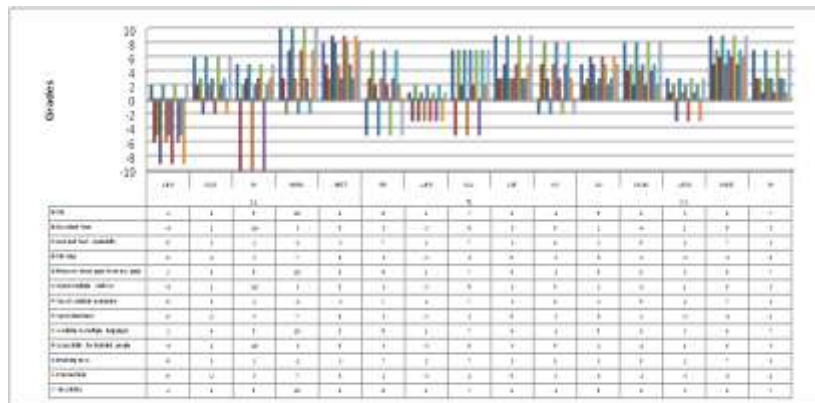


Figure 4 Comparison of different universities

results are shown in Figure 4. The accumulative scores given by students and faculty members to different features are shown in figure 5.

After analyzing the data shown in figures 1 to 5, it can easily be deduced that there is an extreme lack of consistency in HEI's websites of Pakistan. The sites are not properly designed and even in some websites the basic functionalities are not provided. Each website should justify that why one should access it on web through proper services. Some university's websites are nothing more than just static web pages displaying university's introduction.

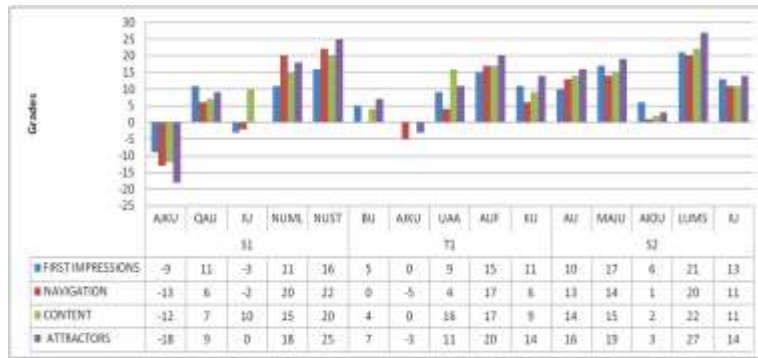


Figure 5 Cumulative comparison of different universities

V. FRAME WORK FOR HEI’S WEBSITE DESIGN

Based on the strong feedback of major stakeholders involved in universities website design, a framework has been proposed as guidelines to develop consistent HEI’s website in Pakistan. The framework is shown in Figure 6.

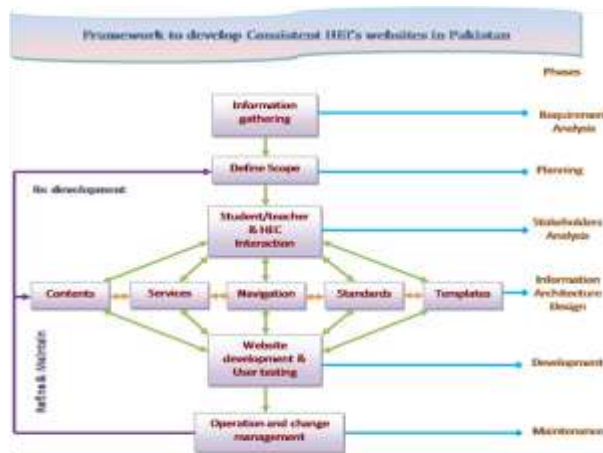


Figure 6 Framework to design Consistent HEI’s website of Pakistan

This framework emphasizes on stakeholder’s analysis and Information Architecture Design (IAD) using templates and standards. The main phases of framework are elaborated as follows:

A. Requirement Analysis

Requirement analysis phase involves gathering all the required information necessary to plan and develop the website. This phase is extremely necessary as it helps to find what to build and also multi rounds to customer can be avoided. Essentially, this phase enables one to tell the stakeholder what you require and what your website needs to achieve.

B. Planning

This phase aims to define the scope of work by defining goals, budget constraints, completion time, targeted audience, design requirements, technology and infrastructure. Consultancy with experienced designers and project managers may also be required during this phase.

C. Stakeholders Analysis

Stakeholder analysis involves what are the stakeholders, their characteristics, nature and level of interest, and how they will be affected by the project. In the development of HEI’s website, the main stakeholders are faculty members, students and HEC. To design a quality website, needs and requirements of all the stakeholders must be considered. It helps better user by in and to understand what is important to everyone.

