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Can I Access my School Website? Auditing Accessibility of the Portuguese Teaching Institutions Websites

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Abstract: Web accessibility is becoming a current topic in social and scientific discussions. With the advances in technology, a need for access to all Web resources is becoming more and more recurrent due to the several advantages that the Web brings to those with some sort of disability, allowing them accessing and integrating in society.
With this document we aim to present indicators regarding the lower accessibility levels of the Portuguese teaching institutions websites. A set of background and theoretical considerations is made alongside the article, as well as the results of an accessibility evaluation made to the Portuguese secondary schools websites using a specialized software tool and according to WCAG 2.0.
The present document also contains a proposal for a model that aims on improving Web accessibility Levels in Portugal by fostering the creation of relations and group activities between the actors that, in our opinion, are those with the most relevance in the Web content accessibility issue.

Keywords: Web accessibility, Portugal, schools, ICT, Model, Ethics, Focus-group
Categories: J.4, K.3, K.4.1, L.2.0

1 Introduction

Despite the increasing interest shown by the world community in accessible Web content and its implications for those who suffer from any kind of disability or incapacity, the accessibility levels of the Websites are still averagely low. In our opinion this issue is very significant and deserves to be analyzed and understood.

With the constant change of the social concepts and the importance of social responsibility issues, the concept of "person with disability or incapacity" has evolved in a consistent and significant way. One major result of these developments and transformations is the fact that Society now recognizes their social responsibilities in finding the necessary and appropriate answers to peoples special needs [MCT 1999].

Even though the social aspects are quite important in ensuring the fulfillment of citizen's rights who have any disability or incapacity, the Constitution of the Portuguese Republic, through its Article 71, prints a legal obligation that strengthens the rights of the physical or mental disabled, as well as the duties to which they are obliged. In the same article of the Constitution, it is also mentioned that the Portuguese Republic has an obligation to exercise its action of governance in what concerns prevention, treatment, rehabilitation and integration of those same citizens [Canotilho 2004]. One of the mechanisms available to integrate people with a disability or incapacity in any society is the use of ICT in various daily activities [EU 2008]. The use of these technologies is also advocated by the Nobel Peace Prize, Ban Ki-Moon, that also introduced a new pacifist dimension to the global ICT context [Ki-Moon 2007]. The Information and Communications Technologies, in conjunction with the Internet represent a set of opportunities for inclusion and social reintegration. According to its "creator", the Internet should present itself, together with all its resources, accessible to all people, including those who have special needs [Out-Law 2006; Wenner 2008].

Currently we are facing a serious economic and social crisis and with this in mind, the use of ICT is helping the development and evolution towards a prosperous future. Nevertheless, both the ICT and the Internet have become common practice in all sectors of society, including the educational sector. The inclusion of ICT in this sector was done in the late 1970's and since that time, there has been an active and extensive expansion on the use of these technologies in all the activities related to teaching and learning [Coutinho 2009; Coutinho 2010; Domingues et al. 2010; Junior and Coutinho 2008; Ribeiro et al. 2011; Shirazi et al. 2009; Shirazi et al. 2010], leading to an increase in the relevance and importance of these same activities.

When perceiving the importance that ICT have on the education related activities (students learning process, teachers teaching methods, administrative processes management and others) it becomes clear that these technologies must be accessible so that their users can take full advantage of its features.

The immense set of limitations imposed by the current social and economic situation that European countries, such as Portugal, are facing impelled our research group to have a horizontal discussion on the research project inherent to the present paper. With this is mind, the following set of goals was defined for the current project:

- Present some high-level indicators and trends concerning the accessibility levels of a group of Portuguese schools websites;
- Present a model that aims on improving the Web content accessibility issues.

