

EDUCA: LESSON PLANS IN HIGHER EDUCATION FROM AN INCLUSIVE PERSPECTIVE

EDUCA: PLANES DE LECCIÓN EN LA EDUCACIÓN SUPERIOR DESDE UNA PERSPECTIVA INCLUSIVA

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RESUMEN

Esta investigación tiene la intención de proporcionar una alternativa a los maestros en su planificación de las lecciones, ofreciendo una plataforma para el desarrollo de planes de lecciones accesibles. La herramienta ayuda a los profesores recomendando contenidos disponibles en la web que están relacionados con los temas de su lección. Además, la herramienta destaca el nivel de accesibilidad de estos materiales. El documento introduce primero el concepto de planes de lecciones y presenta herramientas que están disponibles en la web para realizar esta tarea. Luego, se presentan conceptos de accesibilidad, con detalles actuales e históricos que son relevantes para la investigación propuesta aquí. Finalmente, se presentan las características de la herramienta, así como los resultados preliminares obtenidos mediante el uso de la herramienta con los docentes en el desarrollo de planes de lecciones.

Keywords: Accesibilidades, planes de lecciones, sistema de recomendación.

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ABSTRACT

This research has the intention to provide an alternative to teachers in their planning of lessons, offering a platform for the development of accessible lesson plans. The tool helps teachers by recommending contents available in the web that are related to the topics of their lesson. Besides, the tool highlights the level of accessibility of these materials. The paper first introduces the concept of lesson plans and presents tools that are today available in the web to do this task. Then, accessibility concepts are presented, with current and historical details that are relevant for the research proposed here. Finally, the tool's features are presented, as well as preliminary results obtained through the use of the tool with teachers in the development of lesson plans.

Palabras clave: accessibilities, lesson plans, recommender system .

1. INTRODUCCIÓN

For students to be able to learn, it is vital that they make trials, deconstruct meaning, assimilate new knowledge, compare it with knowledge already learned. Media convergence is important in the development of all these actions and can transform, for example, a technological tool, in a way to bring teachers and students closer. Information throughout the educational process can be represented in different types of educational materials; among them, textbook, videos, maps. In addition to these materials, the web 2.0 opened new possibilities, with interactive and hypertext material that can be used in different educational levels. Organizing teaching material, is a hard task, specially when the teacher has to consider problems related to inclusive education. To assist help teachers in the process of building a school serving diversity and to facilitate this creation by the teacher, the lesson plans are important tools of how the classes will be developed, presentation of content, creation activities, interaction and collaboration among peers. Thus, they describe lesson plans as a proposal for a school organization that originated in Japanese elementary school (Lewis, 2002). According to Nikolic and Cabaj

(2000) no lesson plan works well for all groups of students. ≤They may take different forms and include a wide variety of content. For this, the plans should be structured based on the structure of your class and the variety of knowledge of their students, serving the objectives of content and multiculturalism of their students. Thinking about the role that lesson plans may have on the quality of the lessons, Zabalza (1994) points out the importance of the teacher as a co-responsible for the design and management of their work in class. The author also suggests that the teacher has a "team" of professionals to help them in developing classes. The author reiterates the importance of "the teacher, staff and union with parents and others in the social community involved in education. Zabalza emphasizes the importance of setting goals that meet specific curriculum criteria, and how these goals should meet difficulties in the classroom and the diversity of students and learning modes. The author categorizes lesson plans into four quadrants, as shown in Table 1 (ZABALZA, 1994).

Table 1: Categories defined for building lesson plans.

Content A body of knowledge, ideas and experiences about the phenomenon to be studied.	Directional purpose A purpose or goal to be reached that shows one the direction to follow.
Strategies Procedures that may include tasks, activities and an evaluation of the procedure.	Direction Where to go. How does one know the goal has been reached?

For Coll (1996) "[...] the curriculum is a useful tool to guide the teaching practice, an aid to the teacher. Because of this, it cannot be limited to setting out a series of intentions, principles and guidelines that, too distant from the reality of classrooms, are of little or no help to teachers. "

According to Lajolo (1996) when he states that textbooks should not be the only materials for teachers and students in the teaching-learning process, they may be very influential in the quality of the resulting learning in school activities. This is particularly noticeable in our society, as books ended up by determining the contents and conditioning teaching strategies and

scoring methods.

The way teachers build lesson plans involves decisions that are related to the information they have about the students, about jobs and the environment, features, especially cognitive and attitudinal, teachers and how all of these aspects interact.

