

Computer based training application for NPP Cernavoda

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Abstract

This paper aims to present the modernization needs of the Cernavoda NPP Training Department and a suitable solution for them: the implementation of an original Computer Based Training (CBT) System.

Our solution is called CBTCenter and is a complete software platform which offers a variety of teaching and learning services to its users. CBT or e-Learning mean two things: a software platform and content authoring. Ideally a software platform should be able to import any type of flat documentation and integrate it into a structured database which keeps track of pedagogically meaningful information (test and quiz results, etc.).

The implementation of the CBT technology at the NPP Cernavoda Training Department has brought several advantages: the technology improves overall communication between all individuals which are part of the educational process; students can access training materials from their own desk using the NPP intranet; the logistics problem will decrease, while more and more classic disciplines (courses) will be converted to CBT objects.

1. Introduction

The European vision on the Education and Training fields is based on the Lisbon strategy.

According to this strategy, Europe should become "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion" by 2010.

To achieve this ambitious goal, is necessary not only a radical transformation of the European economy, but also a challenging programme for the modernisation of education systems.

In 2002 was endorsed "**Education & Training 2010**" programme which is the integrated programme supporting the implementation of the Lisbon strategy in the fields of education and training.

The following concrete strategic objectives for the coming ten years have been adopted:

- **Increasing the quality and effectiveness of education and training systems in the European Union;**
- **Facilitating the access of everyone to the education and training systems**
- **Opening education and training systems towards the entire world**

To achieve these ambitious but realistic goals, EU agreed on thirteen specific objectives covering the various types and levels of education and training (formal, non-formal and informal) aimed at **making a reality of lifelong learning**. E&T systems have to improve on all fronts: teacher training; basic skills; **integration of Information and Communication Technologies**; efficiency of investments; language learning; lifelong guidance; flexibility of the systems to make learning accessible to all, mobility, citizenship education, etc.

The effective integration of Information and Communication Technologies (ICT) in education and training systems in Europe occurs under the **eLearning Programme** for 2004 – 2006. The eLearning programme is a further step towards realising the vision of technology serving **lifelong learning**.

The Romanian vision on the Education and Training fields starts, as well, from the Lisbon strategy but includes some specific aspects as well.

This paper is focused on ICT integration in Romanian education and training systems, especially on nuclear field. We believe that the best way to improve education and training systems, in Romanian conditions, is creating private-public partnership through Technology Platforms. That's why, in order to be compatible with EU E&T structures, the **Romanian National Consortium for Training and Education on Nuclear Sciences Platform (CNR-TENSP)** has been created in October 2005. This CONSORTIUM will bring together all aspects of Romanian education and training in nuclear engineering, nuclear

safety, radiological protection and other nuclear disciplines. Its main objectives are to harmonize professional training and accreditation schemes in this sector.

The Cernavoda NPP Training Department modernization project is the first achievement of the CNR-TENSP policy and shows the company's interest on how CBT/elearning contributes to corporate competitiveness.

2. NPP Cernavoda Training Department

2.1 Mission

The NPP Cernavoda Training Department's mission is to train the NPP (Nuclear Power Plant) personnel to continuously improve their individual performance and to eliminate human errors that could adversely affect nuclear and public safety. In doing so, NPP Cernavoda Training Department supports the safe, efficient and cost effective power generation. The NPP Cernavoda Training Department is in charge of training the Unit 1 and Unit 2 employees.

2.2 Training activities

The NPP Cernavoda Training Department is responsible for different kind of training activities:

- General Employee Training (especially for new employees)
- Specific Training (for Authorizing, Operation, Maintenance, Engineering, Chemical Technician, Safety)
- Leadership Training (together with Human Resources Department)
- Radiation Protection training (together with Radiation Protection Technical Service Department)

2.3 Modernization needs

Since December 2nd, 1996, when Unit 1 of Cernavoda started its commercial production, training has been in a continuously need of growth. Considering the training needs for Unit 2, which is now in the commissioning stage, we cope with the lack of instructors and classrooms. On the other hand, logistics need to be linked every year to the increased training activities, and augmented training costs. The issue is that of improving the quality of training using the same space and personnel of Cernavoda NPP Training Department. The solution is to modernize the educational/training technology. But how?

3. Computer Based Training Application for NPP Cernavoda

3.1 CBT Application for NPP Cernavoda Training Department

Our solution is called CBTCenter and is a complete system which offers a variety of teaching and learning services to its users. The groups of users include teachers, instructors, students, employees or any other person who wishes to widen his/her area of knowledge. CBTCenter uses the Web (HTTP service) as its primary method of providing access to users which allows an institution to implement this CBT solution as an intranet or Internet service. These services include online reading, assessment, discussion, class management, user management, reporting and other activities which follow the receipt of success found in many notorious e-Learning and CBT systems. CBTCenter is reliable, scalable, and usable, and offers an enjoyable teaching/learning experience for its users.

3.2 CBTCenter software platform

CBTCenter is a collaborative online learning environment that can be used both as an e-Learning solution and as a face-to-face Computer Based Training (CBT) tool. It is mainly intended to be used by university teachers, training centre instructors, students and company employees for providing course materials, managing assignments, online conferencing, online tests and exams, project management and for improving communication during the educational process. The system assists the training process by providing a rich online environment where students and instructors are able to extend their interaction outside the classroom, in a complementary way. By centralizing the information flow of the educational process, both student and teacher can benefit from the intelligence of the people who use CBTCenter and the intelligence of the software.

