

FONOFF: COMPUTER TOOL FOR THE MANAGEMENT OF “ON LINE” AND “ON LINE-OFF” LEARNING

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Keywords: Knowledge management, "On line", "On line- off line", Interactive 3D scenarios, FONOFF.

Abstract: On-line courses have proliferated exponentially, with growing number of enterprises using those techniques for staff training. However, the e-learning presents a number of limitations that avoid its use from widespreading at all. The solution adopted at this respect is the creation of a computer platform of “on line-off line” non-face learning. This is how FONOFF (“Formación On line-Off line”/ “On line Off line Learning”) arises, which provides the advantages of classic “on line” method, but supplying some of its shortcomings.

1 INTRODUCTION

Non-face learning is emerging as one of the most attractive options among the different available training methods. Within the non-face training, “on line” courses are the choice preferred by many enterprises to train their employees.

However, “on line” courses have a number of limitations, some of which are the result of the very conception of the method of teaching and learning, without a physical teacher who imparts a master class about the subject matter. But there are also other pernicious effects linked to the difficulties in making this kind of learning attractive to pupils, which are often reticent to get a better training.

Considering the professional area to which non-face training is directed, it’s been observed that in construction industry in particular, when it’s aimed to impart some course to site-managers, they require an Internet connection to access during working hours. This situation, which a priori can seem trivial, supposes one of the biggest boundaries against which “on line” courses collide, since the availability of computers at works is usually scarce, connection speed is often quite limited, etc.

Those are the main reasons to develop a computer tool that is able to manage both “on line” and “off line” non-face training.

Therefore arises the computer platform FONOFF “Formación On Line-Off line” (On line-Of line training), which is the subject matter of this paper.

FONOFF is the result of two years of work of Grupo de Investigación de Tecnología de la Construcción (GITECO) from the University of Cantabria, in the draft of a Singular Strategic Project called "The Multidimensional City," funded by the Ministry of Education and Science with a budget of about 35 M €. As the subject matter of this project is underground constructions, the practical operation of FONOFF has been developed within a course of tunnel design and construction, and underground works. However, as expected, the computer platform itself is completely versatile and autonomous, allowing the edition, evaluation and control of courses related to any kind of subject.

The “on line/off line” concept alludes to the possibility of use in both “on line” and “off line” modes. This duality the training platform a great versatility, profiting from the advantages of updating and control that “on line” mode provides, and also from the ease to access the content associated to “off line” mode.

The matter is to satisfy, as far as possible, all the requirements of potential users such platforms, allowing at any time the access to educational content.

FONOFF is composed of a number of basic modules, related below:

- Educational Content Module.
- Administration Panel Module.
- Tools and Utilities Module.

- Evaluation and Control Module.
- Audiovisual Gallery Module.
- Interactive 3D Scenery Module.

The “on line/off line” platform allows users working without Internet connection to access to the educational content, the repository of videos and images and all the interactive 3D sceneries (“Off line” mode). This circumstance is a great advantage in order to meet the requirements of a bigger number of users.

When the user works with Internet connection, he’ll count with some extra educational contents, such as the update of content, the debate forum, tutorship, or the possibility of taking exams. These are the main aspects of the “On line” Mode.

2 MANUSCRIPT PREPARATION

The educational content forms the core around which the non-face training course is forged. FONOFF software includes an automatic content edition system. This allows the application user to edit educational content related to any kind of subject in a fast and effective way.

It can be considered that FONOFF has a content manager-editor implemented within its internal structure. As it’s been said, it offers the user the possibility to edit contents, but it also allows him/her to manage several courses simultaneously, whose matters can be completely different.

3 ADMINISTRATION PANEL MODULE

The use of a tool for keeping control over all the events in the course is absolutely essential for a complete function of the online/offline platform. That is the main reason for the development of an Administration Panel that allows modifying any field of the course, and also to keep maintenance or generate reports.

The Administration Panel is designed with Adobe Flash CS3 under the programming language Action Script. While a friendly and modern design is obtained with Flash, ActionScript allows implementing the algorithms required for the data management.

The panel makes use in its operation of a MySQL database, to which it connects so as to get the necessary information. Once that information has

been collected, it must be kept in semi-structured XML files, in order to visualize it in the program.

Due to the complexity of managing the vast amount of data that the system must be dealt with, the connection between Flash, ActionScript, SQL and XML, among others, is indispensable. The design and maintenance of the database associated to the system are also very important, since if it broke down, the whole programme would collapse. Several security tools, such as logs and redundant data copies have been implemented, in order to prevent losses in case of software failure, and also to allow the recovery of all the information.

The main window possesses a number of buttons that give access to the different categories in which the programme is divided. Each one of them gives access to a different area of the Administration Panel (Questions, Users Administration, Statistics, Platform reports, Updating management, etc).

