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Abstract

Nowadays, almost anyone can publish a website and the interest in using the Web as a competitive weapon by individuals, businesses, and governments is increasing. Little work has addressed the applicability and implementation of several published website evaluation criteria. This work is an attempt to develop a comprehensive set of evaluation criteria for general websites in line with international standards for website design. The proposed evaluation criteria are used to analyze the top 10 websites in UAE in order to measure their compliance with the developed criteria. The proposed criteria can be used as a benchmark of website quality and compliance.

Introduction and Literature Review

The Internet and web technologies created a new and unprecedented environment to governments, businesses, educational institutions, and individuals enabling them to webcast any information using multimedia tools. We are seeing a proliferation of websites with enormous amount of information (L. Hassan & Abuelrub, 2008). The very first website was posted in August 1991 by Sir Tim Berners-Lee (Lawson, 2009). There were 130 websites on the Internet in 1993 and 47 million websites were added to the Internet in 2009 bringing the total number of websites on the Internet to 234 million (Pingdom Royal, 2010). This shows how fast the Web is spreading worldwide. The number of people using the Internet is growing exponentially world over. There were 1.8 billion Internet users by the end of 2009 representing 26.6% global penetration (Internet World Stats, 2010). The Internet is a virtual library containing an unlimited amount of information. Anyone is allowed to publish and access this information. The websites are not monitored, edited, regulated, or approved (Brown, Hickey, & Pozen, 2002).

There is a multitude of indicators to use in and reasonable literature about evaluating a website. Several domain-specific website evaluation criteria were developed in the past few years. Criteria were developed to evaluate websites dedicated to bookstores, jobs (Terzis & Economides, 2005), museums (Pallas & Economides, 2008), airlines companies (Apostolou & Economides, 2008), ministries (Ataloglou & Economides,

2009). Examining the Webby Awards 2000 data set to understand which factors distinguish highly-rated websites from those that receive poor ratings, (Sinha, Hearst, & Ivory, 2001) evaluated 3000 websites based on six criteria: content, structure & navigation, visual design, functionality, interactivity, and over all experience. They found that the content was by far the best predictor of the overall experience, while visual design was the worst predictor of the overall experience. Targeting Web page designers; Web masters; business owners; and researchers, (Viehland & Zhao, 2008a) determined how well New Zealand's top 50 Web sites were following international homepage guidelines based on twelve criteria in three categories – web page design, navigation, and usability. (Mateos, Mera, Miranda Gonzalez, & Lopez, 2001; Miranda Gonzalez & Banegil Palacios, 2004) developed a Web Assessment Index (WAI) which provided an integrated approach for evaluating websites based on four criteria: accessibility, speed, navigability, and content which were objectively evaluated and each website was given a score out of a 100. (Ooi, Ho, & Amri, 2010) used a list of 10 criteria to evaluate three education service providers' websites in Malaysia. The ten criteria used were: source, layout, accessibility, speed, navigability, content, accuracy, level of details, current information, and appearance. They adopted a binary scoring indicating the existence or non-existence of a criterion. Using six Website evaluation dimensions, (Pallas & Economides, 2008) developed museum's site evaluation framework (MUSEF). The framework used website content, presentation, usability, interactivity, e-service, and technical as its evaluation dimensions. Each dimension contained a number of specific criteria. Sonoma State University developed a set of criteria to evaluate website content (Sonoma State University, 2005). Nielson presented evaluation criteria for websites' interface design (Nielson Norman Group, 2006). Several other authors designed sets of criteria for evaluating website features, such as currency, navigation, authority, accuracy, and coverage (Fisher, Burstein, Lynch, & Lazarenko, 2008; Hackett & Parmanto, 2009; K. H. Kim, Jung, Charles, & Doo-Hee, 2007; Lituchy & Barra, 2008; O' Reilly & Flood, 2008; Schmidt, Cantallops, & dos Santos, 2008; Yang & Chan, 2008).

The quality of a Website is difficult to define and capture but designers, developers, and users feel it when it is missing. Website quality depends on three sets of factors: task-related, performance-related, and development-related factors (Brajnik, 2001). Task-related factors include navigability, presentation quality, and appeal, content and function adequacy. Performance-related factors include response time, transaction throughput, reliability, robustness. Development-related factors include code complexity, code reliability, code flexibility, portability, page coupling, and modifiability. The Website quality evaluation method (QEM) proposed by (Olsina, Godoy, Lafuente, & Rossi, 1999) is one of the main approaches to assess websites. (Misic & Johnson, 1999) used four factors of Website effectiveness (function, navigation, content, and contact information) to benchmark the Website of the College of Business at Northern Illinois University against 45 other business schools. WebQual is another benchmarking methodology for

measuring the Website quality (Barnes & Vidgen, 2000, 2003). It used an index that gives an overall rating of a Website based on user perceptions of quality weighted by importance. WebQual uses three dimensions: usability, information quality, and service orientation. A summary of the website evaluation frameworks is given in Table (1).

