



Dynamics of Web 2.0: A Software Application "Web 2.0 Meter"

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Highlights

- This paper focuses on characteristics of Web 2.0 concept.
- A software application "Web 2.0 Meter" is proposed to classify websites based on Web 2.0 concept.
- A highly precise and more efficient classification accuracy were obtained by Web 2.0 Meter.

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Abstract

In this study, it is intended to understand the concept of Web 2.0 and to introduce its effects on the web design. In the first part of the article, necessary information is provided about relevant topics such as, Web design, the features of Web 1.0, Web 1.5 and Web 2.0 sites and the visual, social and technological implications of the Web 2.0 concept. In the second part of the article, a survey, which includes 21 questions related to Web 2.0 features, was conducted to 150 people having the internet background. This survey is applied for three web sites whose categories are accepted as Web 1.0, Web 1.5 and Web 2.0 in literature. Also, a test program called Web 2.0 Meter is developed with .Net technology to determine the category of a website and to produce comments about the necessary Web 2.0 features that the relevant web site should have. The answers given to questions were processed by Web 2.0 Meter. Consequently, the results show that Web 2.0 Meter has evaluated the category of a website in parallel with the survey results.

1. INTRODUCTION

Web design refers to the preparation of a website for publishing as structure, technology and content. Three main factors for designing a website are organization, presentation and interaction. Therefore, designers need to think about the questions of how the website is structured, how it is presented and how it interacts with users. The organization means structure of the website, presentation explains how the site looks to its users, and interaction refers to how the site responds to user actions. Since all interaction between the user and the structure of the site takes place with the presentation of the site, the presentation must be understandable and attractive [1].

The Web or W3 (World Wide Web) is a multi-media system that provides holistic and interactive access to many different types of data, such as text, pictures, audio, movies, animations, and so on. Web pages are displayed in web browsers. They contain multiple links to other pages. By clicking on these links, transitions are made to other pages and from there to other pages. These transitions between the pages show the model of access to information [2].

Web 1.5 sites symbolize the period when the internet began to become commercialized. Between 1996 and 2003, a large number of e-commerce sites were opened. For example, Amazon, eBay sites are important ones that come to life during this period. Web 1.5 sites consist of pages where information can be retrieved from the database and content can be dynamically generated. Web 2.0 is user-centered internet system that exists with content created by users and provides freedom of movement and ease of use to its users [3].

The main purpose of this article is to demonstrate Web 2.0 effects on web design by showing that it is a social phenomenon that changes internet habits, as opposed to being a marketing term. For this purpose, a software application has been implemented to measure the compatibility of websites with web 2.0 features.

The remaining part of this article has been organized as follows: What is Web design?, what is Web 1.0?, what is Web 2.0?, features of Web 2.0, technologies of Web 2.0 and finally "Web 2.0 Meter" as an software application.

2. MATERIAL METHOD

2.1. Literature

Web design refers to the preparation of a website as design, structure, technology and content as a result of interaction with many disciplines (animation, graphic design, interaction design, photographic art, information architecture, typography, corporate identity, communication design, etc.) [4]. Usability should be tested as much as possible at every stage of the web design process, which takes place in the form of requirement analysis, conceptual design, information architecture, interaction and visual design, production and implementation. This results in products closer to perfection [5].

Accessibility means that the content of a website and the service it provides are fully accessible, detectable, evaluatable and usable to everyone, and that it has the flexibility to respond to situations, requirements and preferences. For example, visually impaired people benefit from software that analyzes and voices content on the screen. A picture of visuals with "click here" written on it doesn't mean anything to these people. It takes a lot of time to see heavy graphical content with a low-speed internet connection. Usability is the reason for the existence of interaction design. Usability indicates how effectively and conveniently the visitor can or cannot do the actions required by the visitor on the website, such as accessing information or purchasing a product [6].

Only publicity and information are essential for Web 1.0 sites [7]. In such web sites, a single person manages the web site, users are readers only [8]. A small number of content providers respond to a large number of clients [9,10]. The links in Web 1.0 are uniform and have the same structure. Existing links are opened to other source sites outside the site. Users do not have to register with the system [11].