Finally, it will be possible to know in real time which users are connected, and send a warning message to the Administration Panel whenever a student gets into FONOFF software, being the administrator able to send messages to those users.

4 TOOLS AND UTILITIES MODULE

This module includes all the possibilities offered to users (students) in terms of customization of the platform and accesses to the rest of functionalities of the environment. The image below shows the interface of the Utilities Menu:



Figure 1: FONOFF Software utilities.

This Module counts with the tools referred below: User’s Files, Management, Calculator, Schedule, Internal Mail, Messages for the

Administrator, Desktop Manager, Chat, Forum, Tutorial, User's Statistics.

5 EVALUATION AND CONTROL MODULE

The realization of the exam is limited by several restrictions which were set in order to confer it more security. Following this idea, it will be possible to take online exams only, guarantying that students will count with the latest collection of questions to answer in their test, and that there will be no chance to manipulate scores.

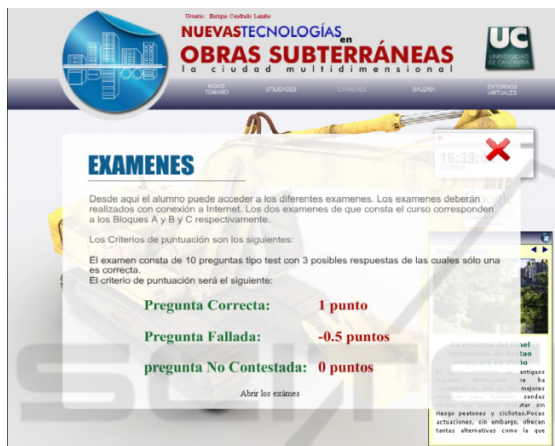


Figure 2: Access to Exams Section.

The functionality of the system is programmed so that the exams will be marked in real time, showing the user all the right answers in order to let him/her compare them with his/her ones, and converting the tests themselves in another training tool for the students.

Considering the technical side of the subject, it's necessary to collect from the database all the questions related to the exam which is about to be taken. This is possible thanks to the integration of several languages, such as ActionScript (used for algorithms), SQL (connection to the database) and XML (certain configurations of the answers).

To summarize all these aspects, the program downloads the questions from the central server and, using a number of stochastic algorithms, chooses a collection of 10 questions which are shown to the user to answer. Once the student has finished the exam, it's marked automatically thanks to a series of algorithms written under ActionScript and complemented with XML. The score is sent to the database, in order to allow the administrator to watch it.

An automatic report including the 10 questions and user's answers is generated and sent to the database, so that it's possible to keep a file of each exam taken by every student, in order to verify the effectiveness of each test and question. These files can be used later to prepare detailed reports to complement the course, both in printable format or in pdf.

6 AUDIOVISUAL GALLERY MODULE

FONOFF platform includes a repository for video and images related to the subject treated at any time. The beta version made has an audiovisual gallery whose theme is "underground works".

The access to the gallery is verified from the main program, through the top interactive menu. Once the user has entered, it's possible to access to a screen that explains the gallery, and download the newest updates with a system of refresh and comparison with the latest version hosted on the server that manages the gallery.

The gallery is designed with Flash CS· under the language Action Script, where all the visual aspects of the gallery, the transitions between images and the right visualization on screen are programmed. The gallery content is uploaded dynamically, allowing automatic changes or updates. This is possible thanks to XML files (code version 1.0 and codification UTF-8), which are read by ActionScript and charged. Therefore, and using Windows API, it's possible to modify those XML files in order to allow the system administrator to change content automatically, being the student able to see those updates after a few seconds.

When the user rolls the mouse over a certain image, an explanatory text will appear, as a complement to the training offered by purely theoretical contents.

7 INTERACTIVE 3D SCENERY MODULE

3D sceneries are a training tool that complements the course about underground works. The user can not only study the content in web format in a traditional way by surfing through the different screens that compose the syllabus, but also interacting with 3D sceneries.

Through their training trip, students can interact at any time with several existing objects (bolts, shotcrete, cross-section type for blasting, coating, ventilation pipe, etc.), receiving instantly a short theoretical explanation about the element, its reason for being, etc., and providing them the possibility to expand the theoretical content by accessing the section of the syllabus related to that topic. These objects are called “Intelligent Objects”, and they involve true training tools.

Following this idea, users can learn what they are really interested in by “travelling” inside an underground work, just like in a first person videogame, and meeting their requirements. The essence is in fact “watch to learn”, but keeping a proper theoretic-conceptual basis.

The image below shows one of the 3Di sceneries included in the version of FONOFF dedicated to Underground Works.



Figure 3: Interactive 3D Scenery.

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