DEVELOPING INTERACTIVE ELEARNING COURSES BASED ON HTML5 FOR STUDENTS IN TEXTILE ENGINEERING

Adrian Buhu, Liliana Buhu

Faculty of Textile, Leather and Industrial Management, Gheorghe Asachi Technical University of Iasi (ROMANIA)

Abstract

Many organizations and institutions are using e-learning because it can be as effective as traditional training at a lower cost. Developing e-learning is more expensive than preparing classroom materials and training the trainers, especially if multimedia or highly interactive methods are used. However, delivery costs for e-learning (including costs of web servers and technical support) are considerably lower than those for classroom facilities, instructor time, participants’ travel and job time lost to attend classroom sessions. The most common approach for self-paced eLearning is Web based training consisting of a set of interactive e-lessons. An e-lesson is a linear sequence of screens which can include text, graphics, animations, audio, video and interactivity in the form of questions and feedback. E-lessons can also include recommended reading and links to online resources, as well as additional information on specific topics. High quality content, polished design and easy navigability are important ingredients of successful eLearning course. One of the most essential elements of an eLearning course design and development is often overlooked; and that is no other than interactivity. Modern learning management systems offer the opportunity to develop different types of courses. These contents have a low degree of interactivity, which is limited to links to different external resources (documents, media, websites, etc.). Because eLearning systems continue to evolve, the educational system becomes dependent upon HTML5. The new language HTML5 is for presenting and structuring the content for the World Wide Web and an Internet core technology. This is the fifth revision of the HTML standard and its objectives were to improve the language with support for the latest multimedia appearances while keeping it easily readable by humans and understood by computers. Due to the fact that the curriculums are becoming more interactive than ever, nearly all students and teachers rely on their devices to when they want to access or present the studying materials. The developers from the eLearning systems constantly create and design concepts that change the way people learn and teach. HTML5 is one of the tools used by eLearning professionals, mainly because of its versatility and flexibility (e.g. H5P platform, Essay Writer, Smart Builder, etc.). H5P was originally developed by the Norwegian company Joubel (in Tromse) for the National Digital Learning Arena, a Norwegian publicly funded learning portal. Its development was motivated by the need to move away from Flash based content. It is an “MIT licensed community development project”. In this paper it will presented an application of facilities offered by H5P for developing interactive contents used in textile engineering education. H5P provides 26 types of self-contained HTML5 interactive content. All very slicks, stylish and compatible with the full range of web browsers and devices – with touch interfaces enabled for phones and tablets. There are 26 types of content that can be embedded into web pages, and which are useful for learning. Two of the content types are more complex, allowing some of the other kinds of content to be embedded into “interactive videos” and “course presentations”. These eLearning objects made in H5P can be uploaded into a Moodle cloud site and used for on-line education.

Keywords: eLearning, HTML5, H5P, course presentation.

1 INTRODUCTION

Development of information technology has led institutions that provide training to their staff and schools to use increasingly more eLearning systems. Traditional learning systems, in the first instance, have lower costs (teacher training and teaching materials). Facilities offered for learning the classical system become more expensive over time as costs increase with the facilities offered in the classroom, movement teacher, learner, lost time to attend to, etc. If eLearning systems, the initial costs are higher (interactive training material, uses multimedia methods), but while they decrease
types: text, images, audio, video, and interactive quizzes. Also, these lessons should include links to recommended reading (online resources) and more information on the subjects [6]. The course should not take place linearly, as it has to give students the opportunity to spend less time on familiar themes and more time to study new information. This system will increase student motivation to learn.

Learning is a process that, in living organisms, leads to permanent changes in the capacity to adapt to the environment, not resulting from maturity or aging [2]. The concept of learning includes learning nature and conditions that influence or are influenced by it. The learning process is also influenced by the interaction between the student and his social, material and cultural environment. It is also influenced by the student's psychological state that will influence the process of acquiring and processing information.

The learning process according to [3] has three dimensions: the content of learning, incentive, and the interaction between them. Learning content includes knowledge and skills acquired during learning, complemented by opinions, sense of attitude, understanding, values, and modes of behaviour, methods or strategies. These elements involved in learning, develop the understanding of the student, which helps to meet the challenges of practical life.

The incentive provides mental energy necessary learning process, consisting of: feelings, motivation and will. Will has to ensure the mentality of the learner and personal sensitivity.

