# Towards a methodology for evaluating the quality of (public) websites

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**Abstract**—*Creating a successful website is not easy. This is an obvious conclusion when looking at sites that are difficult to navigate, find information from or interact with. As users, we are struggling with poorly designed and implemented sites. As researchers, we need to tackle the problem in a new way. It is important to understand that it is not enough to make a website functional but also usable, appealing, compelling and engaging from a user's point of view. The 'art' of creating engaging websites needs new interdisciplinary approaches presenting perspectives from communication studies, film and media analysis, graphic design, architecture, development of digital technologies and computer science, etc. as well as a psychological understanding of the human being as an emotive, sensuous, cultural, intellectual and social being.*

**Index Terms**—*framework, technologies, websites.*

## 1. INTRODUCTION

This paper argues that the current methodologies applied to evaluate the quality of websites are too limited. We need a changed view of literacy, since websites are an inherently visual medium and enable us to combine text, images, audio and video in an innovative way. Moreover, the borders between authors and the audience as well as between reading and writing/designing are blurring. People can add and manipulate the content by themselves and decide which parts of the content they will see hear and read or not. Instead of being pure 'receivers' of information they can become communicators, designers and authors. Moreover, for the creation of useful and engaging public websites it is important to put the citizens in the center of the site design to meet their needs and desires.

An in-depth debate about the concept of the public sphere is beyond the scope of this paper. Nevertheless, the shaping of Europe and other areas of the world highly depends on media – increasingly also on new media like websites – and communication. As media and communication change, so does the concept of the public sphere - in a political, social, economic and cultural sense (Weinberger, 2002, Burnett & Marshall, 2003).

This paper will first provide a brief overview of current literature, and reveal the limitations of existing frameworks evaluating the quality of websites. As a further step we will explain the need for a new and more integrated framework as we have already roughly developed in earlier studies (De Landtsheer, Krasnoboka, and Neuner, 1999, 2001, 2004)2. Finally, we will suggest some initial steps in this direction and draw our conclusions.

## 2. WEBSITES, TECHNOLOGIES, AND COMMUNICATION

The analysis of websites is a recent area of study, nevertheless there is a growing body of research focusing on the development and measurement of website content. Unfortunately, most of them do not look beyond the scope of their discipline and are only paying attention to selected features of websites without providing an overall picture.

A website is not simply displaying information electronically.

The GUI (graphical user interface) is a mediator between the human (cognitive system) and the technical, social and medial environment. It mediates and enables new forms of communication (one-to-one, one-to-many, many-to-one, and many-to-many) and converge verbal and visual media.

For business studies the applied strategies for branding, customer relationship and marketing have highest priority (Johnson, 1995, Aldrige et al., 1997, Faigin, 1997, Herbig & Hale, 1997, Hoffman et al., 1997, Lu & Yeung, 1998, Moon, 1998, Pardun & Lamb, 1999, Merwe & Bekker, 2003).

Education research developed and applied methodologies to evaluate the functionality and design of educational websites (Knupfer, 1997, Reeves & Dehoney, 1998, Gillani, 1998, Maddux, 1998, Maule, 1998, Hedberg, 2003). Gillani (1998), for example, argues that the time for just cool sites is over and we would need now more effective educational websites. Information science merely focused on the evaluation of information quality online (McMurdo, 1998, Bath & Bouchier, 2003, Nicholas et al., 2003) and on the assessment of information visualization and navigation (Buagajska, 2003). McMurdo (1998) goes beyond information accessibility and quality by introducing various resources on website design and layout.

Studies conducted by library science merely concentrated on accessibility of information and general web design issues like navigation, currency, content/information, and authority (Everhart, 1997, 1998, Cohen & Still, 1999). Communication Studies are more interested in comparisons between traditional mass media like newspapers and their online counterparts (e.g. Li, 1998) or in the implementation of traditional research methodologies for online resources ( McMillan, 2000, Wakeford, 2000, Roessler, 2002). In the field of political communication there have been done many surveys to evaluate the quality of political websites. Qualitative methods (Stone, 1996, D'Alessio, 1997, Margolis et al., 1997, 1999, Davis, 1999, Klinenberg & Perrin, 2000, Ferber et al., 2002, De Landtsheer et al., 1999, 2001, 2004) and quantitative approaches (Hill & Hughes, 1998, Gibson & Ward, 1998, 2000, West 2001, Schneider &

Foot, 2002, Rosenstiel et al, 2004) were applied to investigate how efficient and appropriate politicians, parties and candidates filled their sites with content.