There are many tools to help teachers in the organization of lesson plans. These tools are usually provided by the educational institution in which the teacher works, with no possibility to choose a different technological solution. In this study, a few tools were selected and a comparison between them is presented in Table 2.

Table 2: Comparing existing tools

TOOLS	ADVANTAGES	DISADVANTAGES
PlanbookEdu http://www.planbookedu.com/	Modern looks, well-organized and intuitive. It is concerned with the presentation of information (not too much) not to confuse the user	- Paid license - Limited number of languages - No accessibility facilities
ActivInspire http://www.prometheanworld.com	Interaction with <i>White board</i> Shares information in real time	- Limited number of languages - No accessibility facilities
Lesson Plan Builder	Simple navigation	- Limited number of languages

http://www.lessonplanbuilder.org/	It allows the sharing of lesson plans with the community	<ul style="list-style-type: none"> - No accessibility facilities - Permission is needed from the development team to have a lesson plan published
Portal do Professor http://portaldoprofessor.mec.gov.br/index.html	Recommendation system to propose similar plans based on related subjects It enables users to share information in forums	<ul style="list-style-type: none"> - Only in Portuguese - Only for teachers (no student view) - No accessibility facilities - Fixed structure to build lesson plans

Table 2 shows that the main disadvantages seen in all tools are the lack of facilities related to accessibility features, and the limited number of languages offered (usually English, and in one case Portuguese). Despite the known importance in the use of technology to support teaching and learning, the difficulties in developing educational practices that integrate technologies in a natural and continuous way are well known.

In order to talk about accessibility, it is necessary to address the theme Universal Design, as accessibility is a subset of Design. Universal Design concerns the "process of creating products commercially viable, items that can be used by people with different abilities (DIAS, 2003)." " [...] It is impossible to develop an entirely affordable product. One can make it more accessible however, there will always be someone who will not be able use it. Universal design should be thought of as a goal to be achieved, even if unattainable in practice (DIAS, 2003). "

Universal Design has the intention, therefore, to set goals for developing products for the general public; already accessible design is a subset of

universal design, but one may want to cater specifically to the public with some limitation or disability (DIAS, 2003). To address these characteristics, the concept of accessibility concerns the easing of access to information and interaction of users with some kind of special need with digital / virtual environments, with software and hardware, and the adjustments to environments and situations (GUIA, 2014).

The concept of accessibility started to be used specially related to physical issues concerning access facilities (architectural barrier), physical and vocational rehabilitation. Later, the concept was transferred to the computer, focusing on questions related to the access to web information.

In the 90s, with the popularization of the Internet and the development of virtual spaces, we see the need to provide the same universal access in cyberspace. The concern for the construction of accessible virtual environments becomes then apparent. In this sense, The World Wide Web Consortium (W3C) become responsible for popularizing the term and establishing the standards that computer systems should follow to be considered accessible in particular Web

pages, as presented in Figure 1.

Perceivable	Operable	Understandable	Robust
<p>Provide text alternatives for any non-text content</p> <p>Subtitles</p> <p>Media descriptions</p>	<p>Make all functionality available from a keyboard.</p> <p>Provide ways to help users navigate, find content, and determine where they are.</p>	<p>Make text content readable and understandable.</p> <p>Objective language.</p>	<p>Allow the user to use assistive technologies.</p>

Figure 1: Accessibility Guidelines

Based on these arguments, it is possible to realize that the W3C's recommendations do not restrict graphic design or multimedia web pages to obsolete systems that are not visually attractive. On the contrary, their recommendations enable page builders to improve their results (DIAS, 2003).. People don't usually realize the importance of having accessibility associated with designing pages for the Web. The W3C therefore intends to promote standardization, technical standards, information security, copyright and privacy in the Internet. To ease the development of accessible spaces in the web, the Web Content Accessibility Guidelines 2.0 (WCAG 2.0) released basic principles and tips for developing web pages in 2004 to replace the Accessibility Guidelines for Web 1.0 Content created in 1999 by the W3C.

According to the W3C-WAI (W3C, 2014), those who are not familiar with accessibility issues should consider the users might not be able to see, listen, move and thus they may be unable to interpret some types of information.

Focusing on these aspects, a lesson plan-editing platform was developed, giving support to teachers in the production of digital accessible classes. The platform focuses on the recommendation of accessible materials that teachers may use in the building of their lessons.

2. THE CURRENT RESEARCH

The tool developed as part of this project, called "Educa", operates as a support to teachers to create accessible lesson plans. When teachers are working on their lesson plan, the tool suggests additional material related to the subject they are working on as a way to assist them in their research. Educa also evaluates if the materials to be recommended follow accessibility guidelines, suggesting corrections when they do not.

