E-LEARNING SYSTEMS – A WAY TO MAINTAIN COMPETENCE?

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The presentation will show the possibilities and limitations of e-learning systems to transfer and maintain knowledge. Examples of e-learning systems developed in running EC-projects will be given.

In March 2000 the Heads of State and Government at the Lisbon European Council set the European Union the strategic goal of becoming the most competitive and dynamic knowledge based economy in the world. Key elements of this strategy are the adaptation of education and training systems to lifelong learning; the promotion of employability and social inclusion through investment in knowledge and competences; the creation of an information society for all and fostering mobility. This strategy was confirmed by the Barcelona summit in March 2002, where it was stated that European education and training systems should become a world reference by 2010 and that closer cooperation should be promoted in the area of Vocational Education and Training (VET).

Lifelong learning is necessary to maintain skills and competence. The half-life period of knowledge is for:

– School: 20 years
– University: 10 years
– Job: 5 years
– Technology: 3 years
– IT: 1 year

But, what is learning? Learning is a process where information will be transferred into relevant and available knowledge and/or competence. The way how to transfer the information is the same for classical learning systems and for e-learning.

There are always the same questions:

– How can I reach the users?
– How can I transfer my message?
– How can I get attention?
– How can I arrange my information?

The traditional training systems have disadvantages. There are high costs for travelling and accommodation. The training courses are not always available. There is no individual consideration of the available knowledge. E-learning systems are trying to overcome these disadvantages. But what is e-learning. E-learning is nothing else than learning supported by a computer. All information are available in an electronic form. Text, pictures, simulations, audio and video are stored on a computer. The digitalisation of different types of

information makes it possible to store, to distribute and to combine the information in an easy way. The main advantage and quality of digitalised information is that there is the possibility to use it in databases, in virtual reality, in visualisation systems and for co-operative learning.

By the development of e-learning systems there is the hope to:

– reduce costs
– have availability anytime and anywhere
– have high degree of interactivity
– have high degree of individualisation

THE STRUCTURE OF E-LEARNING SYSTEMS

Each e-learning system consists of different parts. The knowledge base contains the learning objectives and the content. The presentation part contains the text part, the pictures, animations, videos and audios. The method part contains the didactical concept and the script. The evaluation part contains the questions and the evaluation of what has been learned.

There are different kinds of e-learning systems available. The kind of systems depends on the requirements of the knowledge which has to be learned. The easiest systems are drill systems. Different messages will be repeated very often, e.g. fire extinguishers are red and after a learning session there are mainly fill in exercises – The colour of fire extinguishers is. . . . In this kind of systems there is no chance for individual learning and no possibility to navigate in the system.

Presentation systems are designed similar to a power point presentation. In this kind of system all different kind of information like text, video, picture etc., are used. The information will be shown either by a timer or by an up and down menu.

A good example for a browsing system is the Microsoft lexicon. The user can search for different topics and can select information of similar topics by a link. The information are combined with videos, pictures etc. Furthermore a free training without any special search is possible. An evaluation of what has been learned is difficult and these systems are not based on a special didactical concept.

The approach we are using in two EC funded projects is a mixture of a browsing system and a tutorial system.

The projects are "SAFEHOTEL – Interactive safety training of hotel personnel" (D/03/B/F/PP-146 086 LEONARDO DA VINCI PROGRAMME) and "e-RESCUE – Interactive training program for work and rescue in fall endangered areas" (LU/03/B/C/PP-156000 LEONARDO DA VINCI PROGRAMME).

The SAFEHOTEL project aims that the hotel staff by using the products of the project

– knows the safety concept of a hotel comprising of structural precautions and organizational measures;
– can identify the structural safety facilities of the own hotel and explain the function of them;

–   learns the right behaviour in the daily business and in the case of a firel;
–   can take up the right measures in the case of fire to minimize the damage for people
   and goods.

