# Information Quality Evaluation.
# Criteria and Tools for
# Web Sites Quality Evaluation

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**Abstract:** Information quantity distributed today within INTERNET, especially through World Wide Web, is rising much more quickly as the quantity of information circulated through other mass-media. Just as we don't believe everything we read in newspapers, see on TV or here on the radio, we can't believe everything on the INTERNET.

Consequently, it became necessary to critically analyze Web sites and to thoroughly evaluate their quality, in order to be able to select them according to our own requirements and needs. In addition, critically evaluating Web sites is essential to conduct quality research.

This paper is an attempt to analyze the 'information evaluation' concept and process – based on some quality management concepts, tools and methods - in order to propose some **basic criteria** to evaluate Web sites quality and some **tools** to be used in order to realize Web sites evaluation and selection.

## 1. Significance, scope and influencing factors of an evaluation process

Evaluation is a complex and critical **thinking process** that every human being uses in making judgments of *quality, truthfulness and accuracy*. Evaluating, for example, information, a good/product, a service, a person, an organization, etc are - or should be - common processes of one's everyday life. University professors and students are - or should be - *the most effective information evaluators*; if not, they have to be conveniently skilled, by education and training...Evaluative judgments are always followed by important **deliberative and decision making processes**. Examples include:

1.  Judging the merits of an argument, of a person, of a product or service, of an organization

2.  Deciding what action to take (for instance to buy or not to buy a good/product or a service provided by a certain company)

3.  Deciding whether to believe or not to believe what someone is saying or writing

4.  Deciding to defer the decision to act or not to act in order to get more time for obtaining additional information

There are in English at least six different verbs having the same basic meaning ("*to form a judgment of worth or significance*") but also a specific additional meaning which has to be taken in consideration, also [6]:

*   '*to evaluate*' – implies considered judgment in setting a value on a person/thing

*   '*to rate*' – involves determining the rank of a person or thing when he/ she or it is judged in relation to others of the same kind

*   '*to estimate*' – may imply judgment based on rather rough calculations (but this term lacks the definitiveness of other terms)

*   '*to appraise*' – stresses expert judgments

- *'to assess'* – implies authoritative judgment (it involves setting a monetary value on something as a basis, for example, for taxation)

- *'to assay'* – refers to a careful examination (such as, for instance, chemical analysis of ore in order to determine its content)

These *last three verbs* can refer, in extended senses, to a **critical** analysis or appraisal.

According to BLOOM – who sets forth, in 1956, a hierarchical model of educational objectives as *thinking skills*, commonly known as *"BLOOM's Taxonomy"* [1] – there are **six basic thinking skills** (listed from the least to the most sophisticated): 1.KNOWLEDGE, 2.COMPREHENSION, 3.APPLICATION, 4.ANALYSIS, 5.SYNTHESIS, 6.**EVALUATION.** This critical difference between EVALUATION and all other above mentioned skills is the inclusion of **criteria and values**.

**Evaluation** is defined as <<*the making of judgments about the value -- for some purpose – of ideas, works, solutions, methods, material, etc . It involves the use of criteria as well as standards for appraising the extent to which particulars are accurate, effective, economical or satisfying. The judgments may be either those determined by the evaluator or those which are given to him*>>.

According to this model, each type of thinking skill is including lower skills in the hierarchy. Thus, **evaluation is the most sophisticated of the thinking skills**. Studies in cognitive psychology, metacognition and critical thinking have established the possibility that evaluative thinking may be influenced by several *factors* (listed in order of their importance) [2]:

I. *Prior knowledge* (which has the strongest influence)

II. *Format preferences* (for example, scholarly books and journal articles are, for researchers, much more important as popular press books, magazines and Web resources)

III. *Epistemology* (which investigates the nature and the origin of knowledge)

IV. *Affect* (which is most common during initialization of evaluation process)

V. *Beliefs* (epistemological, methodological, etc)

All these **influencing factors** may influence or change – some times in a considerably manner - the course of evaluative processes and theirs outcomes.

## 2.Quality of information

Both notions of *'information'* and *'quality'* have become broader and broader over the years and knew a lot of questionable definitions.