The following subsections present the tool developed in more detail, the content recommendation method and the accessibility features of the system. Finally, the methodology for an experiment and some preliminary results

are presented.

3. EDUCA - PROGRAMMING

A few requirement categories were defined for the project: functional

requirement: recommendation system;
non-functional requirement:
accessibility-related content offered by
the recommendation system. Figure 2
shows Educa and its flow of information.

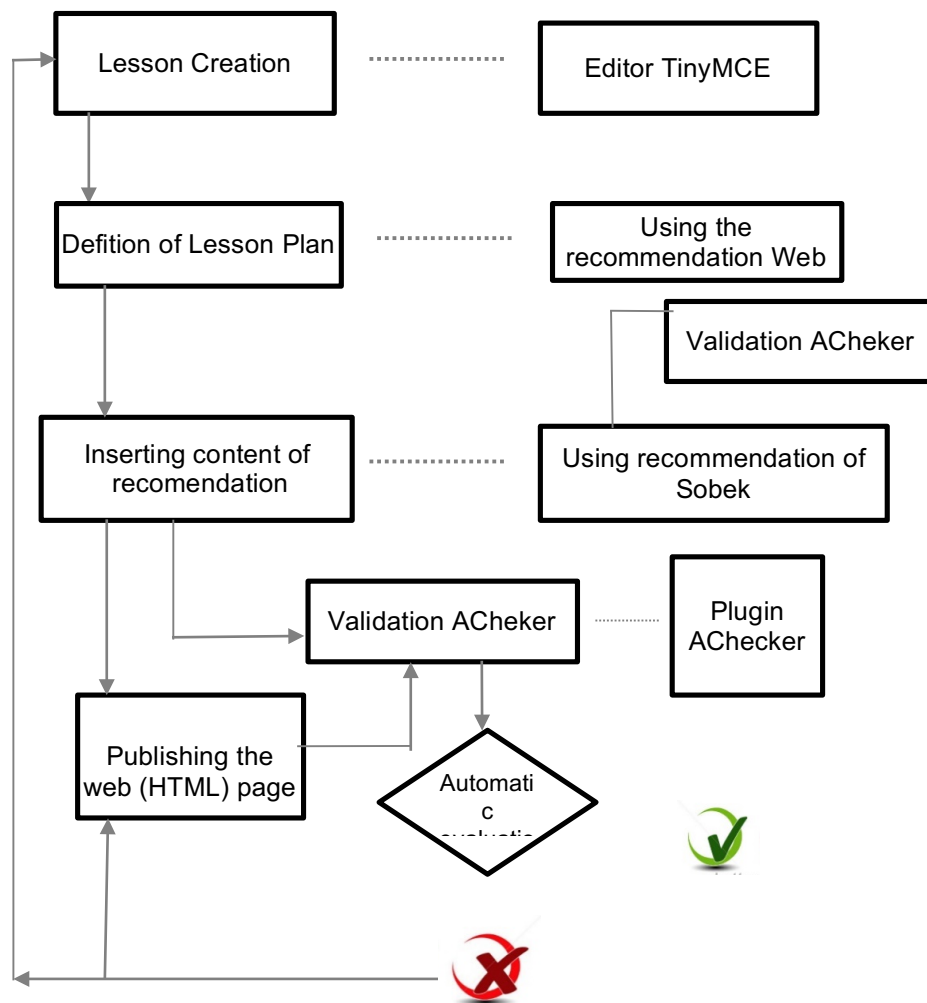


Figure 2: Workflow for the development of Educa

figure 3 shows the main page of the tool, where the teacher may create accessible lesson plans. Figure 4 shows Educa's editing page in which the teacher may insert information related to

his lesson plan (on the left) and the system recommends related contents (on the right), signaling out accessibility information about each item recommended.



