

Heuristically Evaluating Greek e-Tourism and e-Museum Websites

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Abstract: The Internet and its World Wide Web service have reshaped the promotion of cultural and tourism products. Well designed and user adaptable e-commerce websites improve business promotion as they attract more e-visitors. Multilingualism, dynamic and thus frequently updated content, email communication and searching capabilities are crucial options of websites. In this paper we empirically build an evaluation methodology to assess the technologies and services of Greek e-tourism and e-cultural websites. The primary focus of our work is to evaluate the technical capability of tourism and cultural websites and to realize the available options offered to users. A number of tourism e-commerce websites and e-museums were randomly selected and their content and technologies were analyzed based on the methodology proposed. The results of this statistical examination are analyzed and discussed. The main conclusion is that although the reviewed websites are rich in multimedia content they need to support customers more efficiently by offering more services or by refining the offered e-services.

Keywords: e-museums, usability of cultural websites, e-tourism, e-commerce

1. Introduction

The advent of Internet reshaped the promotion of tourist and cultural products and their respective teaching demands (Connolly et al., 1998; Sigala & Christou, 2002). Well designed and user adaptable e-commerce websites improve business promotion as they attract more e-visitors. Actually, many factors are affecting website success. Much has been written about the design of websites regarding human engineering, user interface, business, and usability perspectives (Susser & Ariga, 2006), and numerous web design checklists have been developed for the purpose of identifying design and evaluation criteria (Zhang & Dran, 2000). It is noteworthy that Law and Bai (2006) review the published articles on website development and evaluations in ENTER Conference Proceedings from 2000 to 2005 and the Journal 'Information Technology & Tourism' from 2000 to 2004. Hamil and Gregory (1997) suggested that successful website characteristics include information richness, regular updating, clear information paths, interactivity, and responsiveness to user feedback. Therefore, multilingualism, dynamic and thus frequently updated content, email communication and searching capabilities are crucial options of websites.

Internet is the easiest distribution channel and the most cost effective method to reach customers around the globe. Effective tourism websites should be dynamic, subject to constant update, innovation and management (Lazarinis et al., 2002; Albert et al., 2004). Several tourist agencies and cultural institutes have created online hypermedia presentations. The common aim of all these websites is to effectively promote the agency's products. To attract more e-visitors, the websites should be easy to use and attractive. Large tourism agencies and e-museums such as the British Museum (www.thebritishmuseum.ac.uk) maintain websites developed with dynamic Internet and multimedia technologies. Web pages are categorized according to their content to help visitors discover the information needed.

Greece is a country with many tourist and cultural heritage attractions. However, since most of the agencies are small, targeting usually in the Greek market, it may be the case that some websites are static or with a limited number of services. Deimezi and Buhalis (2003) report the findings of a series of interviews with Greek tourism agents. The majority of the responders stated that Internet bookings count for up to 5% of their reservations. Lack of knowledge on how to manage and market the website was identified as the limitation. Therefore, it is vital to examine users' perceptions about Greek cultural and tourism organization websites because these views give a clue to manage these website effectively and determine the eventual success. To the authors' knowledge, there are no research efforts to evaluate Greek cultural and tourism organization websites. A few research efforts focus on the hotel industry (Zafiropoulos & Vrana, 2006). Generally, there is no universally accepted method for a website evaluation. Nevertheless, the evaluation methods can be grouped in two broad categories: (a) automated methods which are based on automatic

tools able to capture, technical characteristics such as response times, conformance to language standards, or structural coherence; (b) heuristic usability methods: where casual or experts judge whether each element of a web interface follows pre-determined usability and aesthetic principles. The number of evaluators is an important element to derive a significant result from the website assessment, and the experience of the evaluators may reduce the number of evaluators needed. Time and cost considerations suggest to find ways to reduce the number of evaluators needed while assuring a reasonable statistical significance of the results (Corigliano & Baggio, 2006).

