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Ensino à Distância: Desafios Pedagógicos Distance Education: Pedagogical Challenges

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org. Pedro Reis e Fátima Silva

PORTO UNIVERSIDADE FERNANDO PESSOA 2011

Freeware authoring tools for the creation of e-contents – Current experience

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Isabel Damião²

Abstract: e-contents play an important role in e-learning since the latter relies significantly on the former. Furthermore, e-content and e-learning face a number of challenges in producing viable modules for information enriched society and institutions. Hence, e-learning developers feel the need, for instance, to increase collaboration among learners, to create relevant practical activities for learners to participate in and to create content that today's learners will find engaging. This represents an essentially intellectual and creative challenge, which is, basically, to produce imaginative, engaging and interactive designs that work with the browsers used by the target audiences, within realistic bandwidth constraints.

Most of the professional development studios use their programmers to create custom tools that suit their own working methods and styles. In-house units and individual e-learning developers are much more likely to employ tools which help them to avoid the technical minefields and concentrate on the realisation of their designs.

For this purpose, e-learning authoring tools do have their advantages, as they make it easy for e-learning developers to employ a relatively wide range of interactive techniques and to have their content communicate with a Learning Management System (LMS) at moderate costs or even for free. The use of such tools may imply some loss of flexibility since the easier the tool is to use the less one can do with it. However, the real worth of e-learning content is in the design and the writing, so, in our view, one should accept sacrificing a little flexibility if it implies a sensible budget and timetable.

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Based on our current use of freeware authoring tools (such as eXe-learning, Xerte or CourseLab), they seem to have the right functionalities for the production of engaging Learning Objects (LO) and a way of delivering the end-product that conforms to the hardware and software capabilities of our audiences.

In sum, we would like to demonstrate with our current experience as e-learning developers how subject-matter experts may work directly with these tools, to populate the templates with content. For maintenance, this content may be stored in a database, although for delivery it may be converted to standard HTML.

Key-words: e-Content, Authoring Tools, Learning Objects, Distance Education

1. Introduction

Authoring tools are computer applications which allow an author of digital learning resources to integrate different components, creating interactive and multimedia educational content. The concept of content creation tools is a generic term which refers to the software used in the production of content. On the other hand, the term "Authoring Tool" is very common, referring to software for content authors.

This terminological duality stresses the occurrence of two theses: one that places primacy in the technological side, and another that highlights the pedagogical aspects.

Regardless of these two approaches, the primary objective of these tools is to facilitate the production of multimedia materials, providing authors with the autonomy to design their own materials. In fact, these are tools for ordinary users, who can rapidly, and wherever they are, develop a certain content or programme.

Distance Education (DE) is characterized by the establishment of a multi-way communication. Since its possibilities have been broadened due to technological changes, it can now be considered an alternative modality to overcome limits of time and space.

Its benchmarks are based on the four pillars of Education for the 21st century, published by UNESCO:

- Learning to know,
- Learning to do,
- Learning to live together,
- Learning to be (UNESCO, 2003)

Thus, Education is no longer regarded as a mere transfer of information and should be guided by the contextualization of knowledge useful to the student. In distance learning, students are challenged to understand the content and to do research in order to participate in the course.

Technological support has progressively replaced man in the production work, leading him to act increasingly in the design and management of work processes, requiring new skills and competences. In this sense, training has become ever more necessary to monitor changes in the working world.

This scenario has led both companies and universities to invest in developing their intellectual capital through appropriate training (Boog, 2001, pp. 34-35). In this area, technological development and the use of resources, like the Internet, have been pushing such learning processes. The Internet offers valuable advantages and resources such as the updating of content on the fly, expanding forms of communication and support for learning anytime, anywhere.

The junction between learning and Information and Communication

Technologies (ICT) has helped to establish this new concept – e-learning, which can be defined as a set of solutions to improve knowledge and performance using Internet technologies.

According to Rosenberg (2002), e-learning is based on three basic criteria:

- Transmission Networking: makes upgrading, storage, retrieval, distribution and sharing of the information possible;
- Access via the computer connected to the network: so it implies the use of the Internet;

- Broader vision of learning: it promotes different methodologies that make reference to the organizational reality and aim at the development of skills and, with the use of Internet tools, proposes more interactive approaches to content, which contribute to the improvement of the individual's performance.