Web 2.0 includes a collaborative innovation and sharing phenomenon. This concept was firstly used by Darcy Di Nucci in 1990 [12]. Web 2.0 concept had been much more popular when it was introduced at the 2004 conference organized by two companies, O'Reilly and MediaLive International, and attended by the most important gurus of the web world [13]. Technically, web 2.0 can be called rich internet applications [14]. Web 2.0 has a two-way feature in the form of reading from the web and writing to the web. Control of the information is in the hands of the user who is online [15,16]. Users take a more active role in creating the information architecture [17]. Thus, the nature of the web, which is a source of information only, has changed and become a tool to encourage the creation of knowledge, sharing ideas and the development of web communities [18-20]. In this context, there are Web 2.0 tools, which enable users to build their interactive tools [21], such as, Twitter as social networking site, Flickr, You Tube as hosting sites to upload video and image [22], Padlet to produce web content of education [23], other Web 2.0 tools used in education, for example, Nearpod, Miro [24], Plickers, Quizizz, Socrative [25], B2B web sites [26]. In addition, Web 2.0 has effects on designing of infographics [27]. Web 2.0 has played an important role for the emergence of the semantic web or concept of web 3.0 [28,29].

In Web 2.0-based designs, one of the most important elements of the page layout is the navigation or menu structure. Simplicity and easy comprehension, which are the most important features in Web 2.0. Examples of menus are shown in Figures 1 and 2.

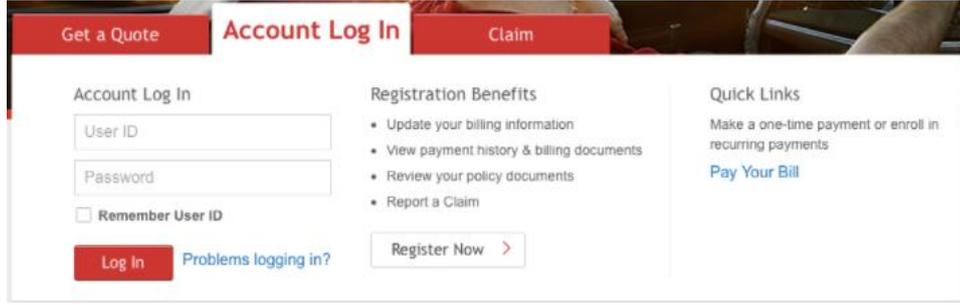


Figure 1. Tab menu

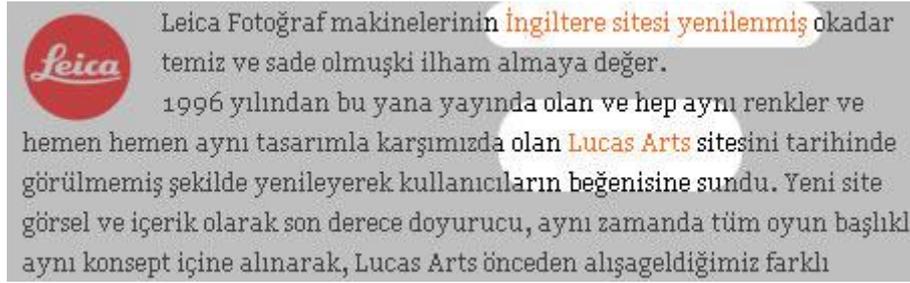


Figure 2. Link Menu

The tag cloud is a tool that allows you to take a summary photo of the topics that focus on the interests or instant common sense on the site as soon as it is entered into the site. Figure 3 shows an example of a tag cloud.

Explore Flickr through tags

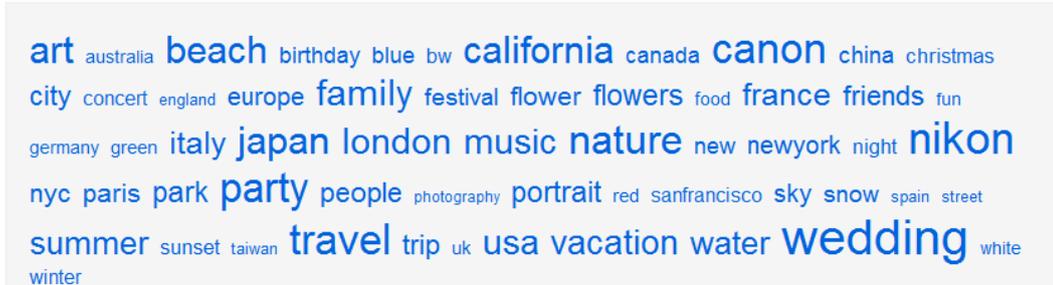


Figure 3. Tag Cloud

Since one of the main purposes of Web 2.0 sites is understandability, thin, undersized graphically meaningless logos are no longer used. The first purpose of the new generation logos is to reflect corporate identity at first glance and to be able to answer the question of who we are. Examples of next-generation web 2.0-style logos are shown in Figure 4.