A growing number of researchers are busy with the examination of the usability of websites (for example, Nielsen, 1993, 1999, 2000a, 2000b, Shneiderman, 1998, Spool et al., 1999, Krug 2002). These studies mostly focus on commercial websites. They provide very helpful knowledge but often focus too much on the functionality and usability while ignoring other important factors like emotions, aesthetics, fun and enjoyable user experiences.

All the mentioned studies provide very valuable insights and expertise but only show a fragmented picture of requirements for high quality (useful, useable and engaging) websites. Of course, one can argue that different types of websites (e.g. advocacy websites, political website, commercial websites, informational websites, news websites, personal websites) have different purposes and target different audiences and therefore require different evaluation criteria and standards. But our goal is the development of a more general framework and methodology adaptable four various types of websites. Similar to established standards for traditional media (e.g. gestalt principles for print resources), also different websites share common criteria necessary to be useful, usable, satisfying and engaging for the citizens.

We conclude from literature that the recent excitement about the power of websites to foster citizen's communication possibilities in previously impossible ways should not led researchers to overlook the fact that the people are still interacting with a machine. A careful consideration of the interface issues is necessary (Dillon, 1990, Mack, 2000, Norman, 1988, 2003) to see how the users will interact best with the website interface. The graphical user interface (GUI) of websites reflects the increasing importance of nonverbal signs and digital images which refers to a changing semiotic system of human communication and interaction (Bolter, 1991). To increase the acceptance of websites by a wide public is important to understand that it is not enough to make a website functional but also usable,

compelling and engaging. There is a need for a model which weighs the visual/aesthetic aspects against the functional and technical aspects of web design (Thorlacius, 2002). Visual communication is an essential foundation for the design of interactive interfaces. The interface is visual and designed to communicate and it is interaction that distinguishes digital interfaces from the more traditional media.

## 3. *AESTHETICS AND EMOTION AS PART OF AN INTEGRATED FRAMEWORKA*

The current literature is helpful in many regards, but focuses almost exclusively on the offered information, features of interactivity and usability without taking into account other important factors – like aesthetics and emotions - for evaluating the quality of public websites. We argue that an interdisciplinary approach with a theoretical and methodological basis is necessary to create as well as assess the quality of public websites. Websites are a new additional channel of communication with new features (graphical interface, motion, sound etc.) in a new environment (virtual, worldwide). The blurring relations between reading and writing, and between verbal and visual media as well as the transition from text-based uses of the Web to graphic and multi-media interfaces is asking for a more generic model of public Internet communication. Big parts of what we see, hear, read and think in our daily lives is stimulated and mediated by media, increasingly by electronic media. Similar to the effects of the book, telephone, TV and radio also the Internet will influenced and change our social, cultural and political life. The Internet opens up a 'new world' with interchangeable roles of creator and viewer; it carries the potential for a media society shaped by citizens' participation and interaction. What we perceive and experience (see, hear, read) on the Internet/websites effects our perceptions of 'real world' (Schirmacher, 1999, Weinberger, 2002). Building on Schirmacher (1999, p. 2) "…aesthetics investigates perception as an inter-active process in which a person plays at the same time an active and a passive role. Aesthetics describes human perception as communication, a sharing of a common world which constructs and deconstructs reality for us." we argue that it is necessary to integrate the aesthetics in a theoretical framework for the creation of engaging public (political, educational, cultural, artistic etc.) websites.

Much research over the past few years from the fields of usability, human-computer interaction and cognitive science has focused on the important field of developing more usable websites to improve the user-site interaction experience. However, in contrast to the ample amount of research focusing on the cognitive usability of web interfaces, only a few studies have focused on the aesthetic aspects of interfaces (Knupfer, 1997, Tractinsky, 1997, Thorlacius, 2002). Furthermore, the few studies dealing with aesthetic aspects of interfaces have limitations.

