

## A Review of the User Based Web Design: Usability and Information Architecture

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### Abstract

In this paper we make a revision about User-centered design (UCD) or user-driven development (UDD) is a framework of processes (not restricted to interfaces or technologies) in which usability goals, user characteristics, environment, tasks and workflow of a product, service or process are given extensive attention at each stage of the design process. Likewise, we focus on two other concepts such as usability and Information architecture (IA) is the structural design of shared information environments; the art and science of organizing and labeling websites, intranets, online communities and software to support usability and findability; and an emerging community of practice focused on bringing principles of design and architecture to the digital landscape, as a reference tool for future researchers.

**Keywords:** Usability, web design, user based, information architecture.

### INTRODUCTION

The consecution of desired objectives through the launch of any kind of Web App is conditioned by the end user. The quality drivers or attributes of an APP or web site that will influence this satisfaction, is classified related to: the quality and contents utility; the quality of the service and provider assistance; the quality of the APP design, attribute of quality which is based the actual paper.

The importance of the App design is the modeling of interaction between user and App, therefore it will make possible or not to reach the user objectives (to find information, to purchase, to communicate, to learn...).

It is easy to realize that a good design must be understandable, easy to use, friendly, clear, intuitive and easy to learn by the user. To could ensure that a simple design comply with these requirements it is not enough the designer to have just a good emphatic attitude during the APP development; it is essential the technics, procedures and methods adoption, to ensure empirically the design adaptation of needs, abilities and user's objectives.

In this article we will talk about how to design useful web Apps and accessible through the application of technics and procedures enclosed in the methodological framework known as User-Based Design.

The structure of the following article will be: (2) Definition and explanation of the concepts of usability and accessibility; (3) Introduction to the Information Architecture; (4) Proposal of User-Based Design application in the context of Web development, detailing some procedures, techniques, methods and recommendations of design; (5) Conclusions and (6) References.

### PROBLEM FORMULATION

#### Usability and Accessibility

The usability – Anglicism that means “easy to use” – as indicated by [1], [2] seems to have its origin in the expression “user friendly”, which is replaced by its subjective and diffuses connotations.

Numerous authors have proposed several definitions of usability, normally through the numbering of different attributes or factors which allow to evaluate it, finally driven by the focus which it can be measured [3], [4].

In order of application for this paper we will use the most extended definition, indicated by ISO, which defines the usability as “The level of efficacy, efficiency and satisfaction which specific users can reach specific objectives, in specific using contexts”.

In the definition we can observe that usability is composed by two kinds of attributes:

Quantifiable attributes in an objective manner: Such as efficacy or number of mistakes performed by the user during the task execution, and efficiency or time used by the user for ending a task.

Quantifiable attributes in a subjective manner: Such as satisfaction of use, measured through the user questioner, and related with the concept of perceived usability.

As stated in the definition, the usability of the application

must be understood always in relation with the way and conditions of use by the users, as well as the characteristics and specific needs of these users. A design is not itself useful: "it is for specific end users in specific contexts".

Pretending a web app to be useful no matter about who and how it is used is more a universal outlook of usability (in some cases necessary), that with a realistic and practical vision. This is because normally every application is designed with the intention of need satisfaction of a concrete and determined audience, so it is less applied for the rest of the people.

The usability concept can be defined, besides a quality attribute of an application, consequently, as discipline or design focus and evaluation. It is often known as Usability Engineering, set of theorist and methodological fundaments that secures the accomplishment of usability level required for the application.

A very close concept related to usability is accessibility. This is not referred to facility of use, but the possibility of access. Concretely explaining that the design, as essential pre-requirement for usability, to allow the access of all the potential users, without excluding to those with individual limitations –disabilities, language dominance, ... - or constraints driven in the access context – software and hardware used to access, bandwidth of used connection, etc. – [5], [6], [7].

Consequently, we have the paradox of meanwhile a used design requires to limit to its potential audience looking for a concrete design; an accessible design implies the necessity of designing for the diversity and heterogeneity of needs for access showed by the specific audience.

When the audience target of design is very wide and has access needs very different, normally it is necessary to have several versions of design or an adaptable design, as the known "only text versions" or versions of multi languages.

## INFORMATION ARCHITECTURE

Although for most users "the interface is the application" since it is the part they see and through which they interact [8], [9], we must understand that the usability of the application depends not only on the interface design but also of its architecture - structure and organization - in other words, of the non-visible component of the design.

Information Architecture (IA) is defined as the art and science of organizing information spaces in order to help users meet their information needs. The activity of organizing involves structuring, classifying and labeling the contents of the website [10].

Design at the conceptual level: The IA's own techniques, within the life cycle of site development, are located in conceptual design phases. The phases of visual design are, on

the other hand, covered by techniques of usability engineering, interface design and information design.

## USER BASED WEB DESIGN

To empirically ensure that a site meets the required usability levels, the designer needs a methodology, techniques and procedures designed for that purpose.