To estimate the dynamicity or static nature of the websites of the Greek cultural and tourism organizations (and their services) we assembled nine features, which most of the worldwide e-tourism and e-museums websites have. We concentrated on the Internet technologies utilized and on the wealthy and maintenance frequency of the supported services. Our primary focus is to realize whether the technologies utilized by Greek e-tourism and e-museum websites add value to the online visitors. Secondly, we introduce a quality vector to evaluate the quality of such type websites. The proposed quality vector has two elements: Total Quality = {Quality Offered Services, Quality Content}.

The evaluation of Greek tourism agencies and museum websites will provide managers with key information useful to maximize the returns (tangible or intangible) a realization can offer, and it can help studying the behaviour of the users and their interactions to the contents and services offered online. Web developers working for similar tourism organizations of other countries can adopt the proposed methodology.

The remainder of the paper is organized as follows. In section 2 the proposed methodology and the sample of the study are presented. Next, the criteria and the statistical analysis of the evaluation are presented. Section 3 synthesizes the conclusions and presents some future work.

2. Evaluation study

2.1 Methodology and sample

The need to evaluate the multimedia presentations of e-museums and e-tourism websites has been long identified (Dierking & Falk, 1998; Werthner & Klein, 1999; Cunliffe et al., 2001). Nevertheless most of the evaluation attempts focus on large-scale companies or are general discussions of the desired features of e-Commerce websites for tourism and culture (Nickerson, 2004). Small and medium sized agencies and institutions have been overlooked although they represent the majority of the existing agencies, especially in small countries like Greece. In this study, we focus on small museums and tourism agencies and we assemble a compact methodology for evaluating their technological features. Cultural and tourism agencies are evaluated together since in both cases these websites try to promote their products and to attract more e-visitors, although their purpose is somehow different. But since the evaluation is performed under the perspective of the technologies used they can be assessed together.

The study reviews 10 websites of tourism agencies and 10 e-museums. These websites are representative sites and were gathered from advertisements in local newspapers or by searching the Internet. In particular, the majority of the domains of the online museums were referenced and linked in the web pages of the Hellenic Ministry of Culture. All tourism agencies reviewed possess a .gr domain and offer various services, such as national or international tours, hotel bookings and airline or boat tickets. The selection of websites was random among a more extended list of e-museums and tourism agencies possessing a ".gr" domain. Table 1 shows the URL addresses of the evaluated websites.

Table 1: Tourism and cultural heritage websites

Tourism agencies	Cultural heritage websites
http://www.24hours.gr	http://www.benaki.gr
http://www.acadimotravel.gr	http://www.emst.gr
http://www.aristotle.gr	http://www.gnhm.gr
http://www.ginis.gr	http://www.karagiozismuseum.gr
http://www.grecian.gr	http://www.mbp.gr
http://www.gulliver.gr	http://www.nma.gr
http://www.pyramis-travel.gr	http://www.petrifiedforest.gr
http://www.signature.gr	http://www.thmphoto.gr
http://www.travelland.gr	http://www.tmth.edu.gr
http://www.travelware.gr	http://www.vrellis.org

During September 2006, the evaluation took place in the Technological Educational Institute of Patras. The human subjects (evaluators) who participated in the research were 25 students, 20-24 years old, registered in the third year of the 'Tourism Management' curriculum. All human subjects who took part in this evaluation were attending the course 'Internet and Tourism Enterprises' that forms part of the Computer Science curriculum. These students represented a wide range of achievement levels and were coming from a variety of social-economic background. Many more females (15) were enrolled in the research than males (10). Most of the students (93%) had computer skills and Internet usage experience (84%). We used the bootstrapping method (Efron & Tibshinary, 1993) for estimating the sampling distribution of an estimator by resampling with replacement from the original sample. Using the bootstrapping method, the confidence interval is approximately 5,4% with 25 evaluators. We may say that at 95% CL (confidence level), there is a 5,4% error on the final evaluation estimate, as it is conducted by 25 students (randomly chosen among the users).