This article is divided in seven parts, in which are included the introduction, the theoretical and background considerations (sections 1, 2 and 3). In section 4 and 5 we present a study aimed on perceiving the accessibility levels of the Portuguese Secondary Schools Websites according to W3Cs WCAG 2.0. A model that describes some of the factors identified as being the ones with the most influence in the

existence of Web accessibility issues, and also a possible solution to those same issues is presented throughout section 6. Some conclusions concerning the current work are made in section 7.

2 Web accessibility – Global concepts

In this section we intend to present, not only a contextual background to the Web accessibility topic, but also refreshing and clear perspectives on the current concerns and visions regarding that same topic.

We start by presenting some theoretical conceptualizations and some insides on both the International and the Portuguese regulations and guidelines towards Web content accessibility, and we finish by describing some other works that focused their attention and their visions on the educational Web content topic.

2.1 Theoretical background and initial perspectives

By perceiving the benefits of ICT, both in the quality of life of the citizens and in the competitiveness of enterprises, the European Union has to take advantage of these technologies [EU 2005], that some authors consider revolutionary and capable of supporting the evolution of societies [Mansell et al. 2007].

The extensive use of ICT on all the axles of our society (social activities, cultural initiatives, business actions, education, etc.), is impelling a need for these technologies to become accessible. The implementation of accessibility strategies and procedures, would allow ICT to become available to all, including those with some sort of disability or incapacity [Thatcher and all 2006; W3C 2010; Yuan et al. 2011]. When transposing the term "accessibility" to the ICT, it is possible to state that the term accessibility concerns the creation of usable and perceivable interfaces that can be easily used by people who have special characteristics, such as physical or cognitive disabilities, functional limitations or other problems [Cavender and Bigham 2011; W3C 2008].

One of the most famous technologies of this century is the Web. In the World Wide Web, there is also the need for using the term accessibility. The concept of "Web accessibility" can be characterized as the existence of interfaces that present themselves usable and perceivable in the same way by both users without disabilities as well as users with some kind of disability [Bradbard and Peters 2010; W3C 2008].

In an Information craving society such as the European, the Web has been presenting an innovative set of ways to access information and to create opportunities for disabled and impaired citizens, to actively participate in their society.

One of the most relevant organizations that address Web accessibility issue is the W3C Consortium. This organization claims that the referred issue is directly related to a series of important factors that make it very complex. In this group of factors are included the Web content developers skills, the availability of tools that evaluate Web contents against the existent regulations, and also the capabilities of the existent software solutions in providing tools for creating accessible Web content [Chisholm and Henry 2005; W3C 2011].

Given all the presented arguments, it is our opinion that Web accessibility should be given the rightly needed attention and importance. An accessible Web, available to

all citizens in an equal manner, can help the development and the evolution of both societies and economies [Easton 2011; Gonçalves et al. 2011].

2.2 Web accessibility legal and social frameworks

From over a decade ago several have been the organizations that, at a given time in their history, have focused their attention and work on the Web accessibility subject [Becker et al. 2008]. As a result of these efforts, several international and national regulations on the referred subject have been published.

The W3C Consortium has published two international regulations aiming to create a set of rules and, at the same time, a set of pointers that should not only help regulating the Web but also help content creators to introduce Web accessibility as a feature of their development projects. The last accessibility regulation created by the W3C is known as the Web Content Accessibility Guidelines – WCAG 2.0 (published in 2008) and is currently the most adopted international regulation on Web content accessibility [W3C 1999; W3C 2008]. In accordance with other relevant published works, the W3C Web Accessibility Initiative - WAI also used the concept of principals as a functional concept in order to design WCAG 2.0 [ISO 2006; Sharp et al. 2007]. For the 2.0 version of the Web Content Accessibility Guidelines four principles have been used as the basis for the entire set of guidelines [W3C 2008]:

Be Perceivable – Information and user interface components must be presentable to users in ways that they can perceive. This means that users must be able to perceive the information being presented (it can't be invisible to all of their senses);

Be Operable – User interface components and navigation must be operable. This means that users must be able to operate the interface (the interface cannot require interaction that a user cannot perform);

Be Understandable – Information and the operation of user interfaces must be understandable. This means that users must be able to understand the information as well as the operation of the user interface;

Be Robust – Content must be robust enough so that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

By analysing the four previously mentioned WCAG principles, we can perceive that, the Web must be simple to use and easy to learn. This is the only way in which we can fully benefit from all, what the Web has to offer.