Figure 3: Main page of Educa

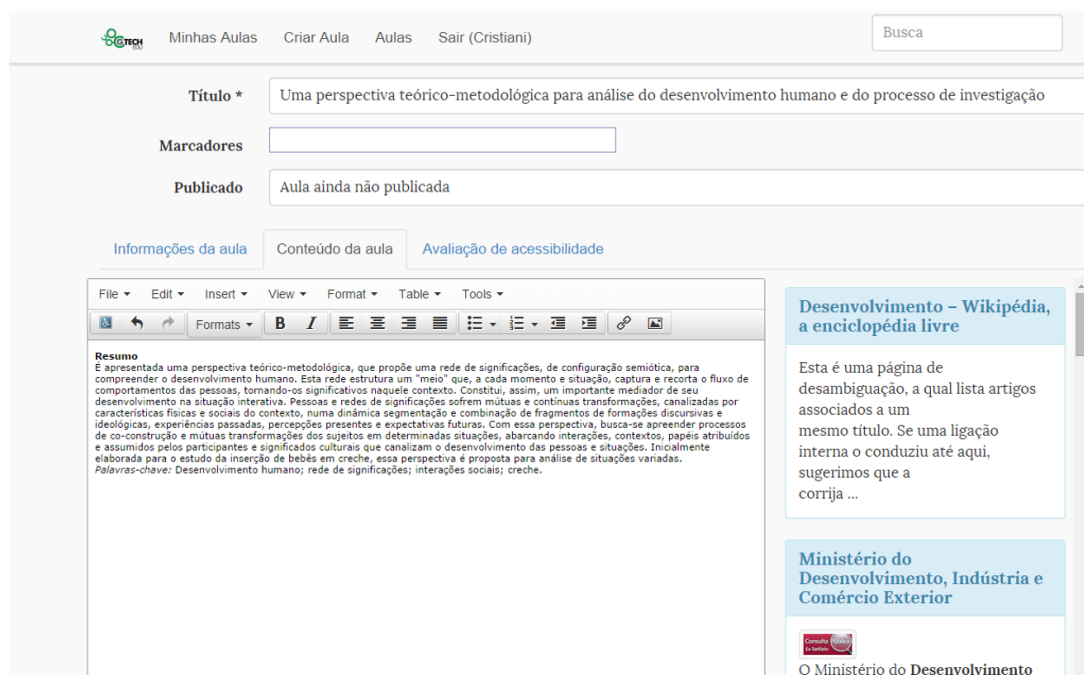


Figure 4: Editing page of Educa with the recommender system

The tool relies on content recommendation functions from the Google content search API. The environment provides teachers with a space in which they may insert an

individual profile, user data, historical lecture database that stores the information about the teacher's lesson plans. The recommendations made by the system include the information provided by the API as videos, images,

Web links, and books. An automatic system to evaluate the accessibility of pages has been added to Educa, showing the teacher the accessibility level of the lesson plan created.

The search process for the material recommended is based on the use of a text-mining tool that scans the teacher's lesson plan and extracts from it a set of keywords. Sobek is the name of the text-

mining tool used in this task, a tool that has been developed specifically targeting educational applications. The tool works behind the editor and is not visible in Educa, only sending the Google API a set of keywords to be used in the search for related material. Figure 5 shows a diagram extracted from Sobek from a Wikipedia text about the Greenhouse effect.

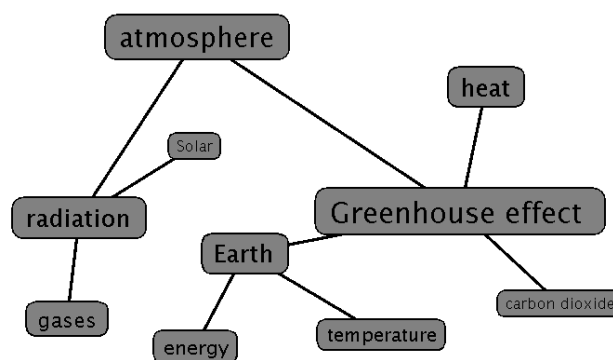


Figure 5: Sobek graph extracted from a text about the Greenhouse effect

The accessibility feature of Educa uses the validation system AChecker, which

employs the W3C accessibility recommendation guidelines.

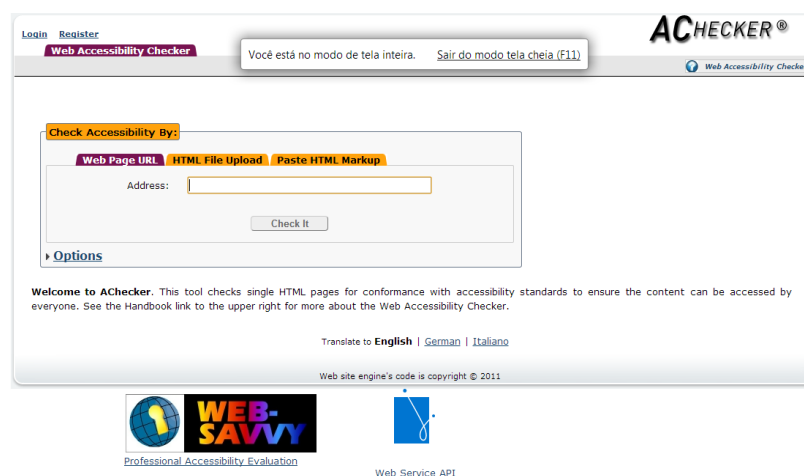


Figure 6: AChecker API used on Educa

Emphasizing the process of web content accessibility validation, the teacher can

know at what level of compliance is the material he intends to make available to

the students. He may also view technical details associated with the automatic

review, as shown in the Figure 7.