The main goals during the implementation of the solution were:

- To create intelligent software that helps to reduce the amount of time spent by the instructors for preparing the course materials and conducting the class, while keeping the students' interest alive;
- To provide students and instructors various methods of communication outside the classroom and improve this important aspect of the educational process;

- To create an attractive and intuitive user interface for making both teaching and learning enjoyable experiences.

The main features of the system are the following:

- Online publishing of interactive course materials
- Online testing
- Tracking the progresses and performances of students
- Class management tools
- Extensive reporting tools

A role based security model is used for authorizing and there are three types of users: authors, instructors and students. All course materials can be published by authors in different categories and can be edited online using a powerful web-based editing tool. This online tool uses an embedded mark-up language – WEML (WebEdu Mark-up Language) – for integrating various types of resources into documents (mathematical formulas, graphics, and simulations). Resource indexes and glossaries can be dynamically created. Documents are hierarchically stored in the data base. Every documentation module can be exported as a WEDP (WebEdu Documentation Package) from one documentation section and can be imported into another in the same class or another class.

A online testing tool is available to be used for intermediary and final exams. Test items can be edited or imported from another class and tests are manually or dynamically generated just by specifying certain parameters like test items category, difficulty and answer type. The system offers an online grade book so that students will be able to follow the progress and results of their evaluation.

3.3 Course materials

CBT and e-Learning always mean two things: a software platform and content authoring. Ideally a software platform should be able to import any type of flat documentation and integrate it into a structured database which keeps track of pedagogically meaningful information like the student's progress in studying materials, test and quiz results etc. In the same time, the materials, the study and the tests have to be organized around certain objectives which play the role of guidelines during the entire educational activity. Some examples of such courses which has been successfully integrated into CBTCenter are shown in the table no. 1.

Nr. crt.	Course cod / CBT object	Course name / CBT object name
1	-	"CBT Center" User Guide
2	AB-001	The emplacement acquaintance
3	AB-006	NPP- CANDU type
4	BB-001	Labour safety
5	BB-006	Chemical safety
6	FB-003	Termodinamics

Table 1: Discipline's / (CBT objects) name

Some specific problems of using a CBT object are described bellow. For instance, the "Labor Safety" is one of the most important disciplines for the NPP Cernavoda training center because it is also one of the very first courses a trainee has to attend when entering NPP Cernavoda. The first step, which a trainee has to do after registering into platform is to make the acquaintance with the new training environment as natural and enjoyable as possible for the new trainee. The course is structured around 15 objectives and is followed by a 30 items evaluation test. The trainee is guided towards completing these objective and assimilating knowledge by means of text, multimedia interaction, narration and quizzes (figure 1). Each of the actions which the student performs during the online study sessions are tracked to allow the instructor to evaluate the student's level of comprehension. The navigation through the course complies with the current e-Learning and CBT standards by providing the overview of all the documents all the time thorough the dynamic menu on the left side of the screen. It is important for a trainee not to get lost in the course in order to keep his level of interest and self-esteem at high levels. The multimedia elements which were used in this course include figures, flash animations, Java applets and MP3 sound files. All these elements are synchronized for creating a useful and enjoyable interaction.

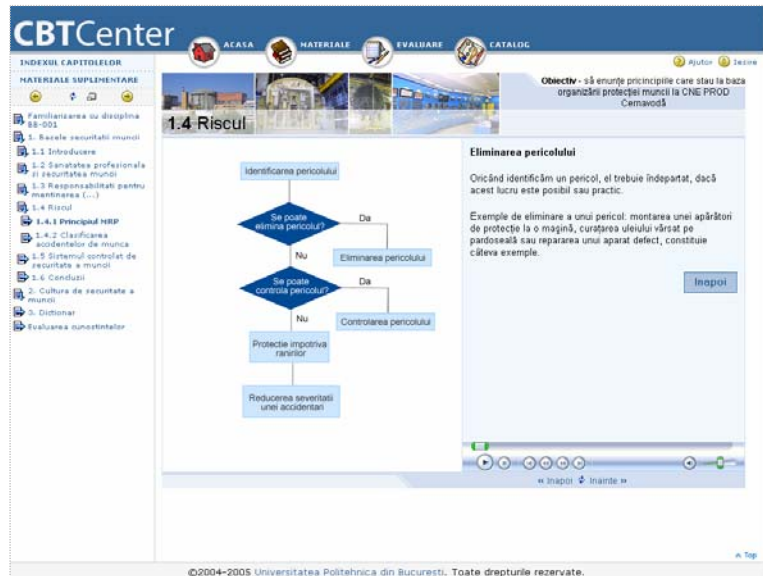


Fig.1: A typical study screen in CBTCenter

4. Conclusions

The CBT technology has brought several advantages to the NPP Cernavoda Training Department:

- There is no space problem any more; students can access training materials from their own desk using the NPP intranet;
- The logistics problem will decrease with the conversion of more and more courses to CBT objects;
- The system allows user interaction outside the classroom, in a complementary way;
- The instructors are relieved of routine teaching activities and can concentrate on creating courses with added value;
- The technology improves overall communication between all individuals which are part of the educational process;

On the other hand CBTCenter software platform, could be suitable for other EU project regarding education and training such as NEPTUNO platform (Nuclear European Platform for Training and University Organisations), EUTERP platform (**EU**ropean **pl**atform on **T**raining and **E**ducation in **R**adiological **P**rotection), etc.

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