Figure 4. Web 2.0 Logo Examples

Web 2.0 concept also includes different technologies. Users can connect each other by using such technologies. In addition, people create their own social environments with facilities provided by Web 2.0. Mashup, Really Simple Syndication [30], Widgets, Ajax are examples of Web 2.0 technologies.

Mashup is web applications that enable the content of a site to be created as a result of combining information from different sources through web services. The best example for such apps is Google and Yahoo's map services. For example, a real estate agent can mark the locations of houses for sale on the map and show them to his clients from his site [31].

Widgets are blocks of code created with technologies such as Javascript and Flash that can be easily integrated into any HTML-based site or can work through the operating system and can also be used in cases where there is no network connection. Widgets correspond to plugins in desktop applications. Widgets are frequently used by internet users who own personal sites or blogs.

Really Simple Syndication (RSS) is a web feed format that allows the collection of up-to-date content on websites. RSS is an Extensible Markup Language (XML) file that summarizes information and links in an information source. They inform users of up-to-date content on websites or blogs of interest. Programs called feed reader or aggregator enables updated content to be transferred to the users by checking the list of RSS feeds. Popular web browsers have built-in feed readers, so RSS feeds are easily recorded on websites [32,33].

AJAX is a web programming technique used to create interactive web applications with XML tags and JavaScript client language. AJAX continues to be the choice of site owners with its economic sourcing and rapid interaction. It is one of the technologies that fits the definition of Web 2.0 [34].

2.2. Material

A questionnaire with 5 point likert has been prepared to understand the existence of Web 2.0 features for 3 specified websites of categories web 1.0, web 1.5 and web 2.0. This questionnaire was applied to 150 people who are interested in internet. The relevant questions are shown in Table 1. Based on the model depicted in Figure 5, a software application has been developed with .Net Technologies to measure the compatibility of a website with web 2.0 features. These surveys were then applied to the web 2.0 meter application. Test questions in the application are the same with questionnaire.