Today we face a very different educational arena. It may be F2F, blended-learning or mostly, or even totally, distance learning. Every day, we are faced by new features brought by this rapidly evolving technology, which affects educational institutions. Talking about education today, has a much broader scope, and it is not possible to speak about education without referring to DE, with all the technological advances providing greater interactivity between people. Due to the use of technological means, DE came to destroy taboos and started a new era in terms of education.

Consequently, we can say that this type of learning is no longer an alternative for those institutions which do not provide formal education. It has become, instead, a kind of quality education that enables learning to reach a greater number of people. Before, DE did not have much credibility; it was a controversial issue and gave rise to many divergences but, over the years, it has conquered its own space. Nevertheless, it is not the kind of education that determines the learning process, whether F2F or distance. Today, learning is synonymous of effort and dedication of each person involved.

In this context, authoring tools may have an important role to play, as vehicles that teachers/trainers have to facilitate distance learning, motivating and challenging students/trainees, providing them not only with the information but also guidelines and motivation so that they may search, by themselves, other data in addition to the teaching, via the Internet.

2. Authoring tools: what they are and what they can be used for

Learning is a process by which people change their structure of knowledge in relation to an issue – either they increase it or change it – and eventually change their attitudes and norms of behaviour. Thus, the knowledge we already have changes as we learn new things and knowledge is restructured to make room for new data.

A really significant learning process occurs whenever a learning object acquires special significance and meaning, always due to active assimilation. This type of learning is able to modify previous ideas, increase knowledge network and even establish new relations between data. Therefore, it consists of modifying and enriching the previous schemes by establishing new connections and relationships. This is, in short, a description of the construction of learning.

Thus, when one creates learning material and prepares learning activities, some issues should be considered, namely:

- What is the student's prior knowledge?
- To what extent will the presentation of content take into account different ways of studying?
- To what extent does this information represent something new in relation to what the student already knows?
- To what extent does it include tools in order to facilitate the assimilation of the new learning?
- How would it be possible to confer meaning to what is learnt? Will the contents have any use? (Guàrdia et al, 2008, p. 13)

Any instructor or content author can – without the support of a production team – develop his/her own course, his/her own methodology for DE by means of authoring tools.

However, there is a catch. Some more sophisticated software has the disadvantage of needing some learning so that users will be able to interact with the tool and to exploit its maximum potential. Authoring tools, in turn, although more affordable to use, imply a lower pedagogical creativity and a less complex content production. So, generally speaking, we have an inverse relationship between the level of software complexity and the creativity of the content.

For example, if we want to develop more complex content and give freedom to the pedagogical creativity of content authors, authoring tools requiring programming skills should be used, such as, Adobe Flash.

There is a wide variety of authoring tools on the market. Some of the best known applications are Authorware, Director, ReadyGo, ToolBook, Dreamweaver and Coursebuilder (e-learning templates as an add-on to Dreamweaver). The use of these tools requires previous training to ensure their truly effective usage.

On the other hand, software such as eXe-learning, Xerte or CourseLab, have features of production for placing contents online [automatically converted into HTML], which makes them quite suitable for use on Web pages.

Besides, these are free access tools that encourage the creativity of each author and, more importantly, the development and creation of LO with some level of interactivity, which is unanimously considered a key factor to the success of DE.

3. The impact of authoring tools on the development of solutions for e-learning

The choice of the authoring tool to be used must take into account aspects such as the complexity, the pedagogical methodology and the level of creativity.

The specific features and functionality of an authoring tool does not affect the freedom of the teacher/trainer to manage the e-learning methodology. On the contrary, it stimulates the development of Instructional Design (ID).

Other reasons justify the use of authoring tools to develop e-learning courses, namely the reduction of both time and cost of production.

4. Advantages of authoring tools

The great advantage is the freedom to create and manage content in terms of the teacher/trainer so that the new educational paradigm lies in the production of content, in the students/trainees, and in the development, management and construction of knowledge. Each teacher/trainer and each college/institution is then responsible for the use of such resources.