In order for a given Website to be classified as accessible according to W3C, it has to satisfy a set of WCAG 2.0 Success Criteria. The Success Criteria are sets of written testable checkpoints (mainly technical and organized by priority levels), that if satisfied can assure that a Website is accessible (has a given conformance level). The tests inherent to WCAG 2.0 Success Criteria involve a combination of both automated and human evaluation. The conformance levels can be understood has the level of accessibility that a given Website presents. If a website implemented all priority level A accessibility checkpoints then it would have the conformance level A. If a given website presented all the priority level A and AA accessibility checkpoints covered then it would have the conformance level AA. By implementing all the priority levels A, AA and AAA accessibility checkpoints, a website would have the conformance level AAA [W3C 2006; W3C 2008].

Despite the early incorporation of Web content accessibility standards in the active legislation by the Portuguese Government, the Portuguese websites still present several critical accessibility faults and the majority of the Portuguese Web content creators present a clear and evident lack of knowledge on the subject. This problem can be easily perceived through the analysis of the studies regarding Web content accessibility in Portugal that have been published [Gonçalves et al. 2009a; Gonçalves and Martins 2011; Gonçalves et al. 2010; Martins et al. 2010].

The last demographic study made in Portugal revealed that almost 10% of the Portuguese citizens present some sort of disability or incapacity [INE 2011].

3 The online teaching in Portugal

Throughout this section we present a background characterization on the Portuguese Educational System, alongside with some information on how ICT are becoming very important to the teaching and learning activities in Portugal.

3.1 The Portuguese educational system and the ICT adoption

The Portuguese Educational System - PES is intended for children and adolescents aged between 3 and 18 years old, is based on a free attendance policy and aims on raising the basic training of the workforce and making vocational education a real and effective option for the Portuguese youth [GEPE 2011].

The massive world adoption of ICT made them an essential part of our society's daily activities. With this in mind and according to [Ricoy and Couto 2011] there is also a clear need for improving the importance that they have within the school context. Several studies claim that the use of ICT within the school context is a common practice that propels not only the students learning but also the efficiency of school administrative activities [Costa 2011; Ribeiro et al. 2011]. The constant advances and transformations in the ICT are presently reflecting in the education of societies. These technologies can have an amazing role in the education of an individual by representing a key factor in the knowledge construction, in the assigning of an active role to the student (allowing the definition of the individual learning path) and in the ease of access to Information [Gomes 2005]. The elaboration of practice and evaluation tests, the use of e-mail, the internet research and the elaboration of educational online contents are the main activities endured within the Portuguese schools. In the last two decades, the Portuguese Government [Vieira 2005] has developed and implemented several national strategies aiming to foster ICT adoption in the schools context. Despite this, as the Portuguese society evolves and transforms itself, there is a constant challenge to PES in what concerns the adoption of ICT within the classrooms [Fernandes 2007].The innovation in educational methods and strategies is a reality in today's society. This can only occur due to the wide variety of technological resources available and mainly due to the extraordinary adoption of the Internet as a way to communicate, learn, interact, share and view user created contents. Nevertheless, in order for the ICT to be successfully integrated within the classrooms, the role of the teacher is critical because he is the main communication driver [Blanco and Ricoy 2007; Castro and Alves 2007; Goodison 2002].