The interaction between learning content and incentive can be exemplified by the fact that the student, by the desire to learn, his interest, necessity or constrained, learning content can influence change. The interaction between the two elements can provide the necessary stimulus for learning: transmission experience, imitation, perception, participation, etc. [2]. These elements serve to integrate the learner into society.

Student behaviours of the content presented is influenced by two factors: internal (health at a time, etc.) and external (learning environment, the existence of deadlines, etc.). The content of the learning material to be presented in the form of a game that is interactive so as to enable the student's interaction with it.

Any progress made on an eLearning system must meet several requirements: content quality, easy navigability, good appearance of the page. Among these requirements, interactivity is most often neglected. Even if the content is very good, this can be unattractive to students if they are not motivated to learn if during study modules are not properly rewarded for retaining information received [4]. The conditions to be fulfilled are:

1. The content of the course must also be relevant to the topic. In addition to high-quality content, it must be significant for the subject and learners. In this way, learners are motivated to attend the course. General information should be kept at a low level so as not to diminish the quality of the course, and the information provided should be important for the student, not the teacher.

2. The course must be interactive. Students must have the opportunity to explore the course content and interact with it. For this purpose, enter links that will drive relevant content for the subject. These contents will contain visual elements that are designed to make content more attractive and to encourage exploration and other interesting pages [4].

The interactivity and attractiveness of the course can be achieved using real-world scenarios. This means that the lessons will include examples and problems from reality that will attract students to eLearning system and enables them to see how their knowledge can be applied outside the learning environment. The scenarios should include images, video and audio files. The scenario may be designed by the teacher so that students can use what they have learned by solving technical problems or otherwise and their experience can be used later.

3. The evaluation should be integrated at the end of each lesson. Teacher and course creators can evaluate course effectiveness by including tests at the end of each module. At the same time students are able to measure progress and summarize the content taught him. Evaluations should include real-life issues that can be resolved with the help of acquired knowledge. In the case of eLearning assessment can be done in several ways: multiple choice tests, essays, seminars, etc. The ultimate goal is to avoid boredom and to strengthen the accumulated knowledge [4].

4. Working Groups. Course modules must be designed in such a way that activities enable collaboration between learners (joint projects, workshops, etc.). Some problems can be solved by using the group discussions on online forums, chatting on-line groups, and integrating social media
sites into eLearning platforms. In this way, it encourages interaction between students even if they cannot meet face to face.

5. Interface rate must be attractive, even in aesthetically. The eLearning course which includes a large number of interactive elements (multimedia elements) is more attractive to learners than a course based on text modules only. It recommends the use of visually pleasing fonts to facilitate reading lessons its size must be adapted to the type of device that accesses the student content. A subject less attractive can become interesting if the text is attached videos or links to online resources. A resource (image, video, etc.) that can cause a strong emotional reaction contributes to retaining and enhancing knowledge referred. Attractive content capture students' attention and persuade them easier to follow the curriculum, so they can make the most of the educational experience.

An eLearning course should be attractive to students. For this reason, it must meet certain conditions: the content of the course must be relevant to the subject, the course must be interactive, the knowledge assessment must be done after each course module and the interface must be attractive for the students. These conditions must be balanced so that the contents cannot distract the student from his goal. For example, pages containing rich multimedia and visual learners can distract from learning purposes. These multimedia elements should highlight the principles, the main ideas and allow retaining the important aspects of the eLearning course [1], [4].

2 CONTENT DEVELOPMENT USING HTML5

H5P was originally developed by the Norwegian company Joubel (in Tromsø) for the National Digital Learning Arena, a Norwegian publicly funded learning portal. Its development was motivated by the need to move away from Flash based content. It is an “MIT licensed community development project”.

H5P provides 26 types of self-contained HTML5 interactive content. All very slicks, stylish and compatible with the full range of web browsers and devices – with touch interfaces enabled for phones and tablets. There are 26 types of content that can be embedded into web pages, and which are useful for learning – but have wider applications as well (a nicely designed multiple choice quiz, an interactive timeline, flashcards). Two of the content types are more complex, allowing some of the other kinds of content to be embedded into “interactive videos” and “course presentations”. Along with “timeline”, these more complex content types can also include videos, images and (in the case of timeline) embedded PDFs and audio. In this way they can act as wrappers for “open educational resources” drawn from other sources (e.g. videos from YouTube). It can therefore create many different activities that draw upon the same set of generic resources. For example, a course presentation that takes a set of generic videos in a way that makes them meaningful for a specific course. Or we could provide the same video to a group of students and get each one of them to turn it into an interactive video, presenting their own interpretation. Each content type is accompanied by a simple wizard and WYSIWYGs drag-and-drop system for creating content.