Table (1) Sample Website Evaluation Frameworks

Framework / Instrument		**Reference**
ASEF	Airline Site Evaluation Framework	(Apostolou & Economides, 2008)
CRAAP	Currency, Relevance, Authority, Accuracy, and Purpose,	(Blakeslee, 2009)
eGovQual	eGovernment Quality	(Ataloglou & Economides, 2009)
FAVORS	Functionality, Authority, Validity, Obtainability, Relevance, and Substance	(Queensland University of Technology, 2010)
MUSEF	Museum's Sites Evaluation Framework	(Pallas & Economides, 2008)
QEM	Quality Evaluation Method	(Olsina et al., 1999; Olsina & Rossi, 2002)
WAI	Web Assessment Index	(Miranda Gonzalez & Banegil Palacios, 2004)
WebQual	Website Quality	(Barnes & Vidgen, 2000, 2003; Loiacono, Watson, & Goodhue, 2002)

We must distinguish between manual and automated approaches for analyzing and evaluating websites. Manual evaluation relies on the judgments of individual analysts on certain websites. Speed, rigorous structure, and abundance of data are assured when evaluation is done automatically with software tools (Bauer & Scharl, 2000).

Based on the literature review presented in this section, the following reasons explain the need for comprehensive evaluation criteria for general websites:

- Several studies developed evaluation criteria for special websites, such as English education websites (Yang & Chan, 2008) and e-commerce websites (Kowtha & Timothy, 2001; Liu & Arnett, 2000).
- Most reviewed research has developed guidelines rather than a complete set of criteria.
- Most of the developed sets of criteria were not empirically validated.

Accordingly, this study develops a comprehensive criteria set, validates it, and develops a website score for comparative analysis. The proposed comprehensive set of evaluation criteria can be applied to general websites and assist website owners, designers, and developers to evaluate, design, and develop effective websites. The criteria can also guide web surfers in screening for reliable and useful websites.

Internet Business Models (IBMs)

Recently, IBMs have been one of the strong points in business and computer science literature (Evans & Wurster, 1997; Pateli & Giaglis, 2003). The topic has attracted journalists, business people, consultants, and academics (Osterwalder, Pigneur, & Tucci, 2005). Despite all publications and reports, Internet business models are still relatively poorly defined and understood. Diversity in the definitions available poses some challenges to itemizing the nature and components of IBM, as well as to establishing a criterion for recognizing good IBMs from bad ones. Table (2) shows some examples of IBM definitions.

Table (2) IBM Definitions

Reference	IBM Definition
(Applegate, Austin, & Soule, 2009)	*How an organization interacts with its environment to define a unique strategy, attract the resources and build the capabilities required to execute the strategy, and create value for all stakeholders.*
(Casadesus-Masanell & Ricart, 2010)	*The logic of the firm, the way it operates and how it creates value for its stakeholders.*
(Demil & Lecocq, 2010)	*The way activities and resources are used to ensure sustainability and growth.*
(Lumpkin & Dess, 2004)	*A method and a set of assumptions that explain how a business creates value and earns profits in a competitive environment.*
(Osterwalder et al., 2005)	*Conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital to generate profitable and sustainable revenue streams*
(Teece, 2010)	*How a firm delivers value to customers and converts payment into profits.*
(Timmers, 1998)	*An architecture for the product, service, and information flows, including a description of the various business actors and their roles. A description of the potential benefits for the various business actors. A description of the sources of revenues.*
(Zott & Amit, 2010)	*A system of interdependent activities that transcends the focal firm and spans its boundaries.*

One of the sufficiently broad definitions of a business model was introduced by (Osterwalder et al., 2005) – "*Conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital to generate profitable and sustainable revenue streams"*. Business model is seen as an abstract concept that allows describing

what a business does for living. According to (Timmers, 1998), business model is:" *An architecture for the product, service, and information flows, including a description of the various business actors and their roles. A description of the potential benefits for the various business actors. A description of the sources of revenues"*.

Various investigators and researchers suggested different schemes to classify IBMs (Cagnina & Poian, 2009; Lumpkin & Dess, 2004; Osterwalder et al., 2005; Timmers, 1998; Wirtz, Schilke, & Ullrich, 2010; Zott & Amit, 2010). As a consequence, several competing taxonomies that are constructed from different perspectives exist today. IBMs are very dynamic and keep evolving at a high pace which renders taxonomies obsolete very fast. Table (3) shows the different IBMs taxonomies. The taxonomy proposed by (Applegate et al., 2009) is used in categorizing the websites selected for this study.

Table (3) IBM taxonomies

(Timmers, 1998)	(Eisenmann, 2002)	(Wirtz & Lihotzky, 2003)	(Rappa, 2010)	(Applegate et al., 2009)	
e-shop e-procurement e-auction e-mail 3rd Party Marketplace Virtual Communities Value Chain Service Provider Value Chain Integrator Collaboration Platforms Information Brokers	e-Retailers e-Portals Internet Access Providers Online Content Providers Application Service Providers Online Brokers Online market makers Networked Utility Providers	Content Context Commerce Connection	Brokerage Advertising Infomediary Merchant Manufacturer Affiliate Community Subscription Utility	Distributor	Retailer Marketplace Aggregator Infomediary Exchange
				Portal	Vertical Horizontal Affinity
				Producer	Manufacturer Service Provider Educator Adviser Info & News Services Producer Portals Infrastructure Service

Methodology and Analysis

Based on reviewing the most recent evaluation criteria and the IBMs taxonomies, three-phase research procedure is adopted:

1. Establish a comprehensive set of criteria using a thorough review of relevant literature.
2. Develop a scoring scheme such that each criterion is weighted relatively equally.
3. Apply the developed set of criteria and compliance scoring scheme to the selected top 10 UAE websites.