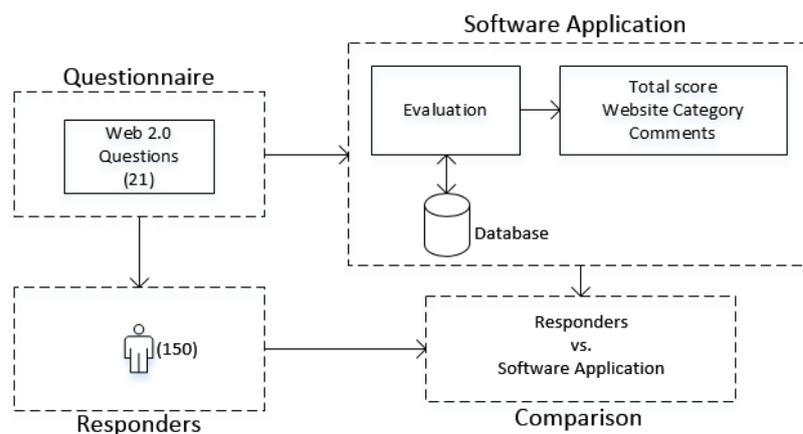


Figure 5. Model

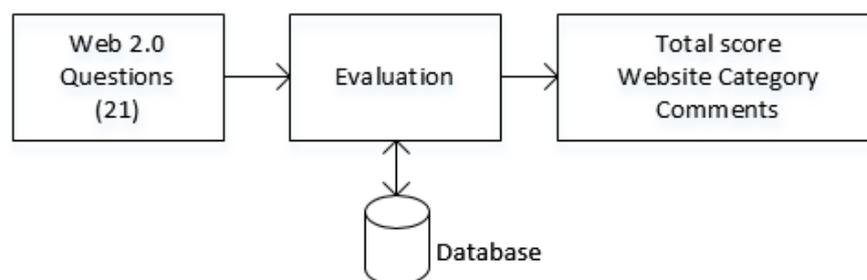
Table 1. Questions

No	Questions
1	Users can create a profile page
2	Membership is a must
3	Users can access the site with mobile devices
4	Users can set their own privacy and sharing settings
5	Users can submit their complaints, suggestions and opinions about the site.
6	Users can communicate with each other by sending in-site messages.
7	The content of the site stay up to date on a regular basis.
8	Users can add comments to the site.
9	Users can get up-to-date content with the RSS service.
10	Users can add content to the site.
11	Users can share a page with their friends.
12	Users can share their comments with the blog.
13	It is possible to share content of the site with other social networking sites.
14	Users can add other members to their lists to create their own social connections
15	Users evaluate content with scoring/voting
16	Users can access older information published on the site.
17	The menu structure is simple and clear for users to navigate the site easily.
18	Icons on the site are clear and understandable
19	Users can communicate via instant messaging on the site.
20	Users can tag content
21	Users can make smart searches by word

The user who answers the test by using the application gets a total score, category information of the site (Web 1.0, Web 1.5, Web 2.0) and an evaluation report consisting of comments. The results and consistency of the software application are evaluated by comparing the website category obtained by the application with the existing category of a website based on the questionnaire results and literature.

2.3. Methods

The developed application is called Web 2.0 Meter. Web 2.0 Meter is a test program that measures and interprets the suitability of websites to the concept of web 2.0 as shown in Figure 6. The general workflow chart for the application is shown in Figure 7. The application is coded with the C# programming language. Membership is required to use Web 2.0 Meter as shown in Figure 8. In addition, 21 questions are displayed for members to answer as depicted in Figure 9. All questions must be answered. After answering the questions, the calculated test score and the category of the website are displayed on the result page as displayed in Figure 10. In addition, the positive and negative comments based on answers to questions are listed in the tables separately.