In this paper we propose the application of the methodological framework known as User Centered System Design [11], [12], adapting it to the characteristics of web application development.

The web design process centered on the user proposed in this work is divided into several phases or stages, some of which are iterative. The following scheme serves as approximation:

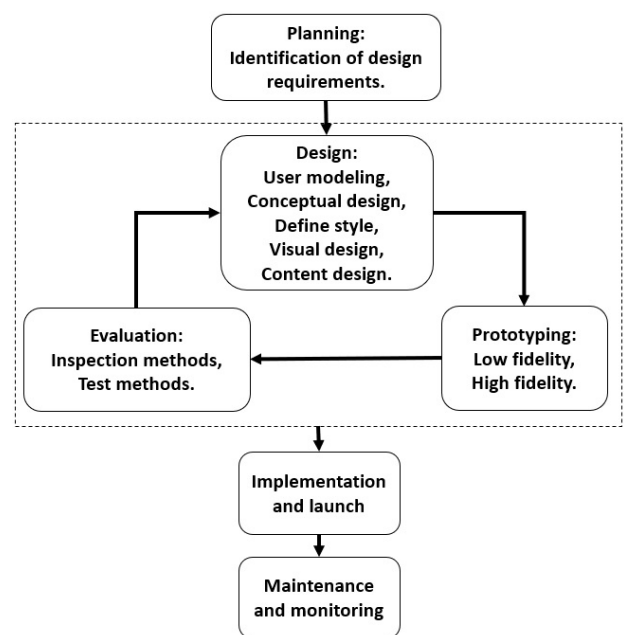


Figure 1: User Centered System Design, [12]

As indicated in the diagram, the design, prototype and evaluation phases are cyclical and iterative. This means that everything that is designed must be constantly evaluated through its prototype, in order to correct usability errors from the first moments of development. The following sections of this work are structured following this same outline of the design process.

## PLANNING

Every project must begin with a correct planning. In this stage the objectives of the site are identified, as well as the needs, requirements and objectives of the potential audience.

Confronting this information defines the back-end and front-

end technical requirements, HR and professional profiles with the available budget. It is about establishing a balance between what the provider can offer and what the user needs. The website should serve as a means to achieve objectives by both parties.

The designer must obtain accurate information of both the need and objectives of the provider and the user the answer to these questions is solved by studying the audience through methods of inquiry as contextual approach, field or ethnographic studies, by groups and individual approach. The more we know the audience, the more adapted the design will be and the more satisfactory the end user experience.

The planning stage is based on the collection, analysis and ordering of possible information, with the objective of having a solid base on which to make design decisions in the following stages of the process.

## Design

The design stage is the moment of the development process for making decisions about how to design, based on the knowledge obtained in the planning stage.

### User modeling

All the information obtained from the user studies carried out in the previous planning phase should serve as a basis to start the design, but for that purpose, this information must be summarized and synthesized.

This step is called user modeling and consists of defining classes or user profiles based on common taxes. Normally they will be attributes such as information needs, conditions of access, experience and knowledge. Through this technique, the designer will have in mind for who designs, who expects to find the user and in what way.

The problem with this user modeling technique is that when the audience is too large and heterogeneous, the total categorization of the audience may not be viable. It is necessary to make a "person" approach in [13], [14].

This user modeling technique is based on the definition of user archetypes that represent patterns of behavior, objectives and needs. These archetypes called "people" are narrative descriptions of users with invented identity. Instead, the attributes, characteristics and needs of the archetype must be based on real information or otherwise lose all their usefulness.

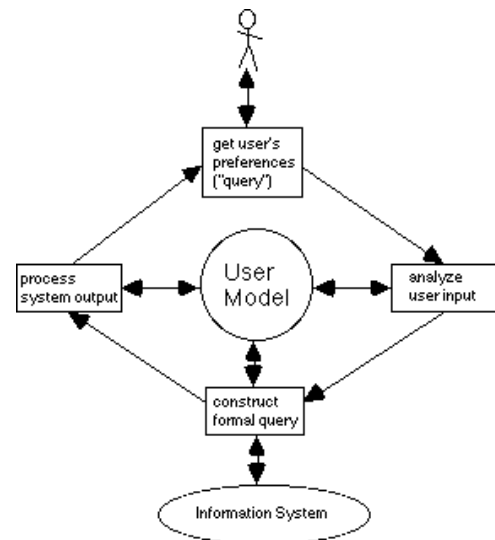


Figure 2: User modeling technique, [13], [14].

The "people" defined contrary to what was intended with the categorization of the audience, cannot represent the total of the users of the website, but this is not their mission.

It is too common for the designer to imagine himself using the site and therefore unable to understand why someone can find it difficult, uncomfortable and even frustrating to use. These archetypes of users will achieve precisely that the designer has in mind a "real" usury, with limitations, skills and real needs.

### Conceptual Design

The objective of this phase is to define the scheme of organization, operation and navigation of the site.

Websites are hypermedia systems formed by sets of pages interrelated by unidirectional links, each of these pages can contain sub-elements with their own entity, multimedia content and interactive tools.