Non-behavioral observation research methodology is adopted in this work. Observation is a systematic process of recording the behavior of people, objects, and occurrences as they are witnessed (Ghauri & Gronhaug, 2005). A prevalent form of non-behavioral observation research is record analysis, which involves historical or current records, and public or private records. The records may be written, printed, sound-recorded, photographed, videotaped or any records generated by information and communication technology such as websites (Blumberg, Cooper, & Schindler, 2008). Record analysis research method will be used in this work to record how the developed website content evaluation criteria are represented in UAE top 10 websites. Non-behavioral observation research methodology fits this proposed research for the following reasons: (1) required data is available from the 10 websites, (2) direct observation is an efficient and effective way to record the desired data, (3) first-hand information can be collected in a natural setting (for example, a Web browser on a personal computer), and (4) website features do not need inference to be identified (Erlandson, Harris, Skipper, & Allen, 1993).

Phase 1: Web Evaluation Criteria

The literature survey has revealed the following thirteen evaluation criteria: accessibility & visibility, accuracy & credibility, authority, coverage, currency, interactivity, metadata, navigability, orientation & objectivity, privacy, searchability, security, and services. Each criterion includes several evaluative and comparative key items called “indicators”. Selected published studies which were surveyed in developing the thirteen-criterion website evaluation criteria are summarized in Table (4).

Table (4) Sample of Evaluation Dimensions and Criteria Research

Factor	***References***
Accessibility & Visibility	(Christy, 2002; Coggins, 2005; Ronan Fitzpatrick, 2000; Ronan Fitzpatrick, 2000; Hernandez, Jiménez, & Martin, 2009; Kubly, 1997; Mateos et al., 2001; Miranda Gonzalez & Banegil Palacios, 2004; Misic & Johnson, 1999; Ooi et al., 2010; Prorak, 2010; Provost, Koompalum, Dong, & Martin, 2006; Saatçioğlu, Özmen, & Arbak, 2006; Taher, 2009; Tran, 2009)
Accuracy & Credibility	(Alexander & Tate, 1999; Atzeni, Merialdo, & Sindoni, 2002; Beck, 1997; Blakeslee, 2009; Christy, 2002; Dragulanescu, 2002; Ronan Fitzpatrick, 2000; Ronan Fitzpatrick, 2000; Gledec, 2005; Greenwood & Steyn, 2006; L. Hassan & Abuelrub, 2008; Henderson, 2009; Kapoum, 1998; Kirk, 1996; Kubly, 1997; Ooi et al., 2010; Prorak, 2010; Queensland University of Technology, 2010; Saatçioğlu et al., 2006; Smith, 1997, 2001, 2005, 2009; Taher, 2009; Tran, 2009; Wilson, 2010)
Authority	(Alexander & Tate, 1999; Beck, 1997; Blakeslee, 2009; Brown et al., 2002; Christy, 2002; Coggins, 2005; Dragulanescu, 2002; Greenwood & Steyn, 2006; L. Hassan & Abuelrub, 2008; Henderson, 2009; Kapoum, 1998; S. E. Kim, Shaw, & Schneider, 2003; Kirk, 1996; Kubly, 1997; Misic & Johnson, 1999; Ooi et al., 2010; Provost et al., 2006; Queensland University of Technology, 2010; Smith, 1997, 2001, 2005, 2009; Taher, 2009; Tran, 2009; Wilson, 2010)
Coverage	(Apostolou & Economides, 2008; Ataloglou & Economides, 2009; Bauer & Scharl, 2000; Beck, 1997; Brown et al., 2002; Coggins, 2005; Dragulanescu, 2002; Eschenfelder, Beachboard, McClure, & Wyman, 1997; Ronan Fitzpatrick, 2000; Ronan Fitzpatrick, 2000; Gledec, 2005; Greenwood & Steyn, 2006; L. Hassan & Abuelrub, 2008; Henderson, 2009; Hernandez et al., 2009; Kapoum, 1998; S. E. Kim et al., 2003; Kubly, 1997; Mateos et al., 2001; Miranda Gonzalez & Banegil Palacios, 2004; Misic & Johnson, 1999; Ooi et al., 2010; Pallas & Economides, 2008; Prorak, 2010; Provost et al., 2006; Queensland University of Technology, 2010; Saatçioğlu et al., 2006; Sinha et al., 2001; Wilson, 2010)
Currency	(Alexander & Tate, 1999; Beck, 1997; Blakeslee, 2009; Brown et al., 2002; Christy, 2002; Dragulanescu, 2002; Greenwood & Steyn, 2006; L. Hassan & Abuelrub, 2008; Henderson, 2009; Kapoum, 1998; Kirk, 1996; Kubly, 1997; Misic & Johnson, 1999; Ooi et al., 2010; Prorak, 2010; Provost et al., 2006; Queensland University of Technology, 2010; Saatçioğlu et al., 2006; Smith, 1997, 2001, 2005, 2009; Tran, 2009)
Interactivity	(Ataloglou & Economides, 2009; Bauer & Scharl, 2000; Ronan Fitzpatrick, 2000; Ronan Fitzpatrick, 2000; L. Hassan & Abuelrub, 2008; Pallas & Economides, 2008; Tran, 2009)
Metadata	(Eschenfelder et al., 1997; Ronan Fitzpatrick, 2000; Ronan Fitzpatrick, 2000; Smith, 2001)
Navigability	(Ataloglou & Economides, 2009; Atzeni et al., 2002; Bauer & Scharl, 2000; Dragulanescu, 2002; Ronan Fitzpatrick, 2000; Ronan Fitzpatrick, 2000; L. Hassan & Abuelrub, 2008; Hernandez et al., 2009; S. E. Kim

