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CRITERIA FOR EVALUATING LEARNING WEB SITES: HOW DOES THIS IMPACT THE DESIGN OF E-LEARNING?

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Abstract

While universities and colleges are speeding up to launch their courses on the Internet, it is not always true that every e-learning site exhibits pedagogical quality and a learner-centered design. Putting a course online is more than a matter of pasting the content into a web page. Important considerations on what should and should not be included in an online course and what tools work best to produce the content of learning events for e-learning should be made.

This paper discusses three levels of criteria to evaluate learning web sites: (1) content, (2) instructional design, and (3) interface design. It concludes with some guidelines regarding the impact of these criteria on the design of e-learning.

Introduction

Today the e-learning concept is larger than ever. E-learning can be an alternative term for distance education, web-based learning, or online learning, which emphasizes net-work-enabled learning. According to Cisco Glossary e-learning is internet-enabled (it can include *cmc* media, i.e. chat, forum, email) learning that encompasses training, education, just-in-time information, and communication. The most pointed out advantages of e-learning are: (1) its power to offer a common ground for the emergence of online learning communities where

users have the opportunity to learn collaboratively; and (2) its flexibility in terms of time, space and budget constraints.

Therefore web-based educational products are becoming an instrumental part of colleges, universities and companies. However, to decide how to design and to deliver instruction using learning sites may present a difficult challenge.

This paper addresses this challenge by developing a set of criteria for evaluating learning web sites so that quality standards in academic and professionals web-based education could be ensured. It also offers some guidelines to e-learning designers based on those criteria.

Evaluation criteria

There can be three levels of criteria to evaluate a learning web site. First, as its purpose is teaching a subject matter, its content should be evaluated — "Content" level. Secondly, because it delivers instruction, it has to be evaluated in terms of instructional design — "Instructional Design" level. Finally, because it uses the web as a media, it has to be evaluated in terms of interface design — "Interface Design" level

These three levels of criteria are presented on the table 1. For each level several criteria were laid down and described.

Table 1 - Levels of criteria and criteria for evaluating learning web sites

Levels of criteria	Criteria
1. Content	— Credibility
(evaluates the web site content)	— Clearness and succinctness
	— Accuracy and coverage
	— Currency
2. Instructional Design	— Instructional objectives
(evaluates the instructional soundness)	— Practice opportunities
	— Feedback
3. Interface Design	— Design and layout
(evaluates the web as a media)	— Consistency
	— Information structure and organization
	— Navigation
	— Visual appeal

1. Content level

Credibility

When using learning web sites authority is a particular concern, as high quality content must be assured. A problem in evaluation credibility on the Internet is to obtain information on scope and authority. These are some of the key indicators for authority (Wilkinson, Bennett and Oliver, 1997; Smith, 1997):

— Does the website have some trustworthy organization or expert behind it?
— Is there a description of the site's content?
— Is the information verifiable?
— Is the contact information (e-mail, phone number, mailing address) of the site's author(s) exhibited?

The scope is informed by the:
— breadth: what aspects of the content is covered?
— depth: what is the level of detail provided?
— format: does the web site provides links that may restrict its scope to just a certain classes of resources?
— time: is the information limited to a certain time periods?

The lack of information about information (metainformation) on the web sites also affects evaluation based on the criterion of credibility (Harris, 1997). Metainformation includes all the abridged forms of information, such as abstracts, content summaries, introductory notes, reviews, commentaries that are very familiar in print sources, but somehow rare in online sources. This type of information allows users to assess credibility and make some judgments or analysis of content.

The user should be able to look for metainformation such as an introduction that clearly states the actual scope of the website;

Clearness and succinctness

Content should be easily understood, unambiguous, and succinct. Research has shown that readers reading from computer screen are 25 to 28 percent slower than reading from paper (Nielsen, 1999).

Accuracy and coverage

The purpose of accuracy and coverage assessment is to guarantee that the content is actually correct: up to date, factual, detailed, exact, and comprehensive (Harris, 1997). Here are some aspects to bear in mind (Harris, 1997; Smith, 1997):

Comprehensiveness

— the information should be complete and extensive;
— the user also should know if the site includes an original/unique content or modified, selected or rearranged information;
— the references/sources should be clearly indicated;
— if the web site that presents conclusions or assertions it should provide verifiable data to support them.

Audience and purpose

— if the purpose of the web site is stated the user knows for whom the web site was created;
— knowing the intended audience for what the web site was designed gives the user an idea about the suitability for him/her of the content offered.

Presence of bias

— political, ideological, gender related or other biases (e.g. does the web site attempt to change the user's mind)?

Currency

While many web sites explicitly include a date of last revision and state when they were created some of them may do not. The user should look for the date of the web site creation, how frequently it is updated, if the dates of update stated correspond to the information in the site, and if it is maintained by the individual, group or organization that sponsors it.

2. Instructional Design level

Instructional objectives

Instructional objectives should be explicitly identified so that users: (1) have a general idea about what they will gain with the specific web site; and (2) are able to check out if their individual goals and objectives match with the specified objectives in the web site. They also should match the strategies for instruction offered.

Practice opportunities

Some opportunities for learners to practice what they have learned will increase the learning (Reigeluth, 1999). For example, practice of a procedure entails doing it for a case that is different from any previously encountered cases.