D. Information Architecture Design

Steps involved in defining effective site organization and navigation are called IAD. Content Writing and visual design creation & modifications are performed during this phase. Information architecture helps to draw site map. This is an important phase for designing consistent HEI’s websites as all the specified standards, templates and checklists are considered during this phase. Standards like W3C and templates help to improve identity, flexibility, usability and consistency in the HEI’s websites.

E. Development

This phase involves building the website according to IAD. During development continuous feedback from the stakeholders plays important role to fulfill the requirements and usability of the website. This feedback can be achieved through user testing during the development of website.

F. Maintenance

Website maintenance involves changing contents and increasing return traffic to website. It plays important role in areas like publishing, quality assurance, feedback monitoring, performance monitoring and infrastructure monitoring. Change management in maintenance coordinates all the technical and other changes. Maintenance may involve just refinement where only IAD needs to be redesign but when maintenance involves redevelopment then scope must be redefined.

VI. DISCUSSION

A website should be created after complete understanding of needs and expectations of its prospective users. Contents, graphical design, organization and navigation should be designed in such a way that allows visitors to access information and complete critical tasks with ease [28]. These aspects have even greater importance for HEI's websites where users come from variety of different backgrounds. Normally expectations of visitor to a HEI's website seem to be same as all the visitors belong to faculty member or students group. Therefore HEI's websites should be consistent in terms of services and functionality. But in case of websites of HEI's of Pakistan, they are designed very poorly without considering consistency and usability aspects.

Major reason of inconsistencies in the HEI's website's design is lack of proper framework to design the websites. A framework has been designed shown in figure 6, to fill this gap. Major emphasis in framework is on IAD which enables intuitive use of website [29]. For proper IAD there should be proper standards, guidelines and templates which are currently unavailable. Initiative must be taken by HEC to design templates and standards for consistent HEI' website design.

VII. CONCLUSION AND FUTURE WORK

In a random survey of websites of HEI's of Pakistan, it has been observed that websites are not consistent in terms of functionality/services. Most of the websites does not justify their usability. The basic reason for inconsistency is lack of specific framework to design consistent websites according to HEC guidelines. A frame work has been recommended while keeping in view the interest and expectation of different stakeholders of universities. The proposed framework can be used as a guideline for designing HEI's websites. Comparative and competitive analysis of the given framework with current website development strategies in Pakistan will be done in future. The results of this study could also be expanded to other corporate websites at national and international level.

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Appendix 1: Universities of Pakistan and their URLs

S#	Abbreviation	University Name	URL
1	AJKU	Azad Jammu & Kashmir University	www.ajku.edu.pk
2	QAU	Qaid-i-Azam University	www.qau.edu.pk
3	IU	Iqra University	www.iqra.edu.pk
4	NUML	National University of Modern Languages	www.numl.edu.pk
5	NUST	National University of Science & Technology	www.nust.edu.pk
6	BU	Bahria University	www.bahria.edu.pk
7	LUMS	Lahore University of Management Sciences	www.lums.edu.pk
8	UAAR	University of Arid Agriculture Rawalpindi	www.uaar.edu.pk
9	AUF	Agriculture university Faisalabad	www.uaf.edu.pk
10	KU	Karachi University	www.uok.edu.pk
11	AU	Air University	www.au.edu.pk
12	MAJU	Muhamad Ali Jinnah University	www.jinnah.edu.pk
13	AIOU	AlamaIqbal Open University	www.aiou.edu.pk
14	GCUL	Government College University Lahore	www.gcu.edu.pk
15	PU	Punjab University	www.pu.edu.pk

Appendix 2: Questionnaire to evaluate Website consistency

This questionnaire is to evaluate the website consistency of HEIs of Pakistan

- 1- Name _____ 2- Role Faculty Member/Student
- 3- University _____ 4- URL _____

Questionnaire (Please answer question impartially after visualizing/using the website)

Part I

Common features (✓ the available feature)

- Is there a link to either the University's search or a site-specific search from your site's home page?
- The University's copyright notice, including the current year, exists on your site's home page.
- Contacts for site owners are provided somewhere within your site.
- A page modification date exists on your site's home page.
- Your site provides critical information in a format that does not require a plug-in (third-party software) for viewing.
- <alt> tags containing alternative text are provided for all of your site graphics and photos.
- All copyrighted material is used with permission.
- Grammar, spelling and punctuation are correct and follow a consistent style.
- You do not advertise, endorse, link to or include logos for commercial entities.
- Your site complies with "Rights, Rules, Responsibilities," as well as the Equal Opportunity Policy.
- Your site represents University well.