The "structure" of the website refers precisely to the connections and relationships between pages, the topology of the web of pages, and the "navigation" to the possibilities and how each page presents the options of moving to other pages.

Different schemes: descending and ascending approach define the structure of the site. Descending structure of the whole to parts; the ascending on the contrary, defines minimum information blocks, going beyond the own segmentation of information in pages.

Garrett's graphic vocabulary [15] is suggested for descending architecture.

Among the user-centered design techniques to be applied in the conceptual design stage we highlight, for its usefulness and ease of being carried out, the "card sorting" technique and card sorting, based on user grouping observations and association with each other a certain number of cards labeled

with the different categories or thematic sections of the website. Thus, it is possible to organize and classify the information of a website according to its model of mind [16].

### ***Visual Design and Style definition***

In this phase, the visual aspect of the website is specified; composition of each type of page, appearance and behavior of the elements of interaction and presentation of multimedia elements.

The behavior of the user in the visual sweep of the page must be taken into account, distributing the elements of information and navigation according to their importance in areas of greater or lesser visual hierarchy

In addition to the position of each element, there are other techniques to prioritize information such as: use of the size and space occupied by each element to give it importance in the visual hierarchy, use of color contrast to discriminate and distribute information, use of typographical effects for emphasize content, break symmetry and use relief/depth effects to highlight elements, etc.

Accessibility is another important aspect in the visual design of the site. In the use of colors, sufficient contrast between text and background must be offered in order not to hinder reading, and also to select combinations of colors, always taking into account the visual disabilities in the perception of color that our users may present.

In images for reasons of accessibility and comprehensibility, we must take care of their resolution and size, as well as in photographs the non-loss of meaning or context due to excessive clipping or minimization of the image.

### ***Content Design***

In the design of hypermedia content, a balance must be maintained between what would be content that did not take advantage of the new hypertext and multimedia possibilities, and what would be chaotic contents or indicative due to an excessive and not calm use of hypermedia possibilities.

Hyper textual writing must be done differently than traditional. The new medium and its characteristics oblige to be concise, creative, etc.

Some tips to follow in the design and content writing are:

- Follow a pyramidal structure
- Allow easy content exploration
- One paragraph = an idea
- Be concise and precise
- Vocabulary and language
- Tone

- Trust

### **Prototype**

According to [18], [19], we can classify the types of prototype according to the level of functionality reproduced:

- Horizontal Prototype
- Vertical Prototype
- High fidelity prototype
- Low fidelity prototype

In the early stages of website development, you can use the prototype on paper or low cost, which is to reproduce the basic aspects of the interface of the site on paper. Another way consists of software tools such as HTML.

### **Evaluation**

The evaluation of usability can be done through several methods or techniques and on different representations of the site.

#### ***Inspection method: Heuristic evaluation***

The heuristic evaluation is a type of inspection method that has the advantage of the ease and speed with which it can be carried out.

Several authors have proposed different sets of heuristics or usability principles through which to evaluate usability. In [20] proposes the following:

- Visibility of the system state
- Common language between system and user
- Freedom and control by the user
- Consistency and standards
- Error prevention
- It is better to recognize than remember
- Flexibility and efficiency of use
- Minimalist design
- Allow the user to solve the error
- Help and documentation

In [5], [16] and [17] propose the following heuristic evaluation model:

- General features
- Identity and information
- Language and writing

- Label
- Structure and Navigation
- Lay-out of the page
- Search
- Multimedia elements
- Help
- Accessibility
- Control and feedback

### ***User testing Method***

The test with users is a test of usability that is based on the observation and analysis of how a group of real users uses the website, noting the problems of use with which they are to be able to solve them later.

It is a complementary test to the heuristic evaluation, but a test with users is more expensive, so it is advisable to do it always after a heuristic evaluation since it would be waste time and money to use it to discover design errors motivated by non-compliance in the development of general principles of usability (heuristics)

There is a way popularized by [21] to make test with users much cheaper and easier to perform, with similar results and utilities, which are the so-called informal tests or "Heuristics" test. Recruitment of participants and choice of premises and materials is the performance of the test and preparation of the final report.

### **Implementation and Launch**

In the implementation of the site of the site it is advisable to use HTML XHTML standards to ensure the future compatibility and scalability of the site. This is because although it may be tempting to use proprietary technologies, the technological landscape can make them disappear or change in a short time.

### **CONCLUSIONS**

In this work we have described how to design usable websites through the application of techniques, design recommendations and user-centered design procedures.

The web design centered on the user is a methodological framework and a clearly multidisciplinary design philosophy, so in practice it should be ideally applied by interdisciplinary development teams. In the context of these development teams, the profile of the documentation professional is particularly suited to information architecture tasks.

It is expected that before the possibility of conquering new

work niches, all these new knowledges will be integrated into the curricula of librarianship and documentation, as well as the proliferation of specialized training courses taught by researchers in our area.

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