The evaluation was deployed in two phases. Firstly, in the analysis of the offered services, the websites were visited by students so as to identify and record features such as multilingualism and the technologies utilized. During the content analysis phase, websites were checked twice, in a month's time, for broken links and changes in structure and content. These checks were performed using a link checker [<http://home.snafu.de/tilman/xenulink.html>] and a Web page content change monitor [<http://aignes.com/>]. The aim of these tests was to realize if there are broken links, to see if the content and/or the structure are regularly updated to reflect the dynamic character of tourism and cultural heritage promotion and to obtain statistical information about the visited websites.

Total Quality = {Quality_{Offered Services}, Quality_{Content}}.

If we have n offered services under consideration, the $Quality_{Offered\ Services} = \sum_{i=1}^n c_i s_i$ where s_i are the following attributes. In our case $n=9$, and if all coefficients c_i are equals, then $c_i=1/n$)

During the first phase, the websites were visited by 25 students so as to identify specific attributes. These attributes are:

- Multilingualism
- Web technologies
 - Static (Text, HTML)
 - Dynamic (JSP, ASP, PHP, CGI, other)
 - Flash
 - XML
- Online booking/Event booking
- E-mail support
- Online payment

- Searching facilities
- Offers/Announcements
- Forum/Guest book
- Adaptivity/adaptability

These attributes were empirically selected and they form a minimum number of services, which should be offered to e-customers. Offers and online payment relate to tourism websites and announcements and event booking relates to cultural heritage sites. Clearly, when we visit a cultural or tourist promotion website, we would like to be able to view the information in our language, to be able to search for specific information and also to be able to communicate by email with the agency. Also, visitors are always interested in offers and special events.

2.2 Analysis of services

The URL locations mentioned in Table 1 were browsed with Internet Explorer and Mozilla Firefox so as to ensure that no compatibility problems exist. Indeed no incompatibilities and errors occurred based on the browser used.

2.2.1 Multilingualism

The first attribute concerns the natural languages supported in the websites reviewed. 9/10 tourism websites support Greek and a few present the information in English as well. All cultural heritage websites are bilingual. A small number of the other main European languages are sporadically supported. Additionally, few Balkan languages such as Bulgarian or Yugoslavian were also recorded during our assessment.

Table 2: Multilingualism of tourism and cultural websites

	Greek		English		More languages	
Tourism agencies	9	(50%)	10	(100%)	3	(30%)
Cultural heritage sites	10	(100%)	10	(100%)	1	(10%)

This finding shows that the Greek agencies realize that in the era of internationalization, presenting the information in English (in addition to Greek) it is a quite important requirement, as it allows people from other countries or people from Greece whose mother tongue is not the Greek to view the content of the websites. However, we should underline the fact that the English versions of the web pages are more limited in their content. In other words, not all the Greek web pages have been translated to English.

2.2.2 Web technologies

The enabling technologies for building tourism websites are numerous (Kappel, 1998; Kanellopoulos et al, 2004). These vary from simple text presentations to dynamic tools such as JSP (Java Server Pages) to interactive hypermedia tools such as Flash and VRML (Virtual Reality Modeling Language). Cultural and e-commerce websites need to be well designed and appealing so as to attract more e-visitors.

The majority, 70%, of the Greek tourism e-commerce websites reviewed are developed using dynamic technologies such as ASP and PHP. The remaining 30% of the tourism websites uses standard HTML, a static technology. The situation is quite opposite in the Greek e-museums. 90% of them are based on HTML and only 10% is based on dynamic technologies.

Flash presentations offer rich interactive multimedia and appealing experiences to e-visitors. This added value to customers enables them to assimilate easier the presented information and to form a clearer and desirable idea of the product. 20% of the tourism e-commerce websites and 20% of the cultural heritage www locations utilize Flash as well. Flash and VRML would significantly enhance e-museums as it would allow visitors to view animations and 3D designs of the exhibits and possibly to interact with them. These virtual tours are a common practice in some major websites of museums, e.g. British Museum (www.thebritishmuseum.ac.uk), Museum of Louvre (www.louvre.fr).