4 Methodology

A Web content accessibility evaluation action should follow a valid and validated methodology in order to be considered solid and representative. The W3C (World Wide Web Consortium) WAI (Web Accessibility Initiative) also supports this same idea and presents an evaluation methodology that follows accordingly. This methodology states that the process of evaluating a website should follow four elementary steps [W3C 2006]:

- Definition of the evaluation scope - Identifying the criteria that will be used for the accessibility evaluation
    - By choosing to use the "AAA" accessibility level of the WCAG 2.0 as the evaluation criteria we aimed to achieve valid results;
- Definition of the evaluation tools that are going to be used
    - For the project inherent to the present work, the chosen evaluation tool was TAW3 [TAWDIS 2010]. This decision was made considering that the tool was WCAG 2.0 compliant, free to be used and created simple reports;
- Definition of the proceedings for the manual evaluation
    - For this project we decided not to contemplate manual evaluation of the target group due to time and budget limitations;
- Definition of which reports will result from the evaluation process
    - In what concerns the reports produced by the present study, we intend to show a set of basic statistical indicators (maximum, minimum, standard deviation and average) that intend to represent the tendency of the Web accessibility levels presented the Portuguese schools websites.

4.1 Web accessibility evaluation target group

For the purpose of the project inherent to the present paper, we decided to evaluate the websites of the Portuguese Secondary Schools, using for that effect the ranked list (according to the students classifications on the education national exams) of Secondary Portuguese schools published in 2010 by the Expresso Journal [CESNOVA 2010]. One of the reasons for choosing this target group was the almost imposed need for the use of educational websites and ICT in all the school years that composed the Portuguese secondary education. It is extremely important that the referred websites and technologies are available to all students, including those with some sort of disability or incapacity.

Despite our initial target group being composed by 485 secondary schools, after the initial research on what are the referred schools websites, we reached the conclusion that only 443 could be evaluated because the remaining websites were unavailable or were incompatible with TAW3 tool (figure 1).

For this we aimed to not only evaluate the Portuguese secondary schools against W3C WCAG 2.0 but also to present a simple, clear and efficient model that characterizes the most important factors for the existence of Web accessibility issues and that presents a possible set of solutions in order to solve those issues. With this in

mind and despite TAW3 tool limitation on the evaluation of websites against WCAG2.0 (only evaluates a website homepage) we decided to only evaluate the homepage of the target group websites. According to [Nielsen and Tahir 2002], the homepage is the most important page of any website, thus receiving more visits than any other page. These same authors, probably two of the most important in their fields of research, also claim that a website homepage is important mainly due to its function within the website. It transmits what the organization/entity behind the website means to the World, what differentiates the website from the others, what are the contents, services or products that the website has to offer and, at the same time, the homepage also aims on satisfying the needs of those who visit it.

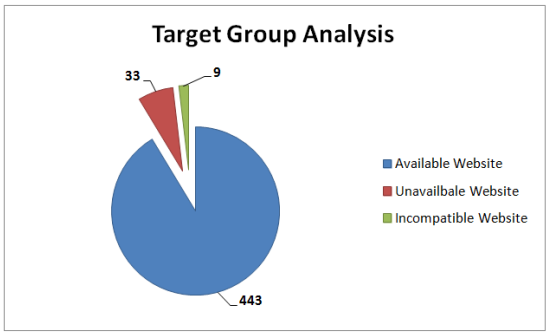

Figure 1: Initial analysis to the target group of the present paper.

5 Results – Presentation and discussion

For the present project we expected to present a set of results that should be seen has a tendency in what concerns the accessibility levels of the Portuguese Secondary Schools. Still, despite the goal of creating public knowledge on the referred tendency, it is still completely necessary to reach valid and trustworthy results. With this in mind we decided to perform some simple statistical treatments to the results of the evaluation to the target group websites. The initial treatment consisted on applying the outlier definition to the referred results [Mendenhall and Sincich 2007]. According to [Muñoz-García et al. 1990] and [Grubbs 1969], an outlier is an atypical or erroneous observation that deviates considerably from the general behaviour of experimental data with respect to the criteria which is being analysed. The task of correcting the outliers of a given sample should be preceded with an accurate analysis on the causes that lead to their appearance. In many cases, the reason for their existence determines how they should be handled. The main causes that lead to the existence of outliers are: measurement errors, execution errors and the variability inherent to the population elements [Figueira 2010]. As a way to exclude from the achieved results those that, in some way, extreme the results sample, we have applied the outlier definition to that same sample. With this we believe that the analysed results represent in a significant manner the reality of the evaluated websites accessibility levels.