It should be noted that these tools facilitate the life of the institutions in several ways, such as reduced costs of the production team, the management of a large number of students, or even the guarantee of return on investment.

The teacher/trainer, as manager of content, becomes increasingly essential. The technology is merely a resource, a mere working tool. Thus, the teacher/trainer can put together all their resources in one place, in the most convenient, interesting, and engaging way, leading the participants to develop and build their learning.

The Internet has a very important role since it makes it possible to implement, at low cost, this new type of education: modern and more accessible to everyone. This promising project is likely to achieve success,

considering the increasing number of users. It is possible, with some security, to delineate plans that address the changing face of education for this new era of DE.

One might even imagine that, soon, with the dizzying advance of technology and Internet, one can learn whatever subject, comfortably at home, at one's pace.

5. Interactivity in online learning

From our point of view, interactivity is fundamental to successful e-learning, because it not only encourages adherence to this type of learning/training, but it also provides greater student engagement in the learning process. Thus, we believe that interactivity should be designed in a thoughtful and intentional manner. We can speak of different dimensions of interactivity, namely:

- Visibility and accessibility (to view and access content in different ways);
- Ability to annotate and manipulate (to build content and create notes);
- Creativity and combination (to create new content by combining data);
- Experimentation and test (to run a simulation or build a model). (Aldrich et al, 1998, pp. 321-332)

The interaction with the content, social interaction and intra-personal interaction are essential for the effectiveness of interactivity

in an e-learning course. Hence, one can mention four forms of interaction:

1. The student-content interaction, which is the key to the effectiveness of the learning process. Thanks to this process of intellectual interaction with the content, changes arise in the understanding of students at the level of their cognitive structures.
2. The student-teacher interaction, considering that the latter has to help, assist, guide and even motivate the student's learning.
3. The student-student interaction, which is central from the constructivist perspective. According to this theory, learning is a social act that requires a specific dialogue between students and their peers. This interaction will result in the sharing of experiences.

In a constructivist approach, Lauzon (1997, pp 22-39) introduces another variant of the interaction:

4. the intrapersonal, which relates to the trainee's ability to reflect on their own knowledge, on the process or how it is achieved; this is metacognition.

Still on interactivity, Northrup (2002, pp. 219-226) proposed a model, with which we agree, that includes five variables to use when designing content for e-learning:

- Interaction with the content,

- Collaboration with working groups,
- Asynchronous and synchronous conversation,
- Intra-personal interaction,
- Support the student's performance.

From our point of view, support of the student's performance can be viewed as a mixture of student-content interaction and intra-personal interaction. According to Northrup, its purpose is to assist students in performing tasks.

6. Current experience

We firmly believe that e-learning needs e-learning authoring tools as well as more collaboration between learners, more relevant, practical activities for learners to participate in and content that today's learners will find engaging.

If designers have the will to make these changes, then they will find a way, as this is essentially an intellectual and creative challenge.

There are hundreds of web development tools, many of which are HTML editors, but some providing WYSIWYG ("What You See Is What You Get") facilities that keep a distance between the developer and the code. Using just the basic facilities of HTML and without special coding in scripting languages such as JavaScript, it is possible to produce quite reasonable e-learning materials, with a very reasonable range of interactivity.

Nevertheless, we must be cautious about the extent to which we can divorce ourselves from the code. The more we understand about the underlying HTML and JavaScript, the more we are in control. If we do not know any HTML, we are likely to be surprised by what appears in the browser since no web tool can be fully WYSIWYG.

As mentioned before, specialist e-learning authoring tools do have their advantages. They should protect the developer from the need for specialist programming expertise. They should make it easy for the developer to employ a wide range of interactive techniques and to have their content communicate with a LMS. If there is a price to pay, it is some loss of flexibility: the easier the tool is to use, the less you can do with it. But given that the real worth of e-learning content is in the design and the writing, many developers will be prepared to sacrifice a little flexibility if it means a sensible budget and timetable.