According to [3], <<*"information' concept -- as it was employed in different disciplines, during many years, for designing a* **state***, a* **product** *or a* **process** *– had a heteroclite, ambiguous, polyvalent and unclear character, despite its considerable heuristic value*>>.

The word 'information' is used today in different contexts: information as a *commodity*, information as *energy*, information as *communication*, information as *facts*, information as *data*, information as *knowledge*, etc. If it is used as a commodity, information (like, for instance, this contained by texts, sounds, images, etc) has an **economic value** and can be sold and purchased, being included in a so-called 'information product' or 'information service'.

According to DEBONS, <<if an individual or organization has sole possession of a particular body of information, that information may enable whoever holds it to achieve objectives. Information can thus provide **control over objects and persons!**>> [4]

Today, the international standard ISO 9000 defines "**quality**" as being <<*the totality of characteristics of an entity* (a general notion including either a product/ service, or a process, an activity, a system, an organization, a person or a combination thereof) *that bears on its ability to satisfy stated and implied needs* >> (of customers and other stakeholders).

This worldwide known and accepted definition is referring both to the **customer/user** (of the product/service) and to the **provider** of product/service. Indeed:

- 'Quality' concerns the *product/service* to the degree that it complies with the **specifications** to the adequacy of its usage, as well as to the number of attributes aiming for excellence at a competitive price (because the customer/user is purchasing exclusively products/services having **the highest ratio quality/price**)
- 'Quality' represents also a *new strategic philosophy of company management*, based on the overall commitment of the management and employees towards *continuous improvement*. This commitment has an ultimate objective: **the customers' satisfaction in all the phases of a product's life cycle and in all the sectors of the company**.

A product is a result of activities included in processes [5]. Consequently, the information *as a commodity* could be considered to be an '**immaterial product**' *) realized and sold by a 'supplying company', purchased and resold by one or more 'providers' and used by its 'end user'. This '**immaterial product**' has not to be confused with the '**material product**' accompanying it (i.e. the material carrier of information: the paper of a book or a journal, an object, a video/ audio-cassette, a CD or a CD-ROM, etc.). These **immaterial and material products** are representing the two components of the so-called '*information product*'.

Quality of both these **immaterial and material products** has to be evaluated separately within the information market, by both the *user* and the *provider*, using specific **criteria** and **tools**. The model of ***External PROVIDER-CUSTOMER/ USER Relationship*** (Fig. 1) could be very useful for someone interested to understand *HOW to define and improve the quality* of both immaterial and material products.

Based on this model, I concluded in [3] that <<*an information product (texts, sounds, images and their carrier - the paper of a book/ journal, the video/ audio-cassette, etc-) is considered to be a* **quality** *information product solely if their provider has taken into consideration both the* **stated and implied needs of customers/users** *(before designing, manufacturing and supplying the product) as well as* **their reactions** *(after having supplied the product).*>>.

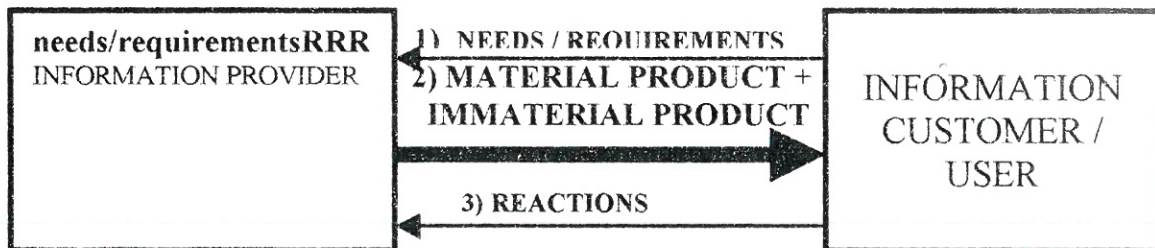| needs/requirementsRRR<br>INFORMATION PROVIDER | 1) NEEDS / REQUIREMENTS<br>2) MATERIAL PRODUCT +<br>IMMATERIAL PRODUCT<br>───────────►<br>3) REACTIONS<br>◄─────────── | INFORMATION<br>CUSTOMER /<br>USER |
|---|---|---|