Factor	***References***
	et al., 2003; Mateos et al., 2001; Miranda Gonzalez & Banegil Palacios, 2004; Misic & Johnson, 1999; Nielsen & Tahir, 2001; Ooi et al., 2010; Provost et al., 2006; Saatçioğlu et al., 2006; Sinha et al., 2001; Tran, 2009; Viehland & Zhao, 2008b; Wilson, 2010)
Orientation / Objectivity	(Ataloglou & Economides, 2009; Atzeni et al., 2002; Beck, 1997; Blakeslee, 2009; Brown et al., 2002; Christy, 2002; Coggins, 2005; Dragulanescu, 2002; Eschenfelder et al., 1997; Ronan Fitzpatrick, 2000; Ronan Fitzpatrick, 2000; Greenwood & Steyn, 2006; L. Hassan & Abuelrub, 2008; Henderson, 2009; Kapoum, 1998; Kirk, 1996; Provost et al., 2006; Saatçioğlu et al., 2006; Smith, 2001; Tran, 2009)
Privacy	(L. Hassan & Abuelrub, 2008; Smith, 1997, 2001, 2005)
Searchability	(Atzeni et al., 2002; Coggins, 2005; Misic & Johnson, 1999; Tran, 2009)
Security	(Ataloglou & Economides, 2009; Smith, 2001)
Services	(Apostolou & Economides, 2008; Atzeni et al., 2002; Barnes & Vidgen, 2003; Pallas & Economides, 2008; Tran, 2009)

Accessibility and Visibility

Accessibility is defined as the art of designing WebPages that can be accessible to all internet users (both disabled and non-disabled), regardless of any internet browser that they are using (Eschenfelder et al., 1997; Smith, 2001; Tran, 2009).

1. Existence of website is made known through search tools.
2. The web site can be accessed publicly (no fees, registration or application required to enter the site)
3. The web site can be accessed efficiently by non-disabled users regarding time and network traffic
4. The web site is accessible to users with a visual impairment
5. The web site has been designed to work well with various internet browsers, and with both Macintosh and PC
6. The website does not need "plug-ins" for full functionality.

Accuracy and Credibility

Accuracy is the degree to which the information and materials available on the web site are correct and trustworthy (Eschenfelder et al., 1997; Tran, 2009). How factual and verifiable is the content – Is the information cited correctly? Does the institution belong to light or dark web? (Ronan Fitzpatrick, 2000; Ronan Fitzpatrick, 2000; Taher, 2009)

1. There is a link to a page describing the nature of the organization, who owns the web site, and the types of community information and services the organization provides
2. There is a phone number and postal address to contact for further information. (Just an e-mail address is not sufficient)
3. Is there a way of determining the achievements of this organization from its inception to the present (including the information, services and activities related to the local communities, the quality of such information and services, user evaluation, new services in association with community needs, the availability of funding, etc.)?
4. Are there statements that the contents, information, newsletters or policies of the site have the official approval of the organization?
5. Is the text well written and understandable? Are there any errors of grammar, spelling, etc.? (These kinds of errors not only indicate a lack of quality control, but can also produce inaccuracies in information)
6. Statement of status of document/website provided: e.g. "under construction" "sample data only"

Authority

Authority refers to two levels of authorship of the web site: the author/owner of the web site, and the authors of information and other materials available on the web pages. In addition, authority shows that the organization or individual responsible for the web site has credible qualifications and knowledge (Greenwood & Steyn, 2006; Tran, 2009).

Who is responsible for the content and is the contact information available? Who is the publisher and is he/she other than the Webmaster/Webmistress? Taher (2006)

1. Is the name of the organization to which the web site belongs clear?
2. Is there a statement of the sponsor(s) of the organization?
3. Is it clear who is responsible for the contents of the site?
4. Is the author(s) of the information given or the source it came from stated?
5. Is there evidence or examples to support the information given?
6. Are the sources of any factual information clearly listed so that they can be verified in another source?
7. If the material is protected by copyright, is the name of the copyright holder given? Of the website gives an indication of the host website.
8. The URL of the website gives an indication of the host site.

Coverage

Coverage is the degree to which information and contents are presented according to various topics through the site. Good contents and coverage should be engaging, relevant, concise, clear, and appropriate for the audience (Sinha et al., 2001). It is believed that coverage is a very important criterion for improvement if the web site is to be useful and have good information value (Alexander and Tate, 1999). Website coverage assesses the relationship between the content and the purpose and mission of the entity (Eschenfelder et al., 1997; Smith, 2001).

1. Match the purpose/mission.
2. Match needs of stated audience.
3. Includes only necessary and useful information.
4. Coverage does not overlap: within the site, or with other agencies.
5. Amount of information is significant, and balanced.
6. Contains direct information resources: rather than indirect. For example the text of document, rather than abstract and instructions on how to obtain information in another format.
7. Clear and consistent language style that matches audience: Plain English, use of Maori, Pacific islands and Asian languages if appropriate.
8. Positive professional tone: Avoids jargon, inappropriate humor, condescension, accusation and chit chat.
9. Content does not show bias: Racial, cultural, political, commercial
10. External links are to appropriate resources, connected with the business of the entity
11. Text is supported by illustrative images.