In sum, we argue that there is no standard way of developing web-based e-learning content and certainly no right way. Professional development studios use their programmers to create custom tools that suit their own working methods and styles. In-house units and teams of one are much more likely to employ an off-the-shelf tool, which helps them to avoid the technical minefields and concentrate on the realisation of their designs. When we choose a tool, we want to ensure that it has the right functionality for the job at hand and a way of delivering the

end-product that conforms to the hardware and software capabilities of the audience, all that at a sensible budget and timetable.

Our current experience as e-learning deliverers involves the use of freeware authoring tools, such as eXe-learning, Xerte, and CouseLab, namely for the development of e-content of Portuguese for Foreigners.

The eLearning XHTML editor (eXe) is an authoring environment to assist teachers and academics in the design, development and publishing of web-based learning and teaching materials without the need to become proficient in HTML or complicated web-publishing applications.

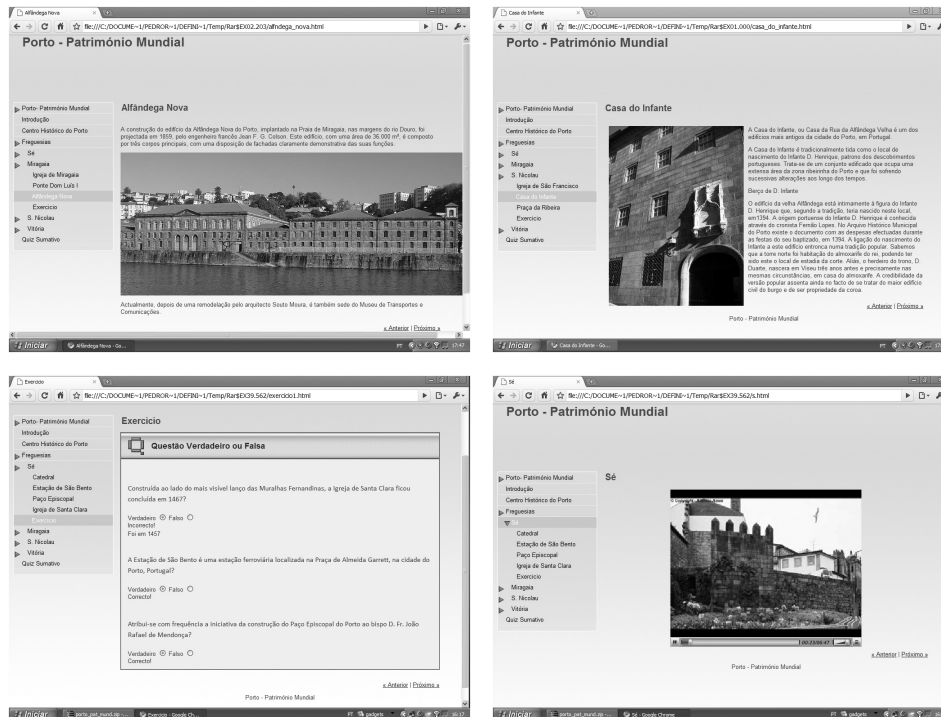
The Web is a revolutionary educational tool because it presents teachers and learners with a technology that simultaneously provides something to talk about (content) and the means to hold the conversation (interaction). Unfortunately, the power of this hypertext medium is constrained in educational settings because the vast majority of teachers and academics do not have the technical skills to build their own web pages, and must therefore rely on the availability of web developers to generate professional looking online content. According to its promoters, eXe has been developed to overcome a number of identified limitations:

- Much web-authoring software entails a fairly steep learning curve, and is not intuitive or designed for publishing

learning content. Consequently, teachers and academics have not adopted these technologies for publishing online learning content. eXe aims to provide an intuitive, easy-to-use tool that will enable teachers to publish professional looking web pages for learning;

- Currently, learning management systems do not offer sophisticated authoring tools for web content (when compared to the capabilities of web-authoring software or the skills of an experienced web developer). eXe is a tool that provides professional web-publishing capabilities that can be easily referenced or imported by learning management systems;
- Most content management and learning management systems utilise a centralised web server model thus requiring connectivity for authoring. This is limiting for authors with low bandwidth connectivity or no connectivity at all. eXe has been developed as an offline authoring tool without the requirement for connectivity;
- Many content management and learning management systems do not provide an intuitive **WYSIWYG** ("What You See Is What You Get") environment where authors can see what their content will look like in a browser when published, especially when working offline. eXe's WYSIWYG functionality enables users to see what the content will look like when published online.

