INTERFACE DESIGN ANALISYS, TEACHING ASPECTS AND DIGITAL RESOURCES OF CARTOGRAPHY EBOOK OF GEOGRAPHY CEDERJ COURSE

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A1 Class

C Educational Sector

E-learning Research Area Classification H

Quality B

SUMMARY

In this study was approached the E-book Project of Cederj Consortium, analyzing specifically one of the published materials, the Cartography E-book of e-learning Geography Course. The criteria used involved the interface design, the didactic aspects and digital resources exploited in material and were based on studies of Maciel (2014) and Dick and Gonçalves (2014). From 27 criteria total raised , 11 were present in the e-book analyzed. Of those 11, seven were related to educational aspects and digital resources and four on the e-book interface design. With this study it was observed that the Cederj system produces E-books rich in content and resources but needs some adjustments in interface design questions, accessibility, help resources and support, tips and search engine.

Keywords: E-book; DDB; design, interaction

1 – Introduction

According to Epstein (2002), electronic technologies will radically change the information transmission mode, reading and culture training beyond the technologies of oral language, writing and mobile devices. The Digital Textbook (DT) or e-books, how we will treat this work, increasingly tend to be incorporated as references to the work of teachers in e-learning, no longer a mere digital reproduction of a printed work, through interfaces that enhance the reading experience to a new level of learning.

This study started from the article published in the journal "EAD em Foco" on E-book Cederj Project (Perdigao et. Al., 2015), which evaluates the ebook publishing system developed specifically for the Consortium Cederj. Stemming from their own Cederj, E-book Cederj project does not follow the standard PDFs and E-Pubs publications, so the published materials have specific characteristics compared with other publications of DTs.

"The E-book Cederj Project is to provide the didactic books of blended undergraduate Consortium Cederj in digital format for access via mobile devices by students, enriching them with multimedia features and activities, suggested not only in their own digital books, as well as currently published by the teacher in VLE Moodle, as well as selected other supplementary materials. The differential E-book Cederj project is that it has a dynamic system of administration of embedded multimedia features, giving full autonomy to the teacher to add and remove resources even after its publication for students, with constant updates in real time." (Perdigão et al., 2015)

2 – Objectives and Justifications

The objective of this study was to analyze the educational aspects and digital resources as well as the interface design of Cartography Ebook of Geography Cederj Course through criteria raised in Maciel research (2014) and Dick and Gonçalves (2014).

The Cederj Consortium coordinates the e-learning undergraduate courses of eight public universities of higher education: CEFET, UERJ, UFRJ, UFRRJ (Rural), UFF, UNIRIO, UENF. Through this consortium, many students who work or reside far from urban centers may study at a public university, getting a prestigious diploma to work in the labor market. All the courses have a e-learning platform that provides resources and study materials for students. The creation of the E-book project came to offer another form of access to content covered in the courses, allowing for viewing on mobile devices.

Analysis of E-book Cederj is of paramount importance to provide quality study material in design and technology with ease of access on mobile devices by the students. According to Maciel (2014), with the launch of the National Textbook Program 2015 of the federal government (Programa Nacional do Livro Didático – PNLD), it identified the need for the existence of a set of criteria to the evaluation of interactive concepts present in this material. To list the criteria for assessing the didactic aspects, digital features and interface design already used in other studies, it will be possible to identify strengths and weaknesses of E-book and suggest improvements for creating a digital book model for undergraduate e-learning Consortium Cederj.

3 – Academic Referential

"The digital textbook (DT) was introduced in this decade as a resource able to replace textbooks in the traditional format. It is based on mobile technology of tablets and / or smartphones, bringing contents of information in various forms of language, and not just verbal and non-verbal, as in force in the books since the time of Gutenberg, but also other educational materials as tutorials, educational games, animations, videos, audio, graphics, web pages and other elements" (Brasil, 2013).

Digital books emerged in the early 1970s, from the Gutenberg Project, led by the US Michael Hart. According Virginio and Nicholas (2012), the project was intended to free production and distribution of electronic books.