XML is a markup language for documents containing structured information. It deals only with the structure of the document and not with the display format. Web documents could subsequently be formatted and dynamically displayed in various ways. RSS (<http://www.xml.com>) is a format, based on XML, for syndicating news and the content of news-like websites. These technologies could enable the straightforward creation of newsletters or the automatic creation of summaries of altered documents found in a site, which could then be

forwarded to registered clients. In general XML allows for unlimited customization of the web content based on user preferences or other factors. None of the visited sites utilizes XML, a fact that prevents customers from taking advantage of these features. Sharing of digital content is a desirable feature among cultural heritage websites (Gill & Miller, 2002). This feature is only possible when the content is coded in XML.

2.2.3 Online booking/Event booking

The primary and ultimate reason for the existence of an e-commerce website is to allow customers to purchase the offered products online. E-tourism websites should therefore support online buying of tours. E-museum websites should offer their customers their ability to book places for special events.

Online purchasing is supported by 70% of the tourism websites under inspection. The few websites, which do not support this option, encourage their clients to contact them by email or phone so as to make the reservation. Event booking is not possible to any of the cultural online presentations.

2.2.4 E-mail support

E-mail is globally used for communication between clients and companies and several problems can be promptly and inexpensively solved. Promotional information can be send to clients, tailored to their preferences. All tourism and cultural websites reviewed in this study include an email address in their web pages via which clients can contact them.

However, when specific questions were addressed to them via email it was made clear that a few agencies do not utilize the email facility suitably. 40% of the travel agencies and 30% of the cultural organizations prompted us to communicate by phone so as to clarify our questions. All the other tourism and cultural agencies replied to this e-mail communication giving specific answers to the questions posed.

2.2.5 Online payment

Law and Wong (2003) identified the three most important factors in a successful website as being “secure payment methods,” “different price ranges for products/services,” and “user-friendly systems”.

Online charging of credit cards for reservations or events is only possible to 10% of the tourism websites evaluated and to none of the e-museums. For e-museums such an option may not sound quite useful but for tourism agencies such an option is, indisputably, of crucial importance. Almost all of the main European travel agencies support online payment. The technology for integrating this option is easy and could be even achieved through initiatives such as paypal (www.paypal.com), a tactic adopted by many organizations and events.

2.2.6 Searching facilities

Discovering specific information on a website is of crucial importance, especially when websites are complex and contain several web pages. Table 3 shows that most of the tourism agencies offer limited or no searching facilities. By ‘limited’ we mean the ability to search information setting specific criteria, for one or more types of the available services but not for all the available services. The majority of the e-museums do not support searching of their pages according to user specified criteria. This service could be of real value to e-visitors as the majority of the e-museums are consisted of hundreds of HTML pages (Liew, 2005).

Searching capabilities could be offered through the utilization of generalized search engines, such as Google. However this tactic would not be suitable for searching tourism and cultural websites as they do not provide specialized options for date and place-name based criteria and do not truly value all the particularities of the Greek language (Lazarinis, 2005).

Table 3: Searching facilities

	Full searching		Limited searching		No searching	
Tourism agencies	1	(10%)	4	(40%)	5	(50%)
Cultural heritage sites	2	(20%)	0	(0%)	8	(80%)

2.2.7 Offers/Announcements

Several online tourism offices maintain a special offer session, which provides customers with the ability to make “last minute” purchases or to take advantage of special offers. 50% of the visited Greek tourism Internet locations contained such a session in a distinct central position.

Most of the cultural websites (60%) include online announcements in their web pages. This is a useful feature as it allows the visitors to be informed promptly about future events. However, most of the announcements are outdated, which is an indication that these websites are not properly and regularly maintained.

2.2.8 Forum/Guest book

Guest books and forums are two options that could let customers and visitors share their opinions and experiences. These two options could lead to the creation of online communities of interest, which could help customers in decision-making and companies improve their services. None of the visited tourism Internet locations offer such a possibility. On the contrary, 30% of the e-museums reviewed offer guest books, allowing their visitors to make constructive comments and share thoughts about the exhibits.