**Figure 1. - The External PROVIDER – CUSTOMER / USER Relationship**

(Figures 1, 2 and 3 are representing the object sequence of actions to be implemented in order to obtain /improve the quality of both the *material and immaterial products* components of an information product)

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*)'**immaterial**' – refers to something having no material body or form

Human beings may have generally *two basic needs/ requirements* [3]. Those are:

- **The need to be aware and to understand** (these *'information need'*, respectively *'knowledge need'* are generating some basic questions like: who are we?, where are we coming from? ; when, where, how and why was happened this phenomenon/ event?, etc)

- **The requirement to act** -- in order to achieve the product needed to satisfy awareness need and, consequently, to improve continuously their life quality *<<Knowing without acting could be useless, but acting without knowing could be dangerous!* >> - warns us a well-known Romanian saying........

Information suppliers/providers and information customers/users are establishing **partnerships** whose informational interactions have *efficiency and effectiveness* depending both on *partners' capabilities* and on *partnership interaction context* [3].

## 3. Quality on Web sites

The World Wide Web is a very complex information technology network consisting today of **several hundred million Web pages *)** and **over a hundred million users.** Each day, these users are searching the myriad of accessible **Web sites****), in order to find the most convenient, relevant and up-to-date information they need.

On the Web, users typically forage for information by navigating from page to page, along Web links. The content of pages associated with these links is usually presented to the user by some snippets of text or graphic.

Based on above mentioned quality management specific concepts and model, I propose to identify values and criteria enabling to a Web site surfer/user to evaluate and select **Web sites and pages.** These are *information products* having two components: the *immaterial product* (information) *and the material product (* electric signal).

Consequently, such an information product is a *quality* information product solely if providers of *information* and of *electrical signal* have taken into consideration both *stated/ implied needs* of site surfers/users as well as their *reactions* (after visiting the site).

Today it is possible to find on Web pages, for example :
- marketing information on products, services, organizations, etc
- texts, sounds and/or images of mass-media productions (including especially electronic documents and journals'/newspapers' articles)
- personal Web pages
- e-mail messages, newsgroups postings, etc

The layout of a Web page has always three main components : the HEADER, the BODY and the FOOTER. By thoroughly investigating these components, it is possible to find answers to some basic questions like, for example:

- Who is the author (or the contact person) of the site?
- When was created/reviewed this page?
- Which is the domain of URL (as, for example: edu, com,org,gov,net,ro,fr,etc)?
- Which organization is representing the site/page?
- Which is the link to local home page and which are other provided links?
- Which is the intended audience of the site/page?
- Which is the purpose of information?

Today, almost anyone can publish a Web site and, unfortunately, there are so far no *formal standards* on minimal acceptance **criteria** for these Web sites.

Some Web sites are using an e-mail link to a *webmaster* in order to facilitate *the interactivity*, i.e. the communication of user with the provider in order to allow the *continuous improvement of site quality,* based on **reactions** collected by this way from different users.

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*) A **Web page** is << *a document on the Web consisting of an HTML file and any related files for scripts and graphics and often hyperlinked to other documents on the Web>>* [6]
**) A **Web site** is << *a set of interconnected Web pages, usually including a homepage, generally located on the some server and prepared and maintained as a collection of information by a person, group or organization.>>* [6]

The **CRITERIA** presented in the next table were found by analyzing with my students their basic needs and requirements, according to the above shown model of *External PROVIDER – CUSTOMER/USER Relationship*.

The product satisfying such a criterion could be considered as a RESULT which has been made possible by some specific ENABLERS...After a careful evaluation of all these RESULTS (corresponding to each satisfied criterion) and of their ENABLERS, an effective evaluator is able to make **comparative judgments** related to the quality of different Web sites and their information providers....

According to CRITERIA presented in the next table, an **ideal Web site** has to be found instantaneously and be interactive; the information it provides to its users has to be simultaneously credible, current, objective, accurate, dense and comprehensive, in order to satisfy all stated and implied needs and requirements of all its users!