Since then much has changed. The first point is that current digital books are no longer only files in pdf format to be read linearly. There are a multitude of features that can be implemented to existing reading devices, ranging from hypertext to multimediatic files and web 2.0 collaboration features.

According to Mattar (2012) the tendency is that systems for the production of content become increasingly friendly, reducing the time and effort to the production work of teachers. They can also interact with the course content in various ways, commenting on them, suggesting sources of consultation, proposing activities, adding features and even modifying the curriculum and course material itself. This theory is also explored in the current digital book production systems. According to Moore (2007) "by integrating different media [...], one of the most important creation of considerations is to ensure that the media operate together." According to him a media mix is more effective to provide education to a large and varied group of students because it allows different types of learners identify the most appropriate mix them.

Amid this profusion of media and technologies, it is important to know how to select and use, properly didactic intentions to the needs of the student, the various resources available. "Therefore, it is imperative to know how to use them, but also analyze them, evaluate them" (Rojo, 2005).

For Moore (2007) one of the permanent dilemmas with technology is the emergence of different proprietary formats and the incompatibility between them. The same author argues that the creation of instructional media depends on the content, the availability of technology, the type of desired interaction and learning environment.

Maciel (2014) mentions in his study that the textbook is the main instructional material the student and in many cases is the only one. In the case of Cederj many disciplines it is fully based on educational books, denying the Moodle platform to the background. In this scenario, the e-book comes as an aggregator of resources that are available on the platform but perhaps by a difficulty in changing the culture of some teachers, are almost unexplored. Many teachers are still considered as "digital migrants" in relation to the use of potential of e-books.

Dick and Gonçalves (2014) go beyond the approach that digital books are also interfaces, making it essential that the principles involving interaction design for the project to be the best suited to that user and to that task.

From the raised benchmark, an important Maciel of questioning was identified (2014): What criteria could be adopted in order to allow the teacher / evaluator a better judgment of a digital book?

4 - Methodological Procedures

The research study object (Cartography E-book) was randomly chosen from the subjects of the Cederj Consortium geography course. In Figure 1 it is possible to see some Cartography e-book screens accessed through a mobile device.



Figure 1. Cartography e-book screens accessed through the Galaxy S5 device.

The Cartography E-book was developed during the implementation of E-book Cederj Project, throughout the year 2014. During that same year it was developed research on the project, published as "Project E-book Cederj: Proposal Execution Methodology and Initial Results Analysis" in the XVI Iberoamerican Meeting on E-learning Higher Education. The research sought to infer the process of e-book creation, the volume and categories of multimedia features used in various undergraduate e-learning courses of Consortium Cederj (Perdigao et al., 2014).

From the analysis of the results of the study mentioned above, which resulted in a publication in the journal "EaD em Foco", a research on the digital book production processes revealed several questions about the criteria for preparation of such was held. With the launch of the National Textbook Programme 2015 announcement of the federal government (Programa Nacional do Livro Didático - PNLD), several studies have raised the need for the existence of a set of criteria to the evaluation of interactive concepts present in the digital textbook. In this work we used evaluation criteria in didactic aspects, digital resources and experience of the user listed in Maciel (2014) and Dick and Gonçalves (2014) studies. The selected criteria took into account the resources available in the Project Publishing System E-book Cederj and the reality of the target audience of the Consortium, which uses the material in both computers and mobile devices such as tablets and mobile phones.

From the listed criteria, a table (Annex 1) was created to analyze the Cartography E-book of undergraduate Geography course. Of the 27 selected criteria, 16 were related to educational aspects and digital resources and 11 were related to the E-book interface design. In response, the YES option is that the criteria WAS OBSERVED in E-book studied and NOT the criterion NOT OBSERVED. When the result was the NOT option, the identifiers were used E (Case E-book has not explored the option) or S (If the inability to use the criteria either because of System limitations).

5 - Results

Of the total of 27 criteria, 11 were observed (YES) in the Cartography E-book. Of those 11, seven were related to educational aspects and digital resources and four on the e-book interface design.