2.2.9 Adaptivity/adaptability

Adaptivity and adaptability are two relatively new research areas with applications, among other fields, to education and to tourism (Brusilovskly, 2001; Kobsa, 2001; Kanellopoulos & Panagopoulos, 2007). Adaptive systems build a model of the preferences, characteristics and navigation behavior of an individual and use this model in order to adapt to the needs of that user. Adaptivity is the ability of the system to adapt to user needs and adaptability is the ability of users to adapt the working environment to their preferences. Personalization techniques have already been applied to tourism research projects (Kobsa & Fink, 2002). Several online shops (e.g. www.amazon.com) or airline companies (e.g. www.easyjet.com) already employ similar techniques to suggest relevant products or to guide the users to the most relevant product next time they visit the site.

None of the visited websites exhibited any kind of adaptive behavior. We tried to identify even the smallest traces of personalization activities, such as color alterations, personalized offers, browser size adaptation according to the user settings, and a few extra characteristics. Unfortunately, it was not possible to recognize any kind of customization performance.

2.3 Content analysis

The content analysis results to the Quality_{Content}. During the second phase, websites were checked twice within 30 days. The main aim of this step was to discover broken links and alterations in structure and content. With the aid of automated link and content checkers we were able to examine the content of the websites and obtain statistics about them.

2.3.1 Statistics and broken links

Table 4 shows the number of local files and the number of broken links of the evaluated websites. All html, asp, jsp, php, gif, jpg, css files are categorized under the “local files” header. So, by local files we mean all the files, which are linked to one of the accessible web pages and are under the agency’s URL. The validity of external links was not tested as it would not be fair to charge external broken links to the website, which references them.

Table 4: Number of existing files and broken links

	Local files	Broken links
Tourism agencies	3315	74 (2.23%)
Cultural heritage sites	14814	106 (0.72%)

In both cases the number of broken links seems as not important but even this tiny number of broken links may cause dissatisfaction to visitors. Especially, when broken links are in the first level of the navigation route then it certainly prevents users from regularly continuing their surfing.

Examining Table 4 closer one can realize that cultural heritage websites are consisted of many more files compared to the tourism e-commerce websites and the rate of broken links is smaller. This can be explained based on to two reasons. First, we must take into account that e-museums contain a large number of images

since their primary intention is to show their exhibits to the public. Indeed almost 60% of the local files of the cultural sites inspected are images. On the other hand, approximately 40% of the URLs in tourism websites point to image files. Secondly, cultural website updates are infrequent compared to the tourism websites so less problematic situations appear.

Another conclusion resulting from this distribution of results is that user specified searching facilities are very important in both cases and especially in cultural websites. Additionally, adaptive techniques, which would take into account the interests and the navigation history of the user, could enhance orientation of the user in the huge collection of available web pages.

2.3.2 Structure and content updates

An important factor in tourism website acceptability is maintenance frequency. E-Commerce websites should update regularly in order to be of real value to the potential e-buyers. Structure alteration means removal or addition of web pages. Content alteration refers to the modification of the information presented to existing web pages. As explained the websites were checked twice within a distance of thirty days. Table 5 presents the results of these inspections. Tourism websites, which are based mostly in dynamic technologies, tend to change their content and structure more often than cultural heritage websites. However, one would expect that in a constantly changing and demanding sector such as tourism, websites should try to keep up with this pace and so modifications of content would be more regular.

Table 5: Structure and content alterations

	Structure alterations		Content alterations	
Tourism agencies	77	(2.32%)	148	(4.65%)
Cultural heritage sites	41	(0.28%)	13	(0.09%)

Cultural organizations maintain web pages based on standard static HTML. Maintenance of static web pages is a more time consuming and demanding procedure than in dynamic Web pages connected to databases where modification of the content is automated. In standard Html format there is a higher possibility of an out-of-date content as the maintenance phase is not a straightforward procedure as in the dynamic web locations. Indeed in many cultural websites announcements concern out of date events. However it should be underlined that cultural websites inspected contain rich multimedia content (images, sounds, etc) and there is no need for very frequent updates.

Overall, in both cases the maintenance frequency is low and does not reflect the dynamic character of tourism promotion, as it would be expected.