Figure 1 – Screenshots of e-content of Portuguese for Foreigners developed with eXe-learning



Another interesting freeware authoring tool that we have been using is Xerte. Xerte is a suite of tools for the rapid development of interactive learning content. In developing Xerte, the team sought to make it very easy to perform simple, common tasks, yet possible to do many things that e-content developers need since Xerte seeks to provide a focus on the types of problems and situations that developers of interactive learning content frequently encounter.

Xerte provides a visual, icon-based authoring environment that allows learning objects to be easily created with the minimum of

scripting. Functionality that would be time-consuming to develop from scratch in other tools can be created very quickly in Xerte.

It is possible to use Xerte to integrate text, graphics, animations, sound and video, create simple interactivity, and deliver it in an accessible interface, everything without writing code. For those who write some code, it is possible to create more complex structures and sophisticated interactivity.

It is also possible to customise the default interface and develop our own interfaces and navigation systems for the learning objects.

Figure 2 – Screenshots of e-content of Portuguese for Foreigners developed with Xerte

The figure displays four screenshots of e-content developed with Xerte, illustrating various interactive elements and content types:

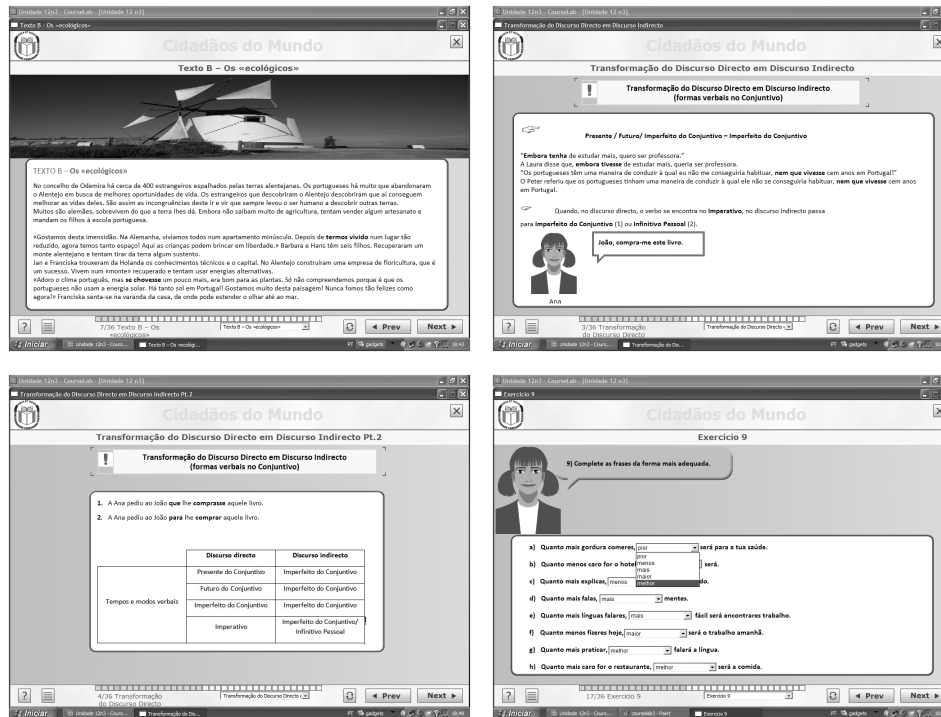
- Learning Object Title: TEXTO A - Mudar de emprego**: A text-based screen with a navigation bar at the top and a 'continue' button at the bottom. The content includes motivational text about career changes and an image of a group of people.
- Learning Object Title: 9. Indique que país é cada**: A screen featuring a bar chart comparing data for Portugal and Espanha across two years (2005 and 2007). The chart shows values for Portugal (approx. 12.5 in 2005, 10.5 in 2007) and Espanha (approx. 13.5 in 2005, 10.5 in 2007).
- Learning Object Title: 15. Faça a ligação das frases**: A matching exercise screen with a grid of phrases and their corresponding completions. The phrases include 'Se eu pudesse', 'Se as crianças quisessem escrever', 'Se o senhor João quisesse', 'Se a Marta trouxer a agenda', 'Se o Luís vier este sábado', 'Se os avós tiveram tempo', and 'Se estiveres triste'. The completions include 'comprava uma nova televisão', 'mandavam um postal ao avô', 'poderia reformar-se este ano', 'podemos marcar a data', 'vamos ouvir tudo ao Castelo', 'tomam conta dos netos', and 'vai ver um bom filme. Diverte-te!'. A 'Check Answers' button and 'Correcto' message are visible.
- Learning Object Title: 21. Exercício**: A screen with a text-based exercise. It includes a scenario about a director and a translator, followed by a list of requirements for each role. The requirements for the director include: 'Ter espírito de liderança', 'Querer trabalhar numa multinacional', 'Lidar bem com o stress', 'Ter disponibilidade para viajar no estrangeiro', 'Ser capaz de trabalhar em equipa', and 'Dominar as tecnologias de informação'. The requirements for the translator include: 'Gostar de trabalhar em casa', 'Saber gerir o seu tempo', 'Ser responsável pelo seu trabalho', 'Não se importar de trabalhar sozinho', 'Poder enviar o trabalho pela internet', and 'Dominar as línguas portuguesa e inglesa'. A 'dominar capaz' and 'informação trabalhar' are listed as skills/requirements.