As for the criteria not observed (NO) the total was 16 criteria, of which nine were related to educational aspects and digital resources-seven on the ebook interface design. Of the total unobserved criteria, three occurred because the teacher did not exploit the resource in the E-book and 13 because the system still has limitations that still does not allow the use.

Of the 13 criteria missed because the system still has limitations, almost half is because currently the published content is in image format, ie, the text is not traceable, so the search for resources, tracking, artificial intelligence, accessibility (and contrast increase sources) are unable to work. The remaining unobserved criteria, four refer to design adjustments to improve the user experience and three are supplements help and guidance to the user.

For criteria not observed because the teacher did not exploit the resources in the E-book, we can point out as the theoretical framework, which in some cases is the lack of possibilities for use of resources by teachers.

6 - Conclusions

The E-book Cederj Project is a proprietary system therefore meets the specific needs of the Consortium. With this study it was observed that the system produces E-books rich in content and resources and allows updating

the teacher himself. On the other hand, it needs some adjustments in interface design, accessibility, help and support resources, tips and search engine.

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ANNEX 1 - RESULT OF EVALUATION BASED ON INSTRUMENTS USED IN MACIEL (2014) AND LEGASPI AND JAKHU (2015)

For all criteria, the YES option is that BEEN OBSERVED in E-book studied and NOT is that NOT BEEN OBSERVED. When the result is equal to NO, it will be followed by E (Case E-book has not explored the option) or S (If the inability to use the criteria either because of System limitations).

Evaluation criteria of didactic aspects and digital resources (Maciel, 2014)

Regarding educational aspects and digital resources of assessed work, you can see:	Yes	No
Educational materials involving the student in the pursuit of understanding the scientific model studied, from interactive concepts in simulations and animations?	x	
The existence of prior instructions that guide the use of digital learning objects contained in the work, as well as an index to these?		хE
The presence of icons / buttons help / information in the text, favoring autonomy of the student?		хS
Aid and tips for the use of existing digital educational materials?		x S
The incentive to free navigation over content through hyperlinks or external links, in characterizing a nonlinear text, making it specific to each user?	x	
The possibility of adjusting the content / planning for the target audience, by the teacher?		x S
The presentation of the content increased by hypertext objects linked to content, such as bubbles (boxes) information, infographics, interactive figures etc?	x	
The color scheme and font chosen favor the use, minimizing eye strain, and assist the identification of educational materials?	x	
The presence of properly indexed content and topics, enabling easy access or returning from different parts of the publication or external references?	x	
Which is endowed with an advanced search tool, allowing the reader to perform a search for terms contained in the work, and offer the possibility of external research (web) of the topics?		хS
The choice and use of digital resources that motivate the target audience, such as introductions to the content in hypermedia format, educational games, interactive quizzes etc?	х	
The existence of digital resources, through which debates among students occur, such as chat rooms or communities in social networks?		хE
The ability to update and text excerpts modification on the part of educational agents involved in the process (author-teacher-student-content), to promote the updating of knowledge and the constant surveillance of its application in everyday situations?		хS

Adequate and functional integration of external aid (web), duly selected, current and functional?	х	
Digital intelligence mechanisms that promote and individualize the assessment system, the path taken by the user, as well as your skills?		хS
Problem situations that require the students to use the potential of support, such as connected mobility, the development of images / videos, using specific applications and GPS, reading and preparation of QR codes, among others?		хE
TOTAL	7	9

Interface design evaluation criteria (Legaspi and Jakhu, 2015)

For aspects of user experience, you can see:	Yes	No
All controls lead to a result in a simple and logical way	х	
There is a clear metaphor between the real world and control	х	
Sending comments when a task is completed		хS
Each step of the flow is clear to the user		x S
All symbols are the clear recognition for the user		x S
The information hierarchy and content structure is organized clearly	х	
Users are able to diagnose and report errors		хS
Help and support are readily available to the user		хS
Symbol / control meet the minimum size, space and contrast requirements	х	
Contrast ratios are accessible when using multiple colors		x S
Typography is ideal for reading in any environment / context		x S
TOTAL	4	7