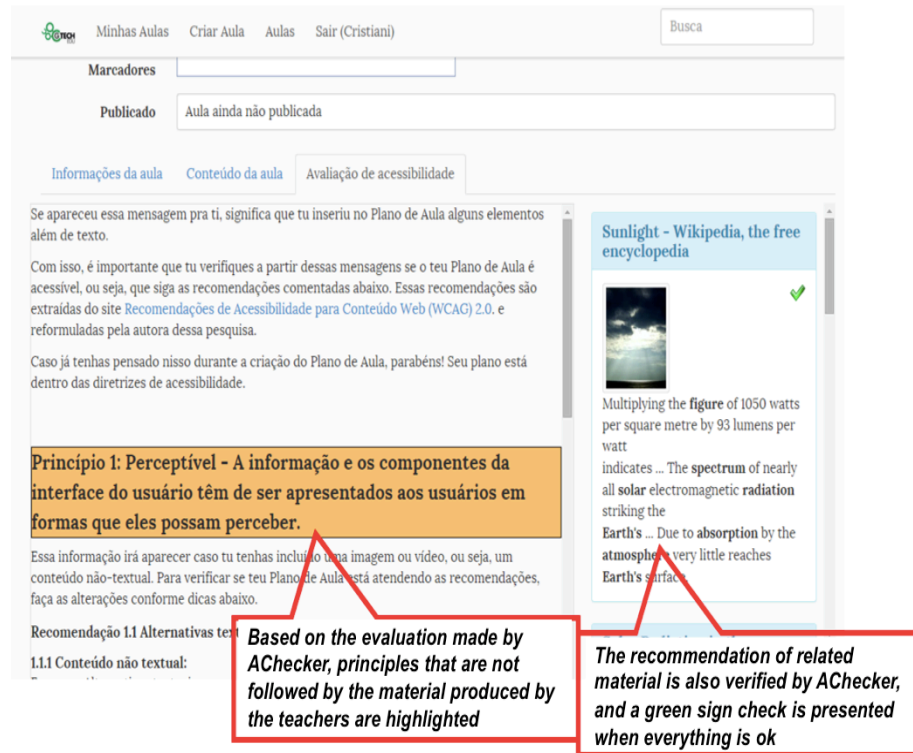


Figure 7: Automatic assessment of verifying lesson plan created by the teacher

In the example presented in Figure 7, the teacher created a lesson plan related to the development of accessible materials. Problems found by AChecker are highlighted in the teacher's material, and the recommendations made are also verified to determine whether they do or do not have accessibility problems. This particular report highlights the type of error that has been identified and which expert advice may help the teacher to solve the problem.

4. PRELIMINARY RESULTS

Educa is the resulting system from a previous study presented in [12], focusing on the support to the teacher in the development of lesson plans - without focusing on accessibility aspects

as done here. An initial experiment was carried out in order to evaluate how teachers would work and view the proposed tool. During the activity, detailed in [12], the teachers demonstrated to be sensible to the development of accessible lesson plans, but they did not want to have to go back and correct problems after they were made. Therefore, the need for the tool to identify problems before they were created (such as in the recommendation of already accessible material) became apparent. Another important finding of the study was that teachers accepted well the recommendations made by the system, showing their appreciation for the suggestion of extra material to complement their lesson plans.

5. FINAL CONSIDERATIONS

This paper described the motivation and aspects related to the development of a tool to help teachers build accessible lesson plans. The tool provides teachers with web editing features, as well as with content recommendations and accessibility check, using the guidelines from the W3C. The tool is still under development, but preliminary results have shown the teachers appreciation for such a system, specially regarding its ability to recommend material related to the lessons' topics, and the evaluation of the plans' accessibility. Besides further testing the tool with larger groups of teachers, we are starting to evaluate the system now from the students' perspective as final users, considering a specific student view of the lesson plans built for them.

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