First, many authors seem to be aware of the importance and power of aesthetics and evoked emotions (Merwe & Bekker, 2003, Hill & Hughes, 1998, McMurdo, 1998, Gibson & Ward, 2000), but there is a lack of research and methodology to measure their quality. Mostly they do not go beyond counting the total number of graphic and multimedia files. We do not agree that the more pictures, animations or video files a site contains the more sophisticated, effective (Gibson & Ward, 2000) or "participation friendly" it is. A too busy site can also have the opposite effect and it depends how the pictures are arranged and which message they contain. Moreover, common statements like "one should apply eye pleasing aesthetics…", "…the site used nice colors" without further explanations or theoretical underpinning are too limited.

Second, several studies reduced the aesthetics to judge the beauty of a website or to assess applied graphic design principles. Our definition of aesthetics embraces the whole perception of the website by users/citizens. It addresses the arrangement and style of written words, elements of visual communication (e.g. pictures, empty space, body language), as well as the use of sound with which the website invites and challenges the user to follow its lead (Asmus, 1999, Schirmacher, 1999, Park, 2004).

The integration of aesthetic aspects of website interfaces – as additional channels

of communication - can improve their quality in many ways. As above mentioned, they are input for our senses (see, hear, feel etc.) and inform our thinking. Moreover, they influence our emotions. Being pretty skeptical towards the use of aesthetics in context of usable websites, finally also Nielsen (2002) discovered the importance of the 'look, feel and fun' factor for engaging and satisfying online experiences. "Designs that engage and empower users increase their enjoyment and encourage them to explore websites in-depth. Once we achieve ease of use, we'll need additional usability methods to further strengthen joy of use.' (Nielsen, 2000a, p. 1). Norman (2003), for example, recently explained why attractive things might work better "Emotions, we now know, change the way the human mind solves problems – the emotional system changes how the cognitive system operates. So, if aesthetics would change our emotional state that would explain the mystery." (2003, p. 38).

Furthermore, aesthetics are not only important for the emotional component but can also improve the ease of use. Several studies have found a close correlation between perceived usability and user judgments of aesthetics (Knupfer, 1997, Kurosu & Kashimura, 1995; Tractinsky, 1997, Schenkman & Jonsson 2000, Kiana, 1999).

The fields of visual communication and interface design, film and television studies can help evaluating colors, images, typography, layout, sound as well as creating engagement through the effective combination of (learning) task and visual representation of the content (Laurel, 1993). These elements can draw the user's attention, assist completing his task, and improve the appeal of the site. Used in a wrong way they can distract, annoy or overwhelm the citizen by increasing the cognitive load.

Expertise from the field of interaction design is necessary to ensure motivated and engaged user. Preece (2002), for example, recommend the use of visual conventions borrowed from the real world, consistent visual metaphors, and the recognition of the learner/user as an actor (Laurel, 1993) to keep them engaged.
Interaction can also be stimulated and supported by appropriate applied elements

of visual communication (Wilson, 1993, Davis, 2002, Nielsen, 2002). Theories and perspectives from film, media analysis and from communication studies contribute to the development of a theoretical frame for successful interaction. Wilson (1993) presents some guidelines concerning the aesthetics and practice of designing interactive computer events. He claims, that before designers try to make the work interactive, they should understand the concept of interactivity and know why to make them interactive (creating versus consuming).

The list of above introduced research fields and their contribution to the creation of more useable, satisfying, pleasurable and engaging public websites is not exhaustive. It should be understood as an attempt to clarify the necessity for the development of a more interdisciplinary framework. However, there is definitely a need for further qualification. And instead of rejecting introduced frameworks and studies, the discussion below incorporates them and builds on them as an important platform for a more integrated theory and methodology for the creation and evaluation of public websites.

## 4. *THE FRAMEWORK*

To develop a theoretical frame as well as a methodology for identifying what the website offers to the citizen/user, we begin to introduce the key properties of the new medium Internet. Building on the work of researchers studying the fundamental changes in our life world through the WWW (Rogers, 1986, Abramson et al., 1988, Weinberger, 2002, Burnett & Marshall, 2003) the following areas will be effected:

First, the style of communication: The increased scale of possible information exchange, the increased speed of information transfers, the reduced time for sending messages through data compression, the changed format of information through the combination of text, images, audio and video, the new directionality of communication enabled through the interactive potential of the Internet (synchronous and asynchronous two-way communication etc.), the individualized control is breaking the traditional publishing model (the individual

user gained power concerning what to view and what to publish).