Highly recommended features (✓ the available feature)

- Your site title is placed prominently on every page.
- Your site has a logical naming convention for Web addresses, menu labels and page headers.
- Your navigation uses straightforward wording, in one- to three-word phrases.
- Your navigation is grouped in clusters of six or fewer items.
- Every page in your site can be accessed from some level of your navigation.
- Interactive elements in your site behave consistently; so that users can predict what will happen when they click on an item.
- When making hotlinks use descriptive two- or- three-word phrases.
- All links to pages within your own site open up in the same window.
- Your site uses a consistent practice for opening up new windows for links that take the user outside of your site.
- Proper names are used correctly.

Part II

Comparison of five websites

Web Site Review Questionnaire						
Score each web site using a number from -10 to +10, including 0. 0 means that the criterion is not available at all to score. Scores from +1 to +10 relate to the how well the criteria is being represented, where +1 indicates that the criteria is extremely poorly represented, and +10 indicates that the criteria is extremely well represented. Scores from -10 to -1 relate to how distracting or irritating the criterion is where -10 indicate a major distraction/irritant and 1 a minor distraction/irritant.						
Criteria Explanation	Criteria	-	-1	0	+1	+10
First Impressions are always important. If the website does not look professional and if it does not function in an efficient and effective way as well as being attractive, potential clients/users may be lost.		1. FIRST IMPRESSIONS				
The URL (Universal Resource Locator). An Internet World Wide Web Address) needs to be short and simple. The best URLs are intuitive.	URL					
Size of home page. The most important factor in conveying an efficient impression is download time. A user will only wait so long for a page to download. All pages should be kept under 50k in size. The homepage should be especially small and quick to download.	Download time - size of home page					
Readability. Pages should be easily readable, clear and easy to understand. It is important that the site is not too cluttered with text and images. The font size needs to be large enough to be readable and clashing colors need to be avoided.	Look and feel- readability					
Asking users to download an application or a plug-in before entering a site can cause annoyance and confusion, hence driving them away.	Need to download software					
Users entering the site will appreciate seeing everything in front of them without having to make the effort of scrolling up and down.	Home page on one screen (above the fold)					
It is extremely important that the user immediately realizes that the site is of potential use to them. The unique selling point of the site should be stated on the homepage.	Unique Selling Point (USP) or Value Proposition					
The site should be interactive and encourage user participation from the outset. There should be direct links to key action points immediately visible on the homepage.	Ability to take action (Key action point – KAP)					
The site should strive to create a feeling of wanting more in the user. The goal should be to get the user to stay as long as possible and to come back to the site again.	Feeling of wanting more - depth of site					
Providing immediate contact details such as e-mail addresses and telephone numbers on the homepage will give the site an open feel and add a personal touch, thus increasing user confidence and trust in using the site.	Contact details					
Providing credential information is a useful way to build trust in the user.	Credential validation - certifications, associations etc.					
Forcing users to subscribe or register on the home page before continuing will not be appreciated and may turn users away. Users will only identify themselves when they are ready.	Are you made to register to get into site?					
Total score for section(1)						
Being offered an easy way to find your way around the website is critical to the success of the venture.		2. NAVIGATION				
The navigation system should be intuitive and easy to use, providing direct access to various content and facilities on the site.	Ease of use					
Site maps are easy to understand and present a completely alternative method of navigating the site to the user.	Site map					
Constantly providing a link back to the homepage is essential to ensuring users do not get lost and feel more secure navigating the site.	Return to Home Page from any page					
An internal search facility provides users with a means of finding what they want on the website quickly and efficiently. This is especially important for large sites with a substantial amount of content.	Internal search engine					
Allow users to move through the site not only through text or graphical navigation system but also through the content. This allows the user to navigate through the site following the natural progression of the content.	Internal links					
All links should be continuously tested to insure they are working. Broken links will frustrate users and give an unprofessional impression.	Broken links					
Graphics may not convey immediate meaning to some users so providing additional text links is important. ALT tags (image descriptors) on images accommodate the visually impaired and can boost ranking with some search engines.	Text as well as graphic links (ALT tags)					