Those who write lots of code will be able to develop powerful components and even extend the Xerte authoring interface with their own tools.

Finally, we shall mention the key features of CourseLab, another freeware authoring tool:

- WYSIWYG environment for creating and managing high-quality interactive e-learning content – no HTML or other programming skills required;
- Unicode support – use any font and encoding supported by the Windows® operating system, including double-byte character sets;
- Object-oriented Model allows construction of e-learning content of almost any complexity just as easily as you put together the building blocks;
- Objects are highly customizable;
- Dynamic HTML based output can be played by most browsers – no Java® or other special player software required for playing created e-learning content;
- Embedded Screen Capturing mechanism (without using Adobe Flash® technology);
- Built-in assessment and test creation capabilities;

Figure 3 – Screenshot of e-content of Portuguese for Foreigners developed with CourseLab



- Import PowerPoint® presentations into the learning material.

In the process of creating LO with these tools, some limitations of the software were identified.

For example, in CourseLab, there are two groups of interactive tools: one is called *Questions* and the type of facilities included are *Single Choice*, *Multiple Select*, *Ordering*, *Numeric*, *Text*, and *Matching Pairs*, and these allow the introduction of feedback to the student. Another group is called *Form*, which includes interactive facilities such as *Text*

Input, *Hidden Input*, *Text Area*, *Checkbox*, *Radio Buttons*, and *Dropdown Menu*, but with these tools it is not possible to provide feedback. So, one limitation of the software, in this particular set of tools, is that the user will not know if his/her answers are correct.

Another limitation, which is to be found both in CourseLab and Xerte, is that text introduced by the user is not saved. Besides, it is not always possible to provide feedback, such as a model answer.

Other difficulties were encountered, for example, when we tried to save a project to

CD, using CourseLab, the entire project was disfigured and, generally, the three authoring tools are not entirely WYSIWYG. The promoters of this software assure that authors can see what their content will look like in a browser when published, but our experience shows that these WYSIWYG facilities do not enable users to see what the content will look exactly like when published online.

In spite of these limitations and difficulties, overall, one must not ignore the advantages of these tools: they are free access tools, easy to use, both by teachers and students, they encourage the creativity of authors and, more importantly, the development and creation of LO with some level of interactivity.

7. Conclusion

We may conclude that the evolution of e-learning requires new tools for the creation of digital educational content that will capture the attention of those who get distance training. It is no longer enough just to put the information on a particular subject on a platform and to ask learners to consult it. The material needs to be exposed, but, at the same time, it must allow interactivity between teacher and student, and even among students.

Hence, authoring tools, such as those that were mentioned throughout this paper, are increasingly used tools which are developed to enable a greater flow of knowledge and expertise in order to enrich DE.

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