Second, the Web is opening up a new world. The concepts of space (the content of the Web is 'near' and 'far' determined by what' s linked with each other and the links are based on human interest), time (we as user decide when and for how long we interact with a website, based simply on what suits us), perfection (the design assumption of the Internet was that is an imperfect world – it celebrates our imperfection as a place where we can articulate our viewpoints, experiment, play, fail and try again), togetherness (the Web is a new social, public space – a shared place where we build, extend, and inhabit, but only to the degree we want to express our individual interests: many small faces, each distinct within the multitude) and knowledge (the web is a written world – the 3000 million people on the Web are its authors; huge amounts of knowledge can be build and shared together world widely) will be effected and might have significant implications - politically, economically, socially, and culturally - for our society.

Given these distinctive potential and the already existing frameworks, we try to detail the main four evaluation categories of useful, usable and engaging websites. These categories were already identified in earlier studies co-authored by the authors (De Landtsheer, Krasnoboka and Neuner, 1999; 2001, 2004). It follows that theories and methods for evaluating the content and design of existing websites can also usefully contribute to the production of new, qualitative and engaging websites.

1) Content - information
The content category refers to the offered information in verbal (e.g. text, speech on video) and visual (e.g. graphs, illustrations, pictures) form. An excellent website provides focused content, which serves the needs of visitors. The appropriateness of information depends, of course, on the objective of the provider, on the type of the website and on the targeted audience (e.g. commercial or advocacy website). The following issues, for example, are of general interest and can be adapted in correspondence with the nature and purpose of the site:
Quality of information (e.g. spelling and grammatical mistakes, accurate and reliable, authority, copyright, currency, quality of writing for the web, etc.)

Appropriateness of information (the relevance for the site's purpose, no 'meaningless' content, types of information, in relevant community language ect.)

Scope of information (the breadth or narrowness of the resource, its depth and level of detail, leaving out nothing significant) Etc.

2) Interactivity – communication settings
Following McMillan (2000, 2002) three types of interactivity can be distinguished: human-to-human interaction, human-to-documents interaction and human-to-system interaction.

Interactivity is mainly about the directionality of communication and level of control over communication. The direction of communication differs between one-way from the source to the receiver, two-way communication between provider and user, or multidirectional communication between any number of sources and viewers. The control of communication embraces one-way sender controlled communication e.g. dissemination of marketing or political marketing messages, or interchangeable roles between author and reader, break down of former hierarchies between sender and receiver in form of responsive dialogues. The dimensions of communication direction and participant control can be applied to all three forms of interactivity mentioned below.

Concerning user-to-user interactivity it is important that we use communication settings which enable the users to have reciprocal exchanges of information e.g. e mail contact, chat rooms, instant messaging tools etc.

Human-to-documents interactivity can be seen how active audiences or users interpret, manipulate and use the media messages. For example the presence of possibilities for the creation of interactive fiction, downloadable documents, interaction possibilities with content creators and actual creation of content; playing games or quizzes, online memberships, Mud's and MOO's, etc.

Human-to-system interaction refers to the interaction between people and the computer/website interface e.g. computer based instructions like online help, online formulas for various transactions, feedback from the computer in learning programs,

possibilities to manipulate the computer and obtain information e.g. the use of databases, spreadsheets.

Given the interactive potential of websites and the three dimensions of interactivity, we can examine how interactive the applied communication strategies of the site are.

3) Usability – easiness of use

Building on Preece and colleagues (2002, p. 14) we define usability of websites as products which are 'easy to learn, effective to use, and enjoyable from the user's perspective. It involves optimizing the interactions people have with interactive products to enable them to carry out their activities at work, school, and in their everyday life.' In other words, a website should be – also depending on its main purpose - satisfying, enjoyable, fun, entertaining, helpful, motivating, aesthetically pleasing, supportive of creativity rewarding and emotionally fulfilling.