The further explanations are based on this project as the results and the course can
also be used for the training of fire protection in industry, trade and administration.
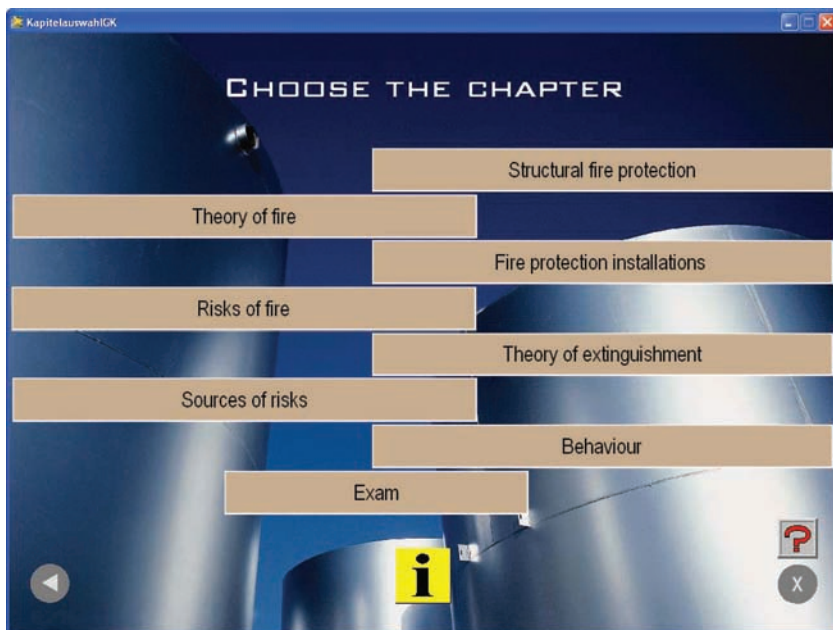

The course has been developed as a first step in English, German and Spanish. We
don't use a manual how to use the programme. The experience has shown that the appli-
cation must be self explaining. We always use the same navigation elements. Each
element has an explanation by mouse over. All chapters are relatively short so that it is poss-
ible to finish one chapter within about 15 minutes. The trainee has always the possibility to
go to another chapter if he likes. On the left upper corner he can see in which chapter he is
working. Furthermore all main chapters have the same background picture which depends
on the content of the chapter. During a lesson the trainee can always find a help function.

