

Audience-Driven Web Site Design

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INTRODUCTION

In the last few years, Web sites have evolved from a simple collection of hypertext pages towards applications supporting complex business processes. Although it is still easy to publish a couple of pages, more and more it is recognized that appropriate design methods are needed to develop more complex Web sites. In the past, Web sites were created opportunistically without prior planning or analysis, and without any regard for methodology, resulting in the classical maintenance problems and development backlog. At the same time, a new problem unknown in classical information systems emerged: competition for the visitor's attention. Especially for commercial Web sites, it is important to hold the interest of the visitors and to keep them coming back. As stated by usability expert Jakob Nielsen: "all the competitors in the world are but a mouse click away" (Nielsen, 2000). Much more than in "classical" software systems, the *usability* of Web sites is a primary factor for their success.

BACKGROUND

One way to deal with the usability of a Web site is by assessing the usability of the Web site and improving the Web site afterwards. There are different ways to assess the usability of a Web site. The techniques that can be used are mainly the same as those used in usability testing of classical user interfaces, for example heuristic evaluation, expert-based evaluation, experimental evaluation, interviews, questionnaires... (Nielsen & Mack, 1994). Another approach to enhance usability (and complementary to the first approach) is to use a Web site design method that ensures a higher usability. The first methods proposed for Web site design are HDM (Garzotto, Paolini & Schwabe, 1993) and its successors HDM2 (Garzotto, Paolini & Mainetti, 1993) and OOHDM (Schwabe & Rossi, 1995), and RMM (Isakowitz et al., 1995) were originally designed for hypertext applications or came from the database research community. These methods used database design methods like E-R (Chen, 1976) or OMT (Rumbaugh et al., 1991), and focused on the organization of the data to be presented on the Web site. These methods could solve to some extent maintenance prob-

lems, but they did not address usability. Essential for good usability in Web sites is meeting the needs of the (different) visitors. WSDM was one of the first Web site design methods to recognize this. This method was presented at the WWW7 conference (1998) as a "user-centered" design method for Web sites (De Troyer & Leune, 1998). The starting point in the approach is the set of potential visitors (audiences) of the Web site. The method recognizes that different types of visitors have different needs and that this should drive the design of the Web site rather than the organization of the available data. Later on (De Troyer, 2001), the authors renamed their approach from "user-centered" to "audience-driven" to avoid confusion with the term "user-centered" from the HCI (human computer interaction) field. In HCI, a user-centered approach refers to a design process in which users are actively involved (by interviews, scenario analysis, prototyping, evaluation...). This explicit involvement is not necessary in WSDM. Often, most of the Web site users will be unknown; they cannot be interviewed in advance and they cannot be involved in the development process. In the audience-driven approach as defined by WSDM, the users play a central role but it is not necessary to involve them actively in the design process.

APPROACHES TO STRUCTURE WEB SITES

When designing a Web site, there are two important questions to be answered:

1. What information and services should be provided?
2. How should all this information and services be structured?

There exist different approaches to answer these questions. One of them is the audience-driven approach. Two other possible approaches are the *data-driven* approach and the *organization-driven* approach.

In a data-driven approach, the data (and services) available in the organization (in databases, brochures, internal documents...) are the design's starting point. Following this approach, the structure of the Web site will reflect the way the data are structured and maintained in

the organization and the content will parallel the internal data. The same applies for services or functionality. Forms available in the organization will be converted into e-forms, and the current way of working will be reflected on the Web site. The advantage is that structuring the Web site is easy and that management of the Web content can be done in parallel with the internal data. However, the disadvantages are: (1) the data are presented and organized the way they are used in the organization. This is not necessarily how people external to the organization need them; (2) some information may be missing because it was not available in the form of a specific document and the designers were not aware of the fact that users may need it; (3) all information and all services are offered to all users. As a consequence, visitors may be drowned in information.

In an organization-driven approach, the internal structure of the organization is the starting point: the structure of the Web site reflects the structure of the organization. This approach is often used for large organizations with a lot of divisions, for example a university Web site that reflects its internal structure into faculties, departments and research institutes. As for the data-driven approach, it is easy to structure the Web site and the development and maintenance of the different parts can be assigned to the different divisions of the organization. The disadvantage is that it may be very difficult for visitors not familiar with the internal structure of the organization to know where to look for information.

In the audience-driven approach, the information and services needed in the Web site are determined by the needs and requirements of the target audiences (users). Also the main structure of the Web site will be based on the different types of audiences. This last point differentiates the audience-driven approach from many so-called user-centered approaches. We illustrate this with a university Web site. Following the audience-driven approach, the university Web site would (at least) contain a part with general information interesting to all visitors; a part with information specific for students and lecturers; and a part containing information for researchers and third parties interested in research. This approach gives consideration to the fact that Web sites usually have different types of visitors that may have different needs. Clearly, such Web sites may have a higher usability than the one structured using a data-driven or organization-driven approach. However, the downside of the medal is that the effort needed to design the Web site is higher and that the task of maintaining may be spread over the organization (usually, there will be no one-to-one mapping from the structure of the Web site onto the structure of the organization).

AUDIENCE-DRIVEN APPROACH

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To arrive at an audience-driven organization of the Web site, the different types of audiences and their needs are identified already in an early stage of the design process. This is done by looking at the activities of the organization and the roles people play in these activities. These people are the potential users of the Web site. Next they are classified into *audience classes* by collecting their requirements (information, as well as functional, and usability requirements). Users with the same information and functional requirements become members of the same audience class. Users with additional requirements form audience subclasses. In this way a hierarchy of audience classes can be constructed, which will be the basis for the main structure of the Web site. For each audience class, a separated *audience track* will be created. Such an audience track can be considered as a sub-site that will provide all the information and services needed by the members of this audience class. To fill in the detailed navigation and content of such a track, the requirements of the corresponding audience class are translated into task- and object models. A task model is defined for each information- and functional requirement of each audience class. Each task defined in the task model is decomposed into elementary tasks, and temporal relationships among the tasks are expressed. For each elementary task an object model (called “object chunk”) is created, which models the information and/or functionality needed to fulfill the requirement of that elementary task. In the next step, the task models of an audience class are translated and combined into an audience track. All audience tracks together form the navigational model. The navigational model defines the conceptual structure of the Web site and describes how the members of the different audience classes will be able to navigate through the site and perform the tasks. Based on this conceptual structure, a page structure will be defined as well as the “look and feel” of the Web site. The aim is to create a consistent, pleasing and efficient look and feel for the conceptual design made by taking into consideration the usability requirements and characteristics of the audience classes. If needed, a logical data design (database schema, XML schema, etc.) is made by integrating the different object chunks. Finally, the Web site can be realized using the chosen implementation environment, for example, HTML or XML.

FUTURE TRENDS

In the last years, many different researchers have recognized the need to take the users into consideration during

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