It is about the ease of use when people are navigating through the site. The more easy to use the website is, the more they will feel encouraged to explore the site in-depth, to interact with it and to visit it again (Nielsen, 2000a, Krug, 2000, Preece, 2002). How useable a website is can be measured, for example, by having a closer look at the quality of the following features:

Navigation (user orientation, information hierarchy and architecture, etc.), links (changing color of links, name of the links, ect.), graphic and multimedia files (containing message, download and loading time), search machines, online documentation, online help, recognizable/clear purpose of the site, browsability, accessibility, used technology etc.

4) Aesthetics – experience and perception

When considering the design of websites, the focus tends to gravitate to common issues of information, interactivity and usability. Even in the discussions regarding the website's usability and human factors, the issue of user experience, or overall their aesthetic experience, is rarely addressed. Our definition of aesthetics embraces the whole perception of the website by users/citizens. It addresses the arrangement and style of written words, elements of visual communication (e.g. pictures, empty space, body language), as well as the use of sound with which the website invites and challenges the user to follow its lead. It refers to the mediated tone and mood of the website's content.

The applied aesthetics influence many important issues for informative, user friendly and engaging websites: the usability of a site, the information presentation, the credibility of the site, the attractiveness, the 'look and feel', the visual appeal, and so on. More and more scholars start to discover positive correlations between aesthetics and other success factors of a website. Tractinsky (1997, p. 2), for example, claims "… recent research on the visual aesthetics of computer interfaces suggests that aesthetics is a strong determinant for user's satisfaction and pleasure… empirical studies in the field of HCI have also found that the aesthetic aspects of various computing products serve an important role in shaping user's attitudes in general…". Kim, Lee and Choi (2003) performed an empirical study of the quantitative relations between design factors and emotional dimensions. Their study confirmed a correlation between examined design factors and positive emotions.

Several studies have found a close connection between perceived usability and user judgments of aesthetics (Kurosu & Kashimura, 1995; Tractinsky, 1997, Schenkman & Jonsson 2000, Powazek, 2002). Edward Tufte wrote, "Skillful visual design of computer screens - with care given to color, typography, layout, icons, graphics, and coherency - substantially contributes to quality and usability" (1994, p. 32). Schenkman and Jonsson (2000) concluded that the best predictor for the overall judgment of a website was its beauty perceived by the user. Powazek (2002, p. 59) concludes "…it's hard to quantify exactly how much the visual design of a community space contributes to quality of the contributions, it's impossible to deny that one directly influences the other."

In our context, the term aesthetics embraces issues like the use of sound, graphic design and gestalt principles, visual communication elements, animation techniques, the emotional and associative dramaturgy of the website content, the used language style. Important criteria in this context are, for example:

Use of color, typography, graphics; the site composition and balance; the whole layout (clear, consistent, easy to read, not too busy); the mediated tone and mood of the site (through sound, pictures, used language style etc.); graphic enhance without cluttering and confusing; used metaphors, semiotics etc.

More generally speaking (Powazek, 2002) it is about the design for the target audience, the design for flexibility, the design for experience, the design for simplicity, the design for readability, the design for beauty and the design for community. Moreover, the aesthetics always depend on the cultural context within which they are applied (Tractinsky, 1997).

## 5. CONCLUSION

The intention of this paper is to show the need for bringing single areas together in one framework to provide a broad picture of the quality of a website. The suggested categories can still be better theoretically underpinned, conceptualized, and categorized. Moreover, their proper application always depends on the purpose and nature of the website and the cultural context. Especially, the aesthetics should no longer be ignored when talking about useable and engaging websites since they can play a crucial role in motivating the citizens to get engaged with the content of the site.

The movement from book to screen, from print to digital with changed concepts of space, time, togetherness and communication provides so many surprises, opportunities, hopes and fears that none of can say how it will play out. Our experiences in the 'virtual world' will effect our perceptions and activities in 'real world'. With changed media and communication also the concept of the public sphere and democracy changes. But how we judge these changes is less important than joining together our expertise for the active creation of this new public space/new part of our public sphere. A shared common world - with public and private discourse – requires the people's participation. In order to design meaningful and attractive websites, designers must understand how citizen use and perceive the site they visit. Therefore, the user should be in the center of the design. Moreover, user and perceptions may vary among various types of websites and tasks, so that we should start with specific contexts before we draw general conclusions.

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