Currency

Currency refers to the timeliness of information, documents, materials and services available on the web site (Eschenfelder et al., 1997; Tran, 2009). Websites should be seen

as a way of providing very recent information (Smith, 2001). This criterion is extremely important to people who rely on web resources for up-to-date information

1. Is the web site updated frequently?
2. Have the pages been updated in the past three months?
3. Is there an indication of when the page was last updated/revised? (Or is there a date on the page to indicate when it was uploaded to the web?)
4. If material is presented in graphs and/or charts and/or tables, is it clearly stated when the data was gathered?

Interactivity

Interactivity refers to the interaction between users and computers that occurs at the interface of web sites. Specifically, interactivity allows users to control what elements are to be delivered and when they are to be delivered through the interface (Tran, 2009). It should project the distinct feeling that the user is not reading a magazine or watching TV anymore (Sinha et al., 2001).

1. Are interactive features provided (e.g. forms, check boxes, list menus, etc.)?
2. Do these features work?
3. Do they add value to the web site?
4. Does the web site deliver the information, contents or services that the user asked for?
5. Do any of the links lead to a dead end when tried?
6. Is the interface friendly and easy to use?
7. Is the interface easy to remember?
8. Are there any error messages?

Metadata / Bibliographic Control

Website metadata refers to tags added to the HTML document containing descriptive information that does not appear in the document body. Metadata can be used by resource discovery tools such as search engines to increase the relevance of information retrieved in searches (Eschenfelder et al., 1997; Smith, 2001).

1. Appropriate metatags are provided, e.g. title, author, description, keywords (with consistent descriptors)
2. Headings are clearly phrased, descriptive, and understandable
3. Each page is titled clearly
4. Terminology and layout are consistent within the headings throughout the website

Navigability

Navigability evaluates how easily users may move around the website and find the information that they require (Sinha et al., 2001; Smith, 2001). Good navigation offers easy access to the breadth and depth of the website's content. Websites should make

good use of navigational visual devices such as menus, icons, buttons, and scroll bars in order to help the navigation of the web content (Eschenfelder et al., 1997; Tran, 2009). Users should never feel lost and therefore, each webpage should be self-sufficient and provide links to the main contents (Mateos et al., 2001).

1. Website is organized logically and by anticipated user need.
2. Navigation options are distinct and spelled out
3. Conventional navigation models are used: e.g. navigation menu on left hand side in frame or bar
4. Navigation links are provided from all pages: e.g. to homepage and other key pages, to previous page, top of page in long pages
5. A sitemap is provided
6. The site map shows how pages are associated with each other
7. Browsing is facilitated by, for example, menus and/or a site map
8. Can reach any point in an appropriate number of links: For an average sized site, should be able to reach any point in 3 links.
9. Search engine provided: Explicitly states what it covers, help is provided with search commands.

Orientation / Objectivity

Website orientation includes Website purpose and scope, origins and status of the types of information, and services provided. Orientation information should be easily located (Eschenfelder et al., 1997; Smith, 2001; Tran, 2009).

1. A website overview is provided: States purpose/mission of website; appropriate to entity's overall mission.
2. Scope of website is clearly stated: Type and origin of information, audience, dates of coverage, etc.
3. Services and information provided at the website are described.
4. `What's new" section: alerts frequent users to changes in content, services, etc.
5. Instructions for the use of the website are provided: Instructions should avoid being platform/ browser specific.
6. A liability/status statement warning the user of the nature of information provided at the site, and through any links made from the site, is provided: e.g. whether the information is suitable for access by children, what the official status of information is, that important information may be available through other channels, degree of responsibility for incorrect information, etc.
7. Copyright statements are provided: Identifies owner of intellectual property on site, and conditions for re-use, linking, etc
8. Does the resource fulfill the stated purpose of the web site?
9. Is the organization's bias clearly stated?
10. If there is any advertising on the page, is it clearly differentiated from the information content

Privacy

This criterion refers to the sensitive issue of protecting users' privacy rights (Eschenfelder et al., 1997; Smith, 2001).

1. Users' privacy rights are protected
2. Explicit statement on how users' privacy rights are protected: e.g. extent to which site-use information is provided to others, or made public.
3. Exchanges of information with users are encrypted. Information of concern could be personal information about users, and information about the searches that they have carried out at the site.

Searchability

Searchability is the ability to browse, search, and acquire data within a website (Tran, 2009).

1. Is there a search engine available for searching the resources within the web site?
2. Can a piece of information within the site quickly be found by searching?
3. Does the search engine work effectively (considering time and the use of keywords)?
4. Can the resource be retrieved effectively by the search engine?
5. Is a help tool for searching available (instructions or guidelines for identifying search terms and keywords, etc.)?
6. Can information be found within this site without using a search engine?

Security

The user interface represents the user's experience in using the information, content and resources of a web site. In terms of web site design, the central core of usability is the user interface that allows the interaction between the user and the content of a site. User interface and website security are very sensitive issues for gaining the user's trust (Ataloglou & Economides, 2009; Smith, 2001).

1. There are areas of the website that are password protected
2. There is a website certificate check
3. The website is secure when necessary

Services

Different from provision of information resources - involves actions by agency in response to a request from client. These may allow supply of products or services, or, in the government context in particular, an alternative way to submit applications etc. (Eschenfelder et al., 1997; Smith, 2001)

1. Availability of services: open to everyone on Internet, or require fees, restricted to particular sector groups.

2. Meet needs of user
3. Fully operational

The indicators of each criterion are worded to be measured easily and objectively by evaluators. Each website criterion indicator can take one of three answers: exist (YES), does not exist (NO), or not applicable (NA) (S. Hassan & Li, 2005). Copy of the assessment form is given in Appendix A.

