

Chapter 12

Accessibility in U-Learning: Standards, Legislation, and Future Visions

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ABSTRACT

Accessibility means free access to content and services, regardless of one's physical and cognitive limitations, maximizing the user's aspect of hardware and software platform independence. Providing this access is a technical issue more than an ethical issue because the characteristics and limiting standards of accessibility are widely known but little used by software engineers, developers, and content producers. Although there is a specific set of standards and legislation to address these difficulties, accessibility is still far from being a priority among developers and content producers. One of the challenges for ubiquitous teaching, in the present and near future, is building tools to support the creation of accessible learning objects, in compliance with current and future standards. This chapter concerns accessibility standards and points out technological ways to enable the creation of support tools in order to minimize accessibility flaws.

INTRODUCTION

Teaching has long surpassed the physical barriers of the classroom. Distance learning has become a reality, given the popularization of the Internet,

especially with the coming of technologies that allow mobility and increase speed of data transmission. By becoming omnipresent, whether in big cities or in the corners of the developing world, the Internet has been recognized as source of information, means for communication, tool of aggregation and improvement of relationships

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between people, fun, change in culture, and learning environment. This fact is highlighted when we realize that technologies such as 3G and mobile devices, satellite transmission, optic fibers, wireless networks in public and private places, environments such as telecentres or cyber cafes, are increasingly common. From this wide range of possibilities of diffuse, mobile, continuous and interactive access arises the term ubiquitous learning or u-learning (Santos, Lima, & Wives, 2011).

According to data from the International Telecommunication Union (ITU) in 2010, about a third of the 6.8 billion people in Earth have access to the Internet, either from home, on mobile devices, or access points. Even though there are still large distortions between developed and developing countries (only 15.8% of households in developing countries have Internet access, compared to 65.6% in developed countries), to a greater or lesser extent, all countries have been through a strong growth in Internet diffusion (ITU, 2010).

The Web has become not only an agile form of contact between people and knowledge dissemination, but the primary channel of communication between the corporate/government world and the population, as well as a new platform for the development of applications. The Web is no longer just an environment of interconnected documents it is a software publishing space that performs various tasks, from games to the managers of banking accounts and transactions (Puder, 2004).

However to make the content of applications and learning environments available and accessible to all people, even those with physical and intellectual limitations, is a technical and ethical duty still poorly resolved. This chapter will demonstrate aspects of international law involving education and accessibility, and will specially highlight the technical standards that, once followed, collaborate in a positive manner to the construction of accessible learning objects. Finally, we will show an approach on how to address difficulties in meeting accessibility requirements, which involves multi-agent systems and

ontologies, through the use of a tool developed at the Laboratory of Software Engineering of Universidade Federal Rural do Semi-árido.

BACKGROUND

Tim O'Reilly, founder of O'Reilly Media and one of the forerunners of the term Web 2.0, asserts that this new Internet, which provides a platform for "Rich Internet Applications" (RIA), is not a technology, a static pattern, a market niche, but rather, attitudes, concepts and principles which are increasingly dependent on people's interaction. That is, it depends on everyone being able to collaborate, interact and access knowledge (O'Reilly 2007).

This concept incorporates the existence of all kinds of access devices, with non-interoperable hardware and operating system, leaving the applications to concern about compatibility, and it cannot be denied that most of the content on the Web is designed only for desktop computers (Yang & Chen, 2006). Dealing with adaptations or creating specific content with features compatible to a particular device, are the most usual alternatives, although there are situations where the use of mobile devices is still considered infeasible (Trifonova & Ronchetti, 2003).

The use of mobile devices, from cell phones to ultrabooks, through a wide range of devices such as tablets, for teaching actions comprise the creation of learning objects that compensate the weaknesses of each platform, leverage the specific capabilities and are able to motivate students (Oliveira & Medina, 2010). Having these barriers broken, a fundamental concept in u-learning is implemented, Universal Access (Yang & Chen, 2006).

Nonetheless, universality is not to be mistaken with access homogeneity. Even in regions where the Internet is widely used, portions of the population continue to be denied the right to access it, due to form and content characteristics. This denial is commonly entitled exclusion. Exclusion

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