Activities may be created, hosted and used in the H5P.org web site. Or it can install a plugin for Drupal and WordPress web sites that adds the same set of creation and hosting tools to those systems. A Moodle plugin is available (launched July 15th 2016) and should be in widespread use soon. That will accelerate adoption of H5P significantly, [5].

2.1 Course presentation

An example of course presentation editing is presented in figure 1. It is a course presentation with questions, media files which are embedded into the page. As with many of the H5P content types, it looks especially good when displayed at full screen (there is a button at the bottom right of its frame to go full screen). Creating a course presentation is similar to creating a presentation, the content being structured on pages that include: text, images, video files, and other elements such as dialog cards, drag and drop, fill in blanks, flashcards, interactive video, summary, image hot spots, etc.
H5P does not present major technical challenges to authors – nothing greater than they might experience in using PowerPoint for example. The creative-pedagogic challenge of applying it is more demanding, and does require more sophisticated capabilities. For the individual author it looks good. When an author creates a H5P activity for the first time, or revisit a content type creates sometime after having first learned to do it, content creation is sufficiently intuitive and recognizable. Perhaps the biggest hurdle is in knowing which content type to use and how to use it. For example, when creating course presentations teacher still struggle in deciding which of the types of multiple choice activity he should use for which purpose. Fortunately the authoring interface makes it easy to try one out and then change it, figure 2.

The content types themselves divide into two camps, with perhaps different likely areas of fit. The simpler content types probably have less of a clear fit in high education, and perhaps are more suited to schools. These elements can be used independently, but although one can imagine their integration into a well-designed web site as a coherent learning experience. The more complex composite types of content have great potential as OER (open education resources) wrappers, or for building immersive learning experiences – more coherent, flowing and hence immersive than we can easily achieve with conventional Moodle activities (for example).

However, for universities that encourage students to be creative, to be researchers, then perhaps the most exciting area of fit will be where students create H5P content. This might, for example, be a project in which they annotate a sequence from a movie from a philosophical perspective. Or they create a timeline as an assessed activity.
2.2 H5P content integration in Moodle

One of the great benefits with using H5P is that it gives you access to lots of different interactive content types. Another great benefit with H5P is that it allows you to easily share and reuse content. To reuse content, you just download the H5P you would like to edit and make your changes – e.g. translate to a new language or adjust it to a new situation. H5P is:

- Open Source
- Free to Use
- HTML5
- Responsive

The H5P community is actively contributing to improve H5P. Updates and new features are continuously made available on the community portal H5P.org.

H5P integration plugin in Moodle can be simple. The user must log in to Moodle installation as an administrator. Under Site administration, Plugins in the admin menu, then press Install plugins and then the button labelled Install plugins from the Moodle plugins directory. This option is not available if the user is not Moodle administrator. For teachers, the content developed on the site H5P course content can be integrated into the platform using a simple method, figure 3.

In the account on the site H5P.org select content to be integrated in Moodle by selecting View. Under the content appear two options: Download and Embed. Select Embed and a window will appear with an embed link, Figure 3.

In Moodle platform user must select: Activate Editing Mode. In the module that is inserted HTML5 content, it creates a new page by selecting: Add activity or resource. Next step is to select a resource: Page.

There will be introducing mandatory data: Name of page, its Description and completed the content of this page. From menu bar of text editor it must select: < >, which represent: Edit HTML source. It will open: Editor HTML source and insert the link. Press the Update and returns to the course.

In module content will appear the new HTML5 content.

3 CONCLUSIONS

In this paper is presented the possibility to use the facilities of H5P.org to develop HTML5 content and the modality of integration in LMS.

The H5P platform is designed to allow other people to develop new content types, either from scratch or as customizations of existing types. The specification for .h5p packages is available online, with
definitions in the form of .json text files. There's plenty of support info on the H5P web site, plus a lively forum.

People with intermediate level tech skills can develop their own content. New users can sign up for an account on H5P.org within a minute, create content, share it and use it. It is very spreadable. The embed content has download options that will further accelerate the network effect.

Long term hosting of content is a problem. The H5P.org web site will can’t host content that may be needed again in the future. Institutions should develop their own hosting arrangements, its can developed own Learning Management Systems like Drupal, WordPress and Moodle. Moodle will be a better option for institutions, but then limits the openness of content. A better approach would be to host and serve H5P from an OER repository.

REFERENCES