Phase 2: Website Compliance Scoring Scheme

For each criterion (indexed by *i*) of the thirteen criteria, there is a total number of indicators *Ii* with the possibility of each to exist, not exist, or not applicable with respect to the assessed website. For each criterion *i* there is a number of indicators Y_i that exist, N_i that do not exist, and NA_i that are not applicable. The criterion compliance score C_i can be measured by the percentage of the existing indicators with respect to the total number of existing and not-existing indicators. The overall website compliance score W can be measured by the ration between overall number of existing indicators and the overall number of existing and not-existing indicators as shown below:

$$\boldsymbol{C_i = \frac{Y_i}{I_i - (NA)_i} \quad \forall\, i}$$

$$\boldsymbol{W = \frac{\sum_{i=1}^{13} Y_i}{\sum_{i=1}^{13} I_i - \sum_{i=1}^{13} (NA)_i}}$$

Phase 3: Analysis of Selected Websites

The top 10 UAE websites are selected from the top 100 list of UAE websites from www.ranking.com (shown in Appendix B). Only the top 10 websites are analyzed in this working paper and the other 90 top websites will be analyzed in the full version of the article. One evaluator, who is an expert Internet user and web developer, was selected to test the top 10 UAE websites. The evaluator was briefed on the study objectives and given the website assessment form (Appendix A). The evaluator used two different laptops with different operating platforms. The evaluator performed the assessment then filled the form for every selected website. The number of existing, not-existing, and not applicable indicators were counted and summarized in Table (5).

Table (5) Web Assessment Scores

Website		Accessibility	Accuracy	Authority	Coverage	Currency	Interactivity	Metadata	Navigability	Orientation	Privacy	Searchability	Security	Services	W
Google.ae	Yes	5	7	4	5	4	8	4	5	6	2	5	3	3	61
	No	-	-	3	3	-	-	-	3	1	-	-	-	-	10
	NA	-	1	2	3	1	-	-	1	-	1	1	-	-	10
	C	100%	100%	57%	62.5%	100%	100%	100%	62.5%	85.7%	100%	100%	100%	100%	**86%**
Ameinfo	Yes	4	8	9	11	5	5	4	7	7	2	6	3	2	73
	No	1	-	-	-	-	1	-	1	-	-	-	-	1	4
	NA	-	-	-	-	-	2	-	1	-	1	-	-	-	4
	C	80%	100%	100%	100%	100%	83%	100%	87.5%	100%	100%	100%	100%	67%	**95%**
Etisalat	Yes	5	6	9	11	5	8	2	8	6	3	1	3	3	70
	No	-	1	-	-	-	-	2	1	1	-	5	-	-	10
	NA	-	1	-	-	-	-	-	-	-	-	-	-	-	1
	C	100%	86%	100%	100%	100%	100%	50%	89%	86%	100%	17%	100%	100%	**87.5%**
Yellow pages	Yes	5	7	9	10	3	8	3	7	4	3	4	2	3	**68**
	No	-	1	-	-	2	-	1	2	3	-	2	-	-	**11**
	NA	-	-	-	1	-	-	-	-	-	-	-	1	-	**2**
	C	100%	87.5%	100%	100%	60%	100%	75%	77.8%	57%	100%	67%	100%	100%	**86%**
E -Company	This URL lead to etisalat.ae website, however, the URL is not broken														

Website		Accessibility	Accuracy	Authority	Coverage	Currency	Interactivity	Metadata	Navigability	Orientation	Privacy	Searchability	Security	Services	W
Abu Dhabi Airport	Yes	5	3	7	9	5	5	4	5	5	-	1	1	3	53
	No	-	4	-	-	-	1	-	3	1	-	5	2	-	16
	NA	-	1	2	2	-	2	-	1	1	3	-	-	-	12
	C	100%	43%	100%	100%	100%	83%	100%	62.5%	83%	-	17%	33%	100%	**77%**
Etisalat Internet Email	Yes	3	6	5	10	4	8	4	5	6	3	1	3	3	61
	No	2	1	-	-	-	-	-	3	1	-	2	-	-	9
	NA	-	1	4	1	1	-	-	1	-	-	3	-	-	11
	C	60%	86%	100%	100%	100%	100%	100%	62.5%	86%	100%	33%	100%	100%	**87%**
Dubai Tourism	Yes	4	6	7	10	4	8	2	9	4	3	5	1	3	66
	No	1	1	2	1	1	-	2	-	3	-	1	1	-	13
	NA	-	1	-	-	-	-	-	-	-	-	-	1	-	2
	C	80%	86%	78%	91%	80%	100%	50%	100%	57%	100%	83%	50%	100%	**83.5%**
Dubai	Yes	4	7	8	11	4	8	4	9	5	3	5	1	3	72
	No	1	1	1	-	1	-	-	-	2	-	1	2	-	9
	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	100%	87.5%	89%	100%	80%	100%	100%	100%	71%	100%	83%	33%	100%	**89%**
Go Wealthy	Yes	4	8	6	9	3	8	4	8	6	2	6	2	3	69
	No	1	-	3	2	2	-	-	1	1	1	-	1	-	12
	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	80%	100%	67%	82%	60%	100%	100%	89%	86%	67%	100%	67%	100%	**85%**