Some guidelines should be followed: (1) the number of practice items can be increased to enhance the instruction; (2) an easy-to-difficult sequence should also be used, as for examples; and (3) prompting is often helpful on early practice items when the procedure is a difficult one. Otherwise, power should be reserved for the feedback (Reigeluth, 1999)

According to Merrill (2000), the web site content should also offer problems framed in real world contexts. He argues that effective instruction involves problem-based instruction. Therefore effective instruction should includes four distinct phases of instruction: (1) activation of prior knowledge; (2) demonstration of knowledge and skills; (3) application of knowledge and skills; and (4) integration of these knowledge and skills into users´ real-world activities.

Merrill (2000) argues that many learning web sites can be characterized as tell-&-ask instruction, where practice opportunities are presented as a few multiple-choice, true-false, or short-answer practice questions. Such practices only asks for recalling the information that has been presented. In opposition, Merrill suggests that tell-&-show-&-do instruction offers real practice opportunities where users´ are asked to activate relevant prior experiences, to analyse examples and demonstrations about the content being taught, to apply their newly acquired knowledge/skill to their everyday life, and to integrate/transfer the new knowledge/skill into real world contexts.

Feedback

Adequate feedback is an important source of motivation for users. If any feedback is given, the user may become bored, unmotivated or not sure of whether the actions performed have been successful (Reigeluth, 1999).

3. Interface design level

Design and layout

Boling (1999) defined "screen space" as "the most effective element you can use to provide support for your audience. They do not have to be decoded and interpreted, as do colors cues, typographical cues, and so on".

Alignment and proximity are two of the most fundamental and useful spatial techniques available. Vertical or horizontal alignment allows organizing information in a way that people process, learn and remember better than unorganized information. Proximity of elements on the screen determines the degree of relationship between them. If they are close together they will be assumed to be related, but if they are far apart they will be perceived as different things.

Another important design principle is: "less is more". Simplicity and cleanness of the interface make it more perceptible and less annoying. The use of

contrast (size, color and shape) that is sufficiently strong allows the use of a few simple and easily-perceptible layout treatments.

Consistency

Consistent interface allow the users to easily follow the required tasks.

Shneiderman (1998) states that consistent sequences of actions should be required in similar situations; identical terminology should be used in prompts, menus, and help screens; and consistent color, layout, capitalization, fonts and so on should be employed throughout.

Information structure and organization

The information structure and organization should be easy to follow and to understand by users. Some questions need to be asked to evaluate this criterion (Wilkinson, Bennett and Oliver, 1997; Smith, 1997):

— Is the web site organized in a logical manner to facilitate the location of information?
— Is the organizational scheme appropriate (e.g. chronological for a historical site)?
— Does the site offer a variety of features in addition to delivering content (e.g., provides e-mail links, downloads, discussion lists)?

Navigation

Nielsen (1999) suggests that the user fundamentally controls his or her navigation through the pages. Users can take paths that were never intended by the designer. They jump straight into what they want to see from a search engine without ever going through the homepage. It is better to design for freedom of movement and flexible navigation that supports many different ways of moving through a site than for restriction pushing the user to follow predefined paths. However, the user needs to be able to get an answer to the questions:

— Where I am now?
— Where I will go?
— How I will go?

Visual appeal

The visual appearance should avoid of overbearing graphics, gratuitous animations, and elements that detract from the user's ability to move freely through the site and learn its content.

Impact on the design of e-learning

The excitement surrounding the Internet has resulted in the explosion of e-learning that we are witnessing today. E-learning is based on new learning paradigms and adopts new instructional and design methods to facilitate knowledge construction. However, the designer should always keep in mind that its main purpose is to facilitate/promote learning. Thus, some of the criteria concerning the content, instructional design and interface design need to be addressed in order to provide quality to web-based education.

Based on such a set of criteria, these are some guidelines that should drive designers towards the design of successful learning web sites:

— *Establish credibility* by clearly displaying the individual, group or organization that sponsors the site. The site's sponsor(s) should show some evidence of being knowledgeable, reliable, and trustworthy in the content area. The designer could do this by giving biographical information about the author(s) background and experience in the field, or by stating the part of the mission of the organization, and by providing contact information. Another way of assuring credibility is by offering content peer-reviewed by experts in the field. The use of metainformation gives the user a quick overview and some evaluation of its content value and interest and assures some credibility.

— *Organize the content* so that it is easy to understand and to read on the screen.

— *Exhibit visibly the references/sources* used to produce the web site as well as all sort of verifiable data that supports conclusion and/or assertions regarding the content.

— *Be focused on the intended audience*. The designer has to always have in mind, whom the intended audience is going to be, and why would this audience accessing/using the web site.

— *State clearly the purpose* of the web site. This assures accuracy and coverage to content.

— *Take into account the importance of setting up the site's currency* (date of creation and of last revision).

— *Build the design based on instructional design theories and practice*. A sound instructional design allows the designer to offer high quality educational web sites. Theory-based approaches informed by the practice give designers knowledge and/or skills to design learner-centered web sites.

— *Focus on the interface design* that creates the form and functionality of the web site. However, the designer must realize that this is only a phase of the whole design.

Conclusion

This paper has presented a set of criteria for evaluating learning web sites. Designers and others working with the deliver of online learning should create and use set of criteria suitable to their intended audience, purposes and content areas. While interface design is important because of readability, organization and navigation issues, instructional elements like practice opportunities and feedback are also crucial to provide instructional soundness to a learning web site. Along with these, more traditional criteria (imported from the print resources) such as credibility, accuracy and coverage and currency assure content quality.

Some guidelines to e-learning designers based on those criteria have also been discussed.

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