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Navigational links should be constantly visible and consistent throughout the complete website.	Navigational links visible					
The fundamental view of data on the Web is the page, which is viewed as an atomic unit. Frames split up web pages and can add confusion to the user attempting to navigate the site.	Opens multiple windows					
Total score for section						
Without valuable and useful information the website may well fail to achieve its objectives. The key to good content is that it is extensive and original.	3. CONTENT					
All content presented on the site should be of the highest quality. Generally users are interested in content and not fancy animations and graphics. It is important to proof read content thoroughly before adding it to a site.	Useful information					
Information published on the Web is generally evaluated under the following five headings. Authority: Who is responsible for the pages, what are their qualifications and associations, can these be verified? Currency: Are the dates when the site was created and last updated clear? Coverage: What is the focus of the site? Are there clear headings to illustrate an outline of the content? Objectivity: Are biases, if any, clearly stated? Are affiliations clear? Accuracy: Are sources of information and factual data clearly listed, and available for cross checking?	Degree of substantiated information					
As a medium the Web is especially tailored to presenting content through the use of text, graphics and animation, offering a huge potential to convey content to users. Therefore a website should be as interactive as possible, taking advantage of the great opportunity to interact with users.	Level of interaction					
Graphics should add value to the website rather than reduce performance without providing any real benefit to the user.	Use of valuable graphics					
Animation used should add value to the website rather than reduce performance without providing any real benefit to the user.	Use of valuable animation					
Animation used should add value to the website rather than reduce performance without providing any real benefit to the user.	Use of valuable animation					
Sound used should add value to the website rather than reduce performance without providing any real benefit to the user.	Use of valuable sound					
Providing independent comments about how trustworthy the website actually is will build trust in the users.	Reviews, testimonials and certifications					
Content should be chunked, that is broken up into easily digestible amounts. Pages that are only composed of scrolling text should be avoided as they will bore the user.	Content in digestible quantity					
All content published should be recent and up-to-date.	Up-to-datedness					
Making the site's content available in multiple languages will make the information accessible to a wider range of people.	Available in Multiple Languages					
It is highly important that the sight accommodates those with visual and acoustic disabilities.	Accessibility for disabled people					
It is important to supply details of how goods and services are to be delivered and returned if necessary. Information on how payment is to be made is also absolutely essential.	Terms and conditions					
Frequently asked questions provide a site with the ability to quickly introduce the site's content to an unfamiliar user.	FAQ's					
The website should provide a means to engage in a discussion with the business.	Availability of follow up discussion					
Total score for section						
Attractors draw individuals and business to your site.	4. ATTRACTORS					
	1. Invitation to register for something					
	2. Competitions					
	3. Special offers					
	4. Freebies					
	5. Breaking news					
	6. External links					
	7. Newsletter					
	8. Other (Specify)					
Total score for section						
These criteria make it easy to find your website in the first place.	5. FINDABILITY					
It is estimated that 47% of all website referrals come from direct navigation (the URL typed directly into the navigation bar). Therefore the site's URL should be intuitive i.e. as close to the company's name or brand as possible.	Intuitive URL					
A "recommends a friend" facility is essential to promoting a website. A user that finds a site interesting and useful is likely to have friends or associates that will also have an interest in the site.	On-line recommend a friend					
Getting other websites to link to your site can substantially increase the flow of traffic through your site. Another benefit of other sites linking to your site is that it can boost your ranking with some of the search engines. Therefore negotiating reciprocal links with other sites can increase the findability of your site in two different ways.	Partner and affiliate sites					
Total score for section						
Many business transactions require some level of contact between the parties concerned. The checklist offers an approach to evaluating the effectiveness of a website using the following key issues with regard to Making Contact.	6. MAKING CONTACT					
	1. Email and other details visible					
	2. Response time to enquiries					
	3. Automatic email response					
	4. Personal email response					
	5. Use of online forms					
	6. Telephone contact number provided					
	7. Telephone call back offered					
Total score for section						
Make the website visit a much more useful and pleasant experience. There are many variations of browsers and monitors in use today and it is important that the website is accessible to as many internet users as possible.	7. BROWSER COMPATIBILITY					

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	1. Internet Explorer (1-5)					
	2. Netscape Navigator (1-4)					
	3. Google Chrome					
	Total score for section					
The more a website knows about the surfing and buying habits of the users, the more ability it has to fulfill the user's needs.	8. KNOWLEDGE OF USERS					
	Availability of utilization statistics					
	Total score for section					
Satisfying users is essential to bringing e-shoppers and e-buyers back to the website.	9. USER SATISFACTION					
i.e. is the site frequently crashing or off-line.	Robustness/reliability of the site					
	Clicks to completion					
	Acknowledge order/request					
Does the cookie fill the form?	Retain personal information to minimize detail entering					
	Total score for section					
Supplying additional useful information will help build confidence in the website.	10. OTHER USEFUL INFORMATION					
	History of the university					
	Management and geographical structure					
	Mission statement					
	Up-to-date press coverage					
	Total score for section					
	OVERALL TOTAL SCORE					

Thank you for completing this questionnaire.

Source of Support: Nil, Conflict of interest: None