3. Discussion & future work

In this study we evaluated the services and content changes of tourism and cultural websites. We empirically assembled a number of desirable features that e-tourism and e-culture websites should have. Then we randomly selected a number of e-tourism and e-cultural websites. The evaluation of the websites revealed a lot of their inefficiencies. Most of the websites reviewed are developed using standard HTML. This tactic increases the maintenance effort and the possibility of broken links. Static Web development technologies prevent sites from being dynamic and adaptable to the needs of their users.

Another finding is that e-mail communication is not properly utilized. Although all the websites contained an email via which customers can communicate with the agency, a significant percentage of the agencies asked the customers to contact them via the phone. This is an indication that the significance of the e-mail as a cost effective and immediate means of communication is underestimated.

Searching is one of the most common operations of the Internet users (Levene, 2006). It seems that its significance has been overlooked in the e-commerce websites reviewed. Most of the e-museums do not offer even basic searching mechanisms. Given the fact that these sites contain hundreds or thousands of pages, users can easily be disoriented during navigation. Search engines are an emerging technology for e-tourism websites (Park & Gretzel, 2006). But only a small percentage of the websites maintain a full search mechanism. This makes the discovery of information hard for users. The visitors although they may have a clear and well-defined aim they have to review the existing lengthy catalogs so as to find relevant information.

Online payment and services such as special offers and guest books are sporadically supported. This finding is surprising considering that these sites should guide and help the customers to complete their orders

quickly and easily. Especially in e-tourism websites, online payment should be a basic service. The findings of our study indicate the opposite behavior in Greek tourism e-shops.

The content analysis of the websites revealed that content changes are rare and there is a small number of broken links. This result indicates that the development of websites follows an ad-hoc path. Disciplined methods for the designed and development of complex sites are essential. Dynamic Internet technologies bound to databases would eliminate the broken links and make the enrichment of content a straightforward procedure.

In comparison to traditional media, the Internet combines and integrates all of the following functional properties:

- Information representation
- Collaboration
- Communication
- Interactivity
- Transactions

E-commerce websites should try to exploit all of these properties in order to make true contrast to the printed advertisements. Websites should be friendly and adaptive to effectively support the needs of their customers. The Greek and, more generally, the small and medium sized agencies should comprehend the needs of their customers. Their websites should be designed according to their target audiences. Data should be stored in centralized databases and be dynamically presented to users. Update of data should be performed via specialized interfaces by technical staff to ensure that their sites are free of technical problems. Managers should visit international websites to review their features and services and be inspired about their websites.

The methodology proposed in this paper for evaluating the websites is an empirical selection of the common services found in major tourism and cultural heritage websites and aimed at estimating the situation in the Greek e-commerce websites. However, the methodology should be refined to include more attributes. It also needs to be further adapted to the nature of the e-commerce sites and take into account studies focusing on the behavior of the online surfers. Also specific services should be further assessed, e.g. the searching facilities (Lazarinis, 2007), and improvements in these services should be proposed.

4. Conclusions

The present study reviews the technologies of Greek tourism agencies and cultural websites. For this purpose we propose a heuristic usability method. The evaluation took place in the Technological Educational Institute of Patras. 25 students registered in the third year of the 'Tourism Management' curriculum with good Internet usage expertise involved in the evaluation process. Actually, there is a 5,4% error on the final evaluation estimate, as it was conducted only by 25 students (randomly chosen among the users). In addition, 20 Greek websites were randomly selected so as to ensure authentic results. The evaluation results of our experiment are the following: Greek tourism websites utilize dynamic technologies such as JSP and ASP whereas cultural websites are developed using standard HTML. Searching facilities, e-mail support, forums and FAQ (frequently asked question) sections, online booking and payment are partially supported which negatively affects the options offered to e-visitors. Content and structure of the reviewed websites are not modified frequently, at least on a monthly basis. This tactic does not absolutely harmonize with the demands of the tourism industry and cultural promotion and shows that the travel agencies and cultural institutions do not utilize the full power of Internet. The current evaluation of Greek tourism agencies and museum websites will provide managers with key information useful to maximize the returns a realization can offer, and it can help studying the behaviour of the users and their interactions to the contents and services offered online. Web developers working for similar tourism organizations of other countries can adopt the proposed website evaluation methodology.

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