Conformance Level	A	AA	AAA
Average	108	11	10
Standard Deviation	183	21	17
Maximum	2174	325	151
Minimum	0	0	0

Table 1: Statistical indicators that resulted from the accessibility evaluation.

After applying the outlier definition to the accessibility evaluation results, we calculated a set of statistical indicators, such as the average number of accessibility errors, the sample standard deviation, and the maximum and minimum number of existing errors. This information can be seen in table 1. Although the statistical indicators presented above present themselves as a considerable help in understanding the tendency regarding the Web accessibility levels of the Portuguese Secondary schools websites, it is our purpose to go beyond that stage, and do a thinner analysis and achieve a distribution indicator that could bring some more light to our discussion. When we reached the final results they were complex and voluminous. This impelled us to discuss, not only within our research group, but also with the Portuguese governmental agency for Web Accessibility – UMIC, what might be the best way to present simple, understandable and efficient results. As a result of this discussion, and by taking in consideration other similar studies regarding Web accessibility evaluations [Gonçalves et al. 2012a; Gonçalves et al. 2010; Gonçalves et al. 2011; Martins et al. 2010], we assumed that in order to give some perception concerning the results we would have to divide them according to qualitative measures for website accessibility. So with this in mind, we have defined five intervals that would allow a qualitative assumption of an accessibility level of a website:

- [0–5] – This interval should contain the websites that could be considered compliant with WCAG 2.0 checkpoints;
- [5–20] – This interval should contain the websites that would present a significant number of compliances to WCAG 2.0 checkpoints and that could almost be considered accessible;
- [20–50] – This interval should contain the websites that presented some compliances with WCAG 2.0 checkpoints, but that also present a significant number of accessibility faults;
- [50-100] – This interval should contain the websites that present an insignificant number of compliances with WCAG 2.0 and a very significant number of faults;
- [>100] – This interval should contain websites that are practically impossible to be used by a person with some sort of incapacity or disability because it presents a totally insignificant number of WCAG 2.0 compliances and an extremely big number of accessibility faults.

By analysing figure 2, it is possible to perceive that the majority of the evaluated websites homepages present more than 100 errors related to WCAG 2.0 Conformance Level A. On the other hand, it is also possible to see that, in a generic way, we can say that the evaluated sample has five or less WCAG 2.0 Conformance Level AA and Level AAA errors. When perceiving all the above results and assuming that the full evaluation of the target group websites against WCAG 2.0 would reflect the same reality as their homepage, in what concerns Web accessibility levels in the Portuguese secondary schools there is a significant tendency for low levels of Web accessibility.

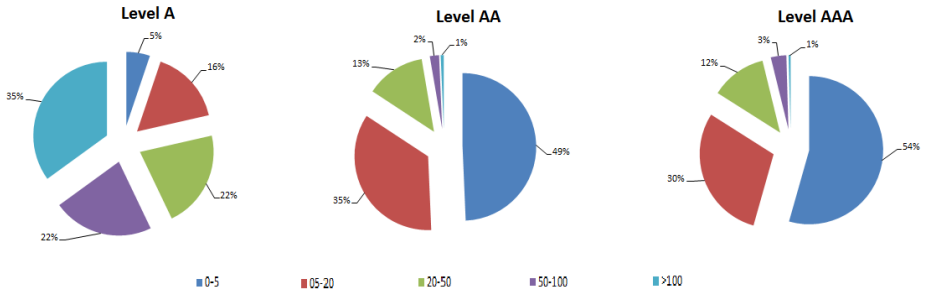

Figure 2: Distribution of the Accessibility Errors Relative to the WCAG 2.0.