**Figure 6. Software Application**

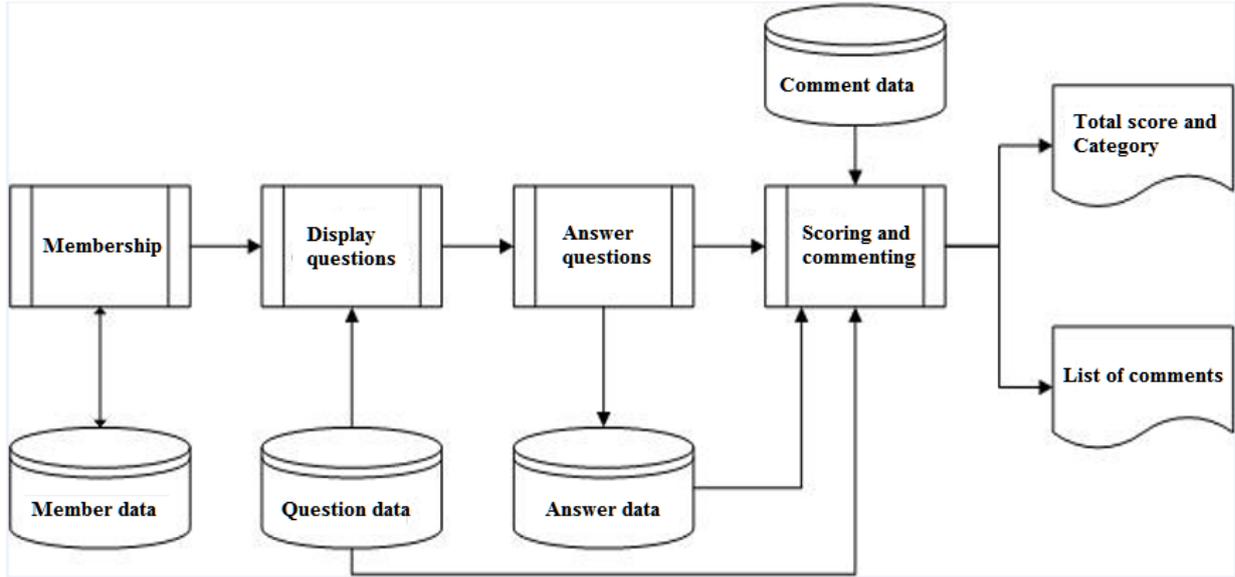


Figure 7. General Workflow Chart

Figure 8. Main Page

Figure 9. Questions Page

Kategori	Olumlu Yorumlar	Kategori	Olumsuz Yorumlar
İçerik	Kullanıcılar profil oluşturabilmektedir.	Erişirlik	Siteye mobil cihazlarla erişim olmalıdır.
İçerik	Kullanıcılar siteme üye olabilmektedir.	Yapı	Kullanıcılar sayfalarının gizlilik ve paylaşım ayarlarını yapabilmektedir.
		Kullanılabilirlik	Kullanıcılar şikayet, öneri ve görüşlerini iletebilmektedir.
		İletişim	Site içi mesajlaşma gerçekleştirilebilmektedir.
		Kullanılabilirlik	Site içeriği sürekli güncel kalabilmektedir.

Figure 10. Result Page with Comments

SQL Server database management system is used to store and to manage data. There has been 14 tables in the database called Web 2.0. The structure of a sample table has shown in Table 2.

Table 2. Table TestSoru

Table Name	testSoru		
Purpose	To store test questions		
Field Name	Explanation	Data Type	Key Field
soruID	Primary Key	int	Yes
soruText	Question Text	nvarchar (300)	

A individual point is calculated for each answered question as shown in Equation (1). The test score is obtained by summing individual points of all questions. Three important factors are taken into account in the test score calculation. These elements are raw point for every answer option as shown in Table 3, the percentage weight of every question, and the bonus point.

$$\text{Points} = (\text{raw point} * \text{percentage weight}) + \text{bonus}$$

(1)

Table 3. Raw Points

Answer Options	Raw Point
I strongly disagree	0
I do not agree	25
I am undecided	50
I agree	75
Absolutely I agree	100

The fact that The number of answer options are more does not make a significant difference in determining the existence of the features. Therefore, 5 point likert were considered sufficient. Undecided option is also considered as a negative option in the process of creating comments. Because the existence of the feature on the website cannot be determined, the given answers as undecided are listed among the negative comments in order to inform and guide the user correctly. Consequently, 50 are assigned to this option as raw point.

The purpose of bonus point is to eliminate side effects over the calculation of total score. Because of that, Bonus point is used to make the answer "I am undecided" closer to the answer "I do not agree", to make the answer "I agree" closer to the answer "Absolutely I agree" in terms of raw point. Bonus point is - 0,75 for the answer "I am undecided", and it is 0,75 for the answer "I agree".

Web 2.0 meter makes evaluation qualitatively and quantitatively to produce results on the suitability of the website in terms of web 2.0 features. It is not enough to calculate only the test score, quantitatively. The accuracy of the category evaluation is increased by considering the qualifications of the questions that contribute to the calculated score. Web 2.0 Meter directs the user about Web 2.0 compatibility of the relevant website by listing the comments corresponding to the answers, which are divided into 2 groups, positively and negatively.

3. RESULTS

With the understanding of Web 2.0, internet users become potential sources of information. Because people can easily transfer their ideas, thoughts and knowledge to the internet environment using web 2.0 services and technologies. For example, internet users can publish their articles, photos, videos, profiles, job advertisements, and sell different products on their websites.

Websites are being designed and created in a more usable and accessible way. It has become possible to access websites not only via computer but also through mobile communication devices. New navigation techniques makes it more easy to visit web pages. Applications and services on websites continue to be dynamically updated according to user trends and preferences.

It is ensured that users can socialize and communicate in a virtual environment. With messaging methods, users can communicate easily and effectively. With the use of XML file structure and web services, information transfers between different computer systems have started to take place effectively. Thus, useful information is created from the point of view of users by combining data from a large number of sources.

Results of questionnaire, which was applied to 150 people interested in internet, has been parallel to results of the same surveys applied in the web 2.0 Meter. This shows that the evaluation mechanism of web 2.0 Meter has high level of accuracy. By increasing the variety and number of questions, for example in terms of usability, accessibility, and visual design, the scope of web 2.0 Meters can be expanded.

Web 2.0 enables different computer systems to communicate with each other and transfer data easily while web 3.0 tries to enable computer systems to understand people's language. Web 4.0 that will form the post-web 3.0 period is discussed. With Web 4.0, it is expected that people will face with an internet life made entirely of web-based virtual networks and built on artificial intelligence operating systems.

CONFLICTS OF INTEREST

No conflict of interest was declared by the author.

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