Chapter 66

Improving Cognitive Load on Students with Disabilities through Software Aids

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ABSTRACT

This chapter proposes a new way to improve the cognitive load and construction of e-learning environments making them more usable and accessible using emerging design. This causes a significant improvement in cognitive load. Accessibility within the area of Web applications, is actually present in different laws of many countries, trying that information could be used for everyone. This objective is limited when you are dealing with severe disabilities. An example of this is people with hearing disabilities who have never hear or speak. To solve these problems the authors propose a platform that brings a complete solution to accessibility.

INTRODUCTION

This paper propounds a way in which emerging design and programming techniques can be used to convert and build accessible web sites. Accessibility, in the scope of the web applications, is a reality present in multiple countries' different laws that must be confronted so anyone, regardless

his condition or nationality, can communicate and use technology without any kind of impediment.

This maxim is limited when we deal with people with severe disabilities, where the problems existing currently, can make almost impossible the use of web sites as a door to the society's information, in which we found ourselves immerse. An example are people with auditory prelocutive disability, people who were never able to hear or speak. The complexity it implies for them learn

the language, the writing and the people with disabilities expressions, implies a serious entry barrier. If we bear in mind as well, Spain has more than a million people with auditory problems and since October 2007, the Spanish sign language is a language recognized by law, wouldn't it be more obvious to find a communication mechanism, familiar to them, which removed their accessibility problems? This solution adapts the Signwriting, mechanism of graphic representation of the sign language, to the environments of the already mentioned information society.

Besides this problem, there is another one even bigger. From January 2006 on the Public Administration sites must be accessible with AA level, according to the WAI (Web Accessibility Initiative) accessibility guidelines. And from January 2009 on, the big companies that render general purpose services and all of those entities and companies that receive public financing, including educational centers, and universitaries, and the private centers financed by the Administration. Then, would it be possible to mitigate the costs of this transformation? or on the contrary, is it necessary to go through a whole redesign process of the web sites, with the high costs it implies? We must not forget the Spanish SMBs will adopt these measures as well, and they are a high percentage of the Spanish business sector (BOE, 2005).

In order to solve these problems we raise a platform which has a complete solution for accessibility. An approximation to this global platform would consist of two architectures, each one oriented to solve things separately, but as a whole when required, depending on the kind of user, the expounded problems on the previous paragraphs, being able to obtain accessible web applications with AA level for people with severe auditory disability by means of Signwriting.

The first one solves the accessibility problem expounded on the third paragraph. In order to do so, we build an Accessibility Adaptor that, using templates allows us to build the interfaces

that currently are "drawn" with JavaScript in the client, in the server. With this we get to reduce drastically the costs of rebuilding web applications with AA level, according to the WAI accessibility guidelines and the LSSICE and the LISI (BOE, 2005) (LSSI, 2009).

The second one contributes with a solution to make every web site accessible for anyone with an auditory disability. The problem has been expounded in the second paragraph. In order to solve it the SWMLSVG language has been developed, which allow us to specify, through XML, the sign language in writing mode, already known as SignWriting. This way, using vectorial graphics a new language could be used so every web site can be defined from spoken language to signed language.

This proposal not only solve the problems mentioned at the beginning of this introduction, but to improve existing solutions for e-learning market, as discussed below as the sociology of disability means that the learning mechanism that are placed at their service are tailored to their specific needs, something that is evident in the people who need to communicate properly signwriting.

CULTURE IN THE DISABILITIES FIELD: DEAF PEOPLE SOCIOLOGY

…An autobiography, in case such thing does exist, is like asking a rabbit what does it look like when it jumps through a meadow. How is it going to know it? But, on the other hand, in case we want to know something related to the meadow, there is no one in a better situation than the rabbit to tell us, always having in mind we don't pretend to know those things the rabbit didn't notice due to its position on a given moment. (Golden, 2005)

In order to understand the concepts of the Deaf Culture and the Deaf Community, we must accept the point of view of the persons that make it up (Marchesi, 1999), deaf people, as we accept the

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