6 Model towards greater Web accessibility

Besides characterizing the Portuguese teaching institutions websites accessibility levels, the present project also intended to develop a model that, at the same, time characterizes the origins of the detected Web accessibility issues and their possible solutions. In this section we describe the factors that were identified has being the one's with the most significant influence on the Portuguese Web accessibility issues and we present a model that may help to bring some change to our society and consequently improve the Web accessibility levels of the Portuguese websites.

6.1 Factors that influence the Portuguese Web accessibility issues

By carrying out several focus-groups whose goal was to analyse the results attained, not only by the study inherent to the current paper, but also, the results attained by others studies that aimed on characterizing the Portuguese reality concerning the Web content accessibility [Gonçalves et al. 2009a; Gonçalves et al. 2012b; Gonçalves, et. all 2010; Gonçalves et al. 2011; Gonçalves et al. 2009b; Gonçalves et al. 2012a; Martins et al. 2010], it was possible to achieve a set of factors whose influence is, in our opinion and in the opinion of the referred focus-groups members, decisive for the significantly low levels of Web content accessibility in Portugal (figure 3).

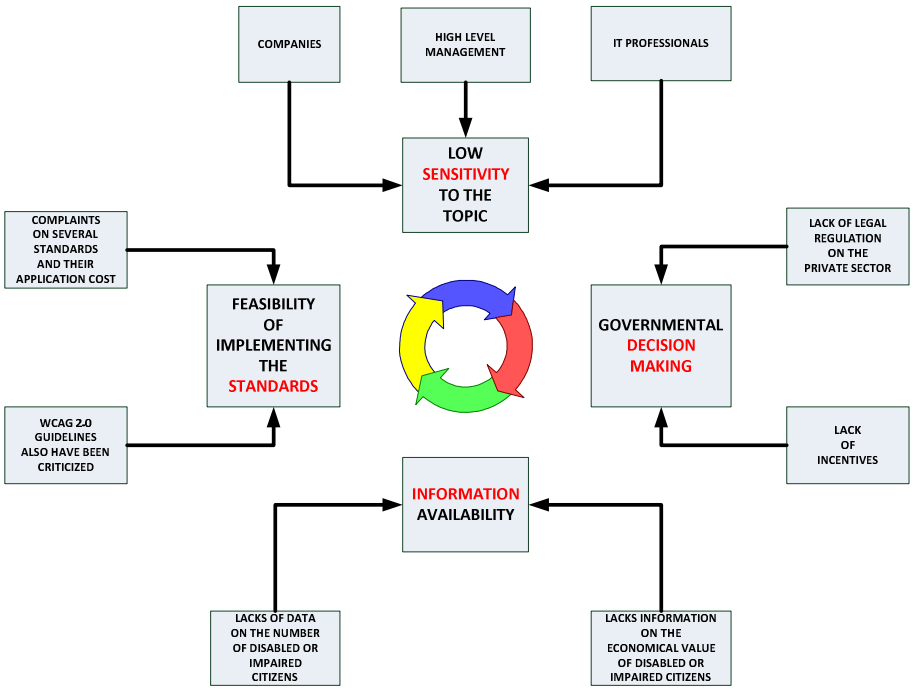

Figure 3 : Perspective on how the factors, identified as the ones with the most impact on Web content accessibility, relate among themselves and how they can be organized according to their focus.

One of the previously referred factors is the existence of low levels of sensitivity to the issue of Web accessibility by not only organizations, but also by the high-level management teams and part of the IT professional, that together contributed to significant underestimation in the organization's annual budgets and to an erroneous conceptualization that the Web accessibility issue in not relevant in an economic and social perspective. The presented low levels of Web accessibility in Portugal are also influenced by the inexistence of enough information on the number of Portuguese citizens that have some sort of disability or incapacity and what is their true economic value.