If it is obviously impossible to realize such an ideal Web site, it is surely possible **to attempt to satisfy all these needs and requirements in a ever greater and greater extent!** This is the spirit of Total Quality Management (TQM) and **this attempt could be continuously made easier and faster by applying quality management specific tools, methods and techniques** [5]

| EVALUATION CRITERIA | QUESTIONS TO BE ANSWERED BY USER |
|---|---|
| **1. ACCURACY** *(extent/ degree of information exactness and correctness)* | -Does the author mention his information sources? <br> -Is it possible for you to check if these sources are legitimate? <br> -Is the author's background related to the covered topics? <br> -Did the author indicate clearly the research method and how he collected and processed data *(only for research-based data)*? |
| **2. AUTHORITY** *(extent /degree to which the author could be considered an expert in his field).* | -Is the author known? <br> -What do you know about the author (as for example: his/ her background, position, affiliation, publications, etc)? <br> -Is it possible, for you, to determine the author's expertise and credibility? |
| **3.COVERAGE** *(extent/ degree to which topics was observed, analyzed and reported)* | -Are all site's topics explored in depth? <br> -Are all site's links relevant, appropriate, comprehensive and operational? <br> -How relevant and comprehensive is, for you, the site's information? |
| **4. CURRENTNESS** *(extent/ degree to which the distributed information is belonging to the time now in progress)* | -When was created and reviewed (last time) the site? <br> -Is the copyright date displayed? <br> -Are all mentioned resources available? <br> -Are all of site's links relating to correct INTERNET addresses? |
| **5. DENSITY** *(extent/ degree to which comprehensive and relevant information is displayed on each site's page)* | -Is text or graphic content predominant on each page? <br> -Is enough comprehensive, for you, text/graphic information displayed on each page? <br> -Did you find useful enough, for you, the displayed text/graphic? <br> -How much advertising information is included on site's pages? |
| **6. INTERACTIVITY** *(extent/ degree to which is operating the bi-directional communication between user and author)* | -Is it possible, for you, to find at least one e-mail link to Web site author or to the webmaster? <br> -Is this link active? <br> -Is this link quickly operational? <br> -Did you receive an answer to the message you sent to author/ webmaster? |
| **7. OBJECTIVITY** *(extent/ degree of site's author objectivity versus his subjectivity)* | -What is the real goal of the site? <br> -What is the real purpose of the site's author? <br> -Are you confident enough in author's objectivity? |
| **8. PROMPTNESS** *(time delay needed for site finding and its pages displaying )* | -Was the site URL found quickly enough? <br> -Is it possible to change immediately displayed pages? <br> -Is it possible, for you, to contact, within a reasonable delay, all provided links? |

## 4. Web sites search or library publications search ?

Today, searching information for a project on Web sites seems to be a *lot more efficient and effective* as searching information in a library store! Is this expectation real?

In my opinion, Web and library are well complementary one to another. **The Web can be a good source of quick overviews but the library is necessary for depth analyzing.**

Finding in a library the information we need for a project could determine, in itself, the success of our project! Such a search can be exhausting and invigorating; it often results in *unexpected discoveries* that a wise researcher could file away for future projects. And the search as often invalidates a point of view as it validates! In poring over vast quantities of information, we are more likely to find *alternative points of view* that enhance our own picture of the true nature of things.

In contrast, searching information on Web sites, for the same above mentioned project, is to ask the various search engines, meta-crawlers and directories to find specific pieces of information that *support our assumptions.* Accidental discoveries do happen, but they are more rare on the Web....

Information search in library is usually forcing researchers to dig deeper into material in order to find what they need. In doing so, researchers develop a more sophisticated understanding of their findings (of course, if they are allowed enough time!).

Web sites, on the other hand, encourage the reading of *abstracts* and enables us to be *generalists,* i.e. persons who are willing to learn on any subject that suits the needs of the day, rather than attaining mastery of a single subject area.

## Conclusion

We, as professors, want students to learn to find information on all sides of an issue and to learn some of its complexities. We want students to learn a vast variety of subjects but we also need them to master at least one! The challenge for us, as educators, is – I am convinced - **to integrate old and new ways of learning.**

But, in order *to be able* to act in this manner, we should learn, first of all, **HOW to evaluate critically Web sites information quality!**

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