The results show that five out of the ten top websites in UAE are infomediaries. Infomediary business model is a type of aggregator that unites sellers and buyers of information-based products, such as news, sports, entertainment, and financial information (Applegate et al., 2009). Infomediaries often charge a company or a corporation a subscription fee and may provide the information service free to consumers and generate revenue from advertisements. Among the five infoemdiaries, AMEinfo.ae website scored 95% which is the maximum infomediary score and the best at the top 10 level. AMEinfo.com is a provider of online business information in and about the Middle East region. Founded in the United Arab Emirates in 1993, AMEinfo.com offers both English and Arabic current information in daily news wires, editorial columns, special feature articles, reports, video and radio features, including detailed business directory information and event listings. AMEinfo.com has a readership of 2.2 million people worldwide and was the first website in the region to be audited by ABCe. Abu Dhabi Airport website scored 77%, which is the lowest score among the top 10. Accuracy, searchability, and security scored below 50% for abudhabiairport.ae.

Emirates Telecommunications Corporation, branded trade name Etisalat, is UAE based telecommunication service provider, currently operating in 18 countries across Asia, Middle East, and Africa (Emirates Telecommunications Corporation, 2011). On February 10, 2011, Etisalat reported net revenue of USD $8.4 billion and net profits of USD US$2.078bn. Its website etisalat.ae scored 87.5% and its weakest criterion is its searchability. The website does not have a local search facility. The top 10 websites in UAE include, in addition to etisalat.ae, two Etisalat's divisions. The first is ecompany.ae which is a business service provider and the second is Etisalat Internet Mail service provider, eim.ae, which provides a paid email service. Ecompany link point to etislat.ae and eim.ae scored 87%.

There are two portal websites on the top 10 list as well. The first websites is Dubai eGovernment portal, dubai.ae, which refers to Dubai Government's use of Information and Communication Technology (ICT) to provide government services to citizens, residents and visitors (G2C), to businesses (G2B), to other government entities (G2G) and to government employees (G2E); using multiple channels, in line with its vision of easing the lives of people and businesses interacting with the Government (eGovernment, 2011). Dubai.ae scored 89% with security as its weakest criterion. The second portal is Gowealthy.com which is the No. 1 Real Estate Portal in the Middle East with over a million visitors every month. The portal offers a comprehensive database of properties for potential consumers looking to sell, buy or lease in Dubai and across the world (Gowealthy, 2011). The portal scored 85% with no major problems in all criteria.

Dubai Department of Tourist and Commerce Marketing (DTCM) infomediary website is the 8th on the list of top 10 and scored 83.5%. The DTCM was established in 1997 in

order to promote Dubai's commerce and tourism interests internationally and to assume the major role as the principal authority for the planning, supervision and development of the tourism sector in Dubai (Marketing, 2011). DTCM website, dubaitourism.ae, scored low in metadata, orientation, and security criteria (see Table 5).

In summary, the top 10 UAE websites represented three business models: (1) Infomediaty, (2) Portal, (3) Service provider. None of the three business models sell online, however the three service providers have complete online financial transactions such as bill payments. Infomediaries are mostly free for individual customers. In general, the top 10 UAE websites scored well in most of the 13 criteria.

Conclusions

The findings of this work are expected to contribute to the set of theory-based and specific criteria for general website users, designers, owners, and developers for the following reasons:

- With the rapid changes in information technologies, this study can be used by other researchers in website usability and satisfaction studies.
- This study developed a ranking scheme to help users in selecting among general websites.
- Poorly designed websites frustrate users and cause them to leave. This study provided a set of criteria to facilitate finding what is needed in order to satisfy the users.

The remaining 90 websites will be assessed and scored. It is expected to include more IBMs in the study and scores can be aggregated at the business model level.

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Appendix A

Web Site Assessment Form				
URL:				
Date				
Time				
Evaluator				
Business Model				
Criterion	***Indicator***	***YES***	***NO***	***NA***
Accessibility	1. Existence of website is made known through search tools.			
	2. The web site can be accessed publicly (no fees, registration or application required to enter the site)			
	3. The web site can be accessed efficiently by users regarding time and network traffic.			
	4. The web site has been designed to work well with various internet browsers, and with both Macintosh and PC.			
	5. The website does not need "plug-ins" for full functionality.			
	Total			
Accuracy	1. There is a phone number and postal address to contact for further information. (Just an e-mail address is not sufficient)			
	2. Is there a way of determining the achievements of this organization from its inception to the present?			
	3. Are there statements that the contents, information, newsletters or policies of the site have the official approval of the organization?			
	4. Is the text well written and understandable? (no grammatical, typing, or spelling mistakes)			
	5. The website contains cited references to sources used for verification purposes.			
	6. Are there links to other credible websites?			
	7. Graphs and charts are labeled clearly.			
	8. Statement of status of document/website provided: e.g. "under construction" "sample data only"			
	Total			
Authority	1. The name of the organization to which the website belongs is clear.			
	2. There is a statement of the sponsor(s) of the organization/website.			
	3. It is clear who is responsible for the contents of the website.			
	4. The author(s) of the information is given or the source it came from is stated.			
	5. There is an evidence or example to support the information given.			
	6. The sources of any factual information are clearly listed so that they can be verified in another source.			