Another of the factors that was identified as having a direct implication in the Portuguese Web accessibility levels is the complicated and time consuming decision making by the governmental organizations, namely in the creation of regulations that affect the private sector and the creation of incentives for those that develop and maintain accessible websites.

At a more technical level, it was possible to perceive that there are still several complaints on the Web accessibility standards and their implementation costs. An example of this situation is the big number of complaints made to W3Cs WCAG 2.0, mainly concerning their form and content.

6.2 Portuguese society and Web accessibility improvement model

After identifying the factors with the greatest influence on Web accessibility problems in Portugal, we drafted, alongside several relevant persons and entities (APDSI, UTAD, UMIC-FCT, etc.), a model that in our opinion characterizes the relations, activities and goals that should exist between the main actors in order overcome the previously referred problems (figure 4).

In the proposed model we have identified three "actors" as being the ones that should relate among themselves and draft and execute activities that aim on improving the Portuguese Web content accessibility levels. The identified actors were the Business and Civil Society Associations (that among its staff they have the ability to disseminate knowledge and raise awareness to the theme), the State (in the form of its democratically elected Government and which has capacity for creating regulations and monitor their execution) and Education Institutions (from which we can highlight the Universities and the Polytechnic Institutes and which have in them the knowledge and capabilities to develop and transmit the existent knowledge on the subject of Web content accessibility.

The previously referred model, besides contemplating actors, also foresees a set of key-points whose analysis and discussion is imperative in order to understand the nature of the relations between the referred actors. The identified key-points were:

- Teaching of Web Programing
  - The inclusion of techniques that allow the development of accessible and usable Web content in the teaching of Web programming done at university or polytechnic context, would at the same time give future IT professionals the technical skills necessary and would help foster sensitivity in these same professionals for the theme;
  - Ex.: An example of the application of this proposal is the introduction of features and evaluation criteria directly related to the Web accessibility issue in the Web programming disciplines school projects;
- Assistive Technologies
  - The spectrum of technologies to support the development of accessible web content is very scattered, but IT professionals (current and future) do not have the expertise to operate with these same technologies, so it is necessary to invest more in this area, both at enterprise level and at the level of educational institutions;
  - Ex.: In order to improve the familiarity with the assistive technologies, both the enterprises and the educational institutions should, for instance, establish partnerships with the producers of the referred technologies and ask them to undergo a series of, well organized, demonstrations and training sessions for both the students and the enterprises professionals;
- Legal Regulations
  - With respect to Web accessibility, Portuguese legislation still only covers the websites of entities belonging to the Central Government. Thus, it is our understanding that the publication of laws that encourage and promote a minimum level of accessibility for all

Portuguese websites will, in the long term, enable behavioural change and encourage the development of new content with more viable Web accessibility and usability criteria, thereby contributing to an overall improvement in the quality of all Portuguese Web content;

- Ex.: All institutions, regardless of their scope (businesses, educational institutions, civil society organizations, etc.) should exercise their citizenship rights and raise awareness and encourage the governing bodies for the incorporation of legal regulations that implement the need for a minimum level of accessibility for all Portuguese websites;

- Studies
  - The frequency of studies on the issue of Portuguese website accessibility is too small, limited almost exclusively to five (or less) studies per year. This makes it very difficult for organizations to truly realize the existing reality, which in turn leads organizations to take actions at a pace that does not allow an improvement in the levels of accessibility of their websites;
  - Ex.: A possible solution for this is the creation of various specialized workgroups, each of them responsible for performing studies regarding the Web accessibility of a given activity sector with a quarterly recurrence, would allow for a more complete set of data that would help to better understand the Web accessibility issue;
- Good Practices
  - The existence of good practices within the Web content development teams would allow these same teams to incorporate the concepts of accessibility (and even usability) in their development processes without a significant cost. That said, it is very important that organizations producing web content, introduce sets of best practices in their development processes as this would indirectly lead to an increase in the quality and accessibility of created content;
  - Ex.: In the majority of the times, the lack of good practices is related to the inexistence of knowledge towards the Web accessibility and usability areas. By taking this in consideration, several are the enterprises that are creating consortiums and partnerships with Universities and Polytechnic Institutes in order to foster a quicker and efficient knowledge transfer, thus allowing a proper definition of good Web development practices;
- Standards
  - In Portugal, the most used Web accessibility regulatory standard is W3Cs WCAG 2.0. However, due to the high complexity of this standard, it is extremely important that the Portuguese organizations and educational institutions make available to its employees and students the necessary mechanisms to enable them to understand the rules and techniques necessary for its implementation.