STRUCTURE OF LESSONS
Every lesson starts with a mind map. On the first page and on the last page the main mess-
ages of this lesson will be shown. Field test have shown that people will better remember
to the messages over a longer period if the programme is using this mind map.
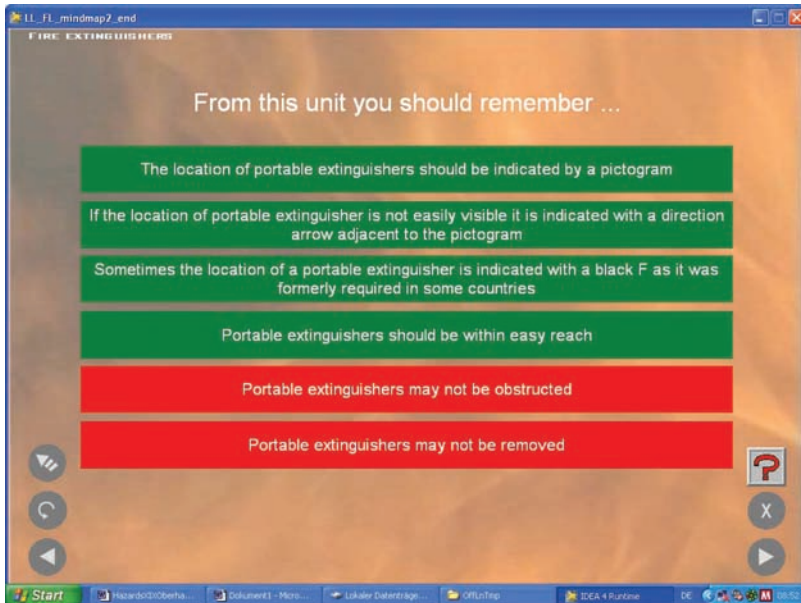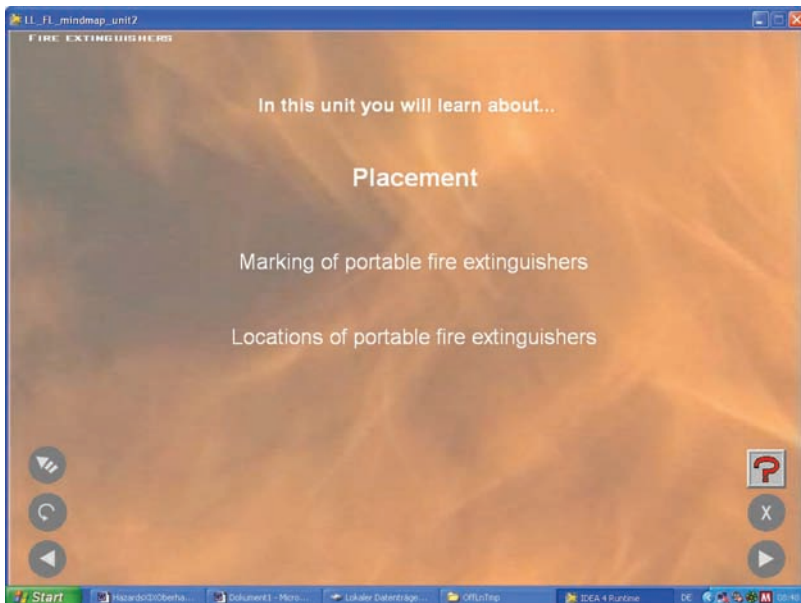
There are different possibilities to explain a message. It can be a written information, a picture, an animation, a video or an audio file. One person can better remember a written information and another person can better remember to a picture. We try to repeat the messages by offering all kind of possibilities.
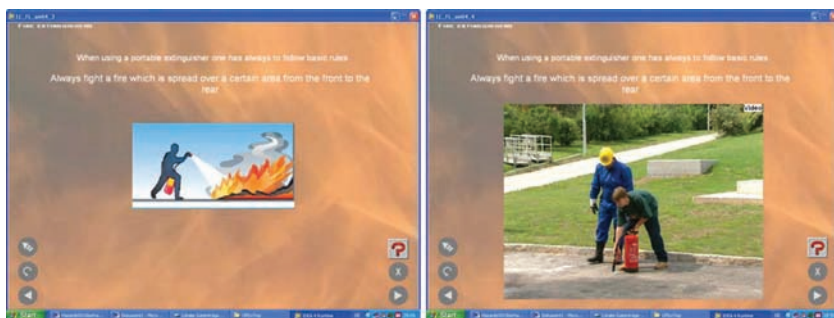
Our brain is subdivided into two different parts. One part is responsible for all visible information and the other part for all audible information. Both parts are able to work in parallel so that it is possible to offer a visible and an audible information in parallel. It is not possible to offer two visible information at the same time as the brain will only recognise one of them.

All visible information will be shown picture by picture using a timer function.

Do and don't information are supported by colours. It is usable that something which is allowed is shown on a green background like rescue ways in buildings and something which is forbidden is shown on a red background. We are also using green and red to underline the main messages.

EXERCISES

Exercises are an important part of an e-learning system for the self control of what has been learned.

There are different kinds of exercises possible:

– Multiple choice (Some answers are correct and some are false and the trainee has to select the correct ones.)
– Drag and drop (The trainee has to drag a correct answer on a picture.)
– Sensitive pictures. (The trainee has to move some outside a picture on the right place in the picture.)
– Fill in (The trainee has to fill in the correct word into a given sentence. The advantage of this exercise is that the trainee has to remember of what he has learned. He has to use his knowledge. The disadvantage of this exercise is that it can not be used in multi-language projects as the grammar and the size of a word is always different in the different languages.)
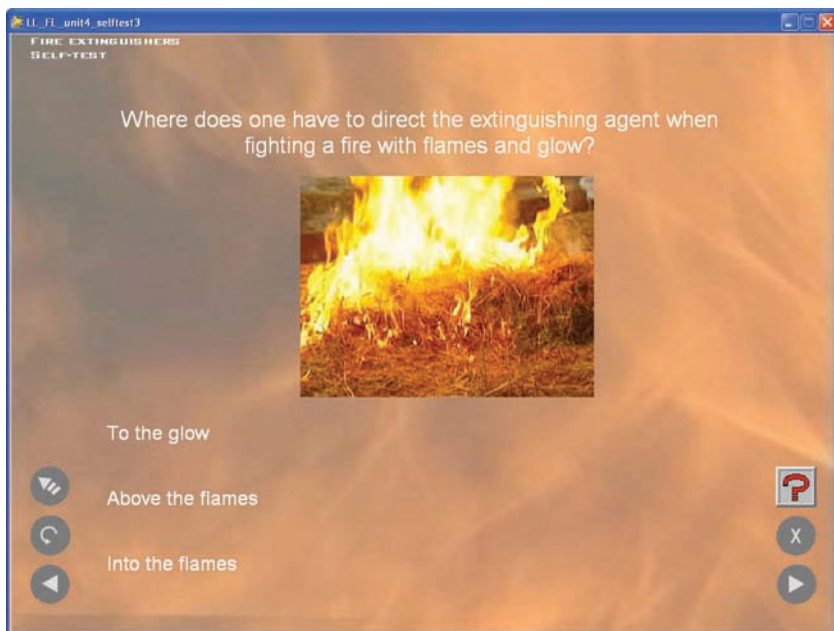
The trainee can repeat the exercise as much as he like. After finalising the course he can select the option final exercise where he has to fill in his name. In this exercise points will be given for each correct answer and at the end a final result can be printed out. The trainee has to sign that he has done the exercise without any external help.

POSSIBILITIES OF E-LEARNING COURSES

In general the course and the structure depend on the user structure. If the user has to learn the content the structure will be much more restrictive than in a course where the user likes to learn the content.

E-learning courses can be developed for all kind of safety applications (e.g. electro-static hazards) up to a defined level of content. Special knowledge is difficult to integrate in an e-learning course as it is one the one hand too expensive and on the other hand normally needs a support by a trainer.

If a trainings needs

– to be present for the training e.g. for a workshop
– a personal support

– a personal contact either to the trainer or to the other trainees
– special knowledge

than it is not applicable for an e-learning system.
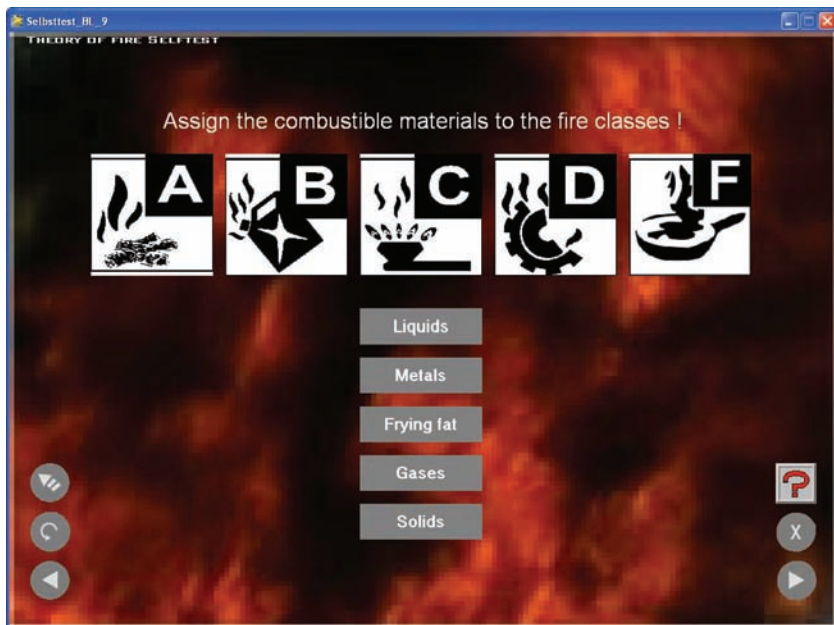
E-LEARNING IN THE 7TH FRAMEWORK PROGRAMME OF THE EUROPEAN COMMISSION

The new framework programme is subdivided into four specific programmes:

● Cooperation (9 Themes)
● Ideas
● People
● Capacities

One of the cooperation themes is called "Nanosciences, Nanotechnologies, Materials and new Production technologies". European Technology platforms in fields such as industrial safety help establish common research priorities and targets. The technology platform on industrial safety is subdivided in different focus groups. Focus group 4 is dealing with education and training.