Criterion	*Indicator*	*YES*	*NO*	*NA*
	7. Copyright statements are provided: Identifies owner of intellectual property on site, and conditions for re-use, linking, etc.			
	8. The author can be contacted.			
	9. The URL of the website gives an indication of the host site.			
	Total			
Coverage	1. The primary purpose of the website is stated.			
	2. Information match the needs of stated audience.			
	3. Includes only necessary and useful information.			
	4. Coverage does not overlap within the site			
	5. Amount of information is significant, comprehensive, and balanced.			
	6. Contains direct information resources: rather than indirect. For example the text of document, rather than abstract and instructions on how to obtain information in another format.			
	7. Clear and consistent language style that matches audience: Plain English, use of Arabic language if appropriate.			
	8. Positive professional tone: Avoids jargon, inappropriate humor, condescension, accusation and chit chat.			
	9. Content does not show bias: Racial, cultural, political, commercial			
	10. External links are to appropriate resources, connected with the business of the entity			
	11. Text is supported by illustrative images.			
	Total			
Currency	1. The web site is updated frequently.			
	2. The information is current and timely enough to meet the need.			
	3. The pages have been updated in the past three months.			
	4. There is an indication of when the page was last updated/revised? (Or is there a date on the page to indicate when it was uploaded to the web?)			
	5. If material is presented in graphs and/or charts and/or tables, is it clearly stated when the data was gathered?			
	Total			

Criterion	*Indicator*	*YES*	*NO*	*NA*
Interactivity	1. Interactive features are provided (e.g. forms, check boxes, list menus, etc.)			
	2. Do these features work?			
	3. Do they add value to the web site?			
	4. Does the web site deliver the information, contents or services that the user asked for?			
	5. No links lead to a dead end when tried			
	6. The interface is friendly and easy to use			
	7. The interface is easy to remember			
	8. There are no error messages			
	Total			
Metadata	1. Appropriate metatags are provided, e.g. title, author, description, keywords (with consistent descriptors)			
	2. Headings are clearly phrased, descriptive, and understandable.			
	3. Each page is titled clearly.			
	4. Terminology and layout are consistent within the headings throughout the website			
	Total			
Navigability	1. Website is organized logically and by anticipated user need.			
	2. Navigation options are distinct and spelled out			
	3. Conventional navigation models are used: e.g. navigation menu on left hand side in frame or bar			
	4. Navigation links are provided from all pages: e.g. to homepage and other key pages, to previous page, top of page in long pages			
	5. A sitemap is provided.			
	6. The site map shows how pages are associated with each other			
	7. Browsing is facilitated by, for example, menus and/or a site map			
	8. Can reach any point in an appropriate number of links: For an average sized site, should be able to reach any point in 3 links.			
	9. Search engine provided: Explicitly states what it covers, help is provided with search commands.			
	Total			

Criterion	*Indicator*	*YES*	*NO*	*NA*
Orientation	1. A website overview is provided: States purpose/mission of website; appropriate to entity's overall mission.			
	2. Scope of website is clearly stated: Type and origin of information, audience, dates of coverage, etc.			
	3. Services and information provided at the website are described.			
	4. `What's new" section: alerts frequent users to changes in content, services, etc.			
	5. Instructions for the use of the website are provided: Instructions should avoid being platform/ browser specific.			
	6. A liability/status statement warning the user of the nature of information provided at the site, and through any links made from the site, is provided: e.g. whether the information is suitable for access by children, what the official status of information is, that important information may be available through other channels, degree of responsibility for incorrect information, etc.			
	7. Does the resource fulfill the stated purpose of the web site?			
	Total			
Privacy	1. Users' privacy rights are protected			
	2. Explicit statement on how users' privacy rights are protected: e.g. extent to which site-use information is provided to others, or made public.			
	3. Exchanges of information with users are encrypted. Information of concern could be personal information about users, and information about the searches that they have carried out at the site.			
	Total			
Searchability	1. There is a search engine available for searching the resources within the web site.			
	2. A piece of information within the site can quickly be found by searching			
	3. Does the search engine work effectively (considering time and the use of keywords)?			
	4. The resource can be retrieved effectively by the search engine			
	5. A help tool for searching is available (instructions or guidelines for identifying search terms and keywords, etc.)			
	6. Information can be found within this site without using a search engine			
	Total			
Security	There are areas of the website that are password protected.			
	There is a website certificate check.			
	The website is secure when necessary.			

Criterion	*Indicator*	*YES*	*NO*	*NA*
	Total			
Services	Availability of services: open to everyone on Internet, or require fees, restricted to particular sector groups.			
	Meet needs of user			
	Fully operational			
	Total			

Appendix B

UAE Rank	Web Rank	Domain	Internet Business Model	TrustGauge	Company Name	Links
1	2,141	google.ae	Infomediary	3	N/A	22,958
2	4,353	ameinfo.com	Infomediary	7	AME Info FZ LLC	884,617
3	12,579	etisalat.ae	Service Provider	2	N/A	24,671
4	23,701	yellowpages.ae	Infomediary	2	N/A	0
5	27,178	ecompany.ae	Service Provider	2	N/A	4,341
6	34,956	abudhabiairport.ae	Infomediary	2	N/A	0
7	49,050	eim.ae	Service Provider	2	N/A	5,985
8	55,015	dubaitourism.ae	Infomediary	4	Dubai Tourism Department	0
9	61,189	dubai.ae	Portal	2	N/A	0
10	65,006	gowealthy.com	Portal	6	Site Managed by W3 Informatics FZC	32,695