- Ex.: One solution to this problem is to conduct training activities, carried out by WCAG 2.0 expert entities, which would allow the members of the various organizations, to interiorise the concepts and methodologies for deploying accessible Web content incorporated in the referred guidelines.

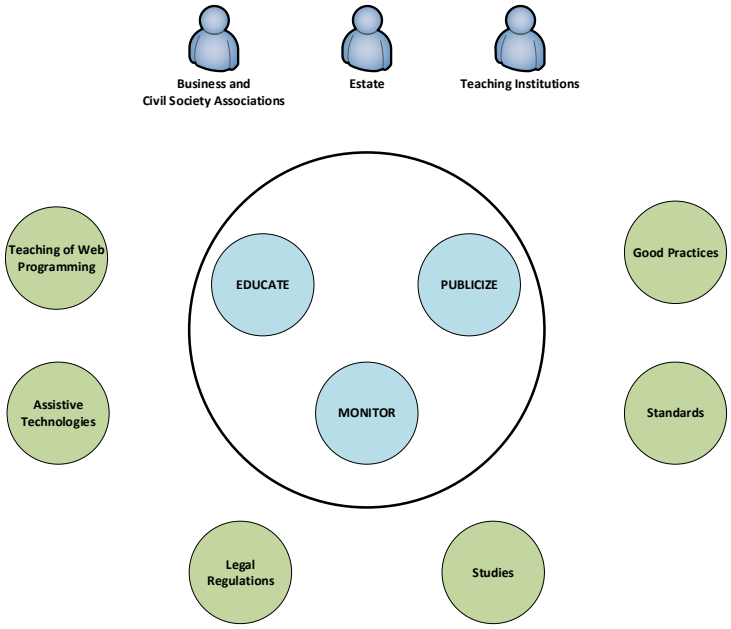

Figure 4 : Proposed Model for the Improvement of the Portuguese Web Accessibility Levels.

7 Conclusions

The study of the Internet and the ICT as platforms to help and give support to the educational systems all around the World has been in the agenda of several research projects. It is an accepted truth that using the Web and incorporating ICT in the classrooms bring a wide range of benefits that could also be used in the Portuguese educational system as a way to help shading the barriers between students and school and to assist in the learning process.

Throughout the present paper we aimed on highlighting that the Web accessibility problem is, at the same time, an ethical, social and economic issue, in which diverse actors may intervene, at different times and with different types of responsibility.

Despite the functional limitations presented by the tool used to perform the evaluation of the target group websites against WCAG 2.0, it is our opinion that the accessibility issues that were detected in the websites homepages could be extrapolated and be accepted as an indicator on the levels of accessibility conformance of that same websites.

When considering the achieved results of the evaluation of the Portuguese Secondary Schools websites against WCAG 2.0, it is possible to perceive that there are still several issues and problems. The existence of these problems will limit the availability of the referred websites and their contents, thus bringing serious implications in what concerns the students' educational context.

With the achieved results in mind, a model to improve Web accessibility levels within the Portuguese spectrum was designed. The presented model is based on a group of relationships that must be established between a number of actors and a set of activities that these same actors must perform within their executive functions. This accessibility model that was presented, besides being the main contribute for the current paper, it is assumed to be easy to interpret and, in our view, relatively simple to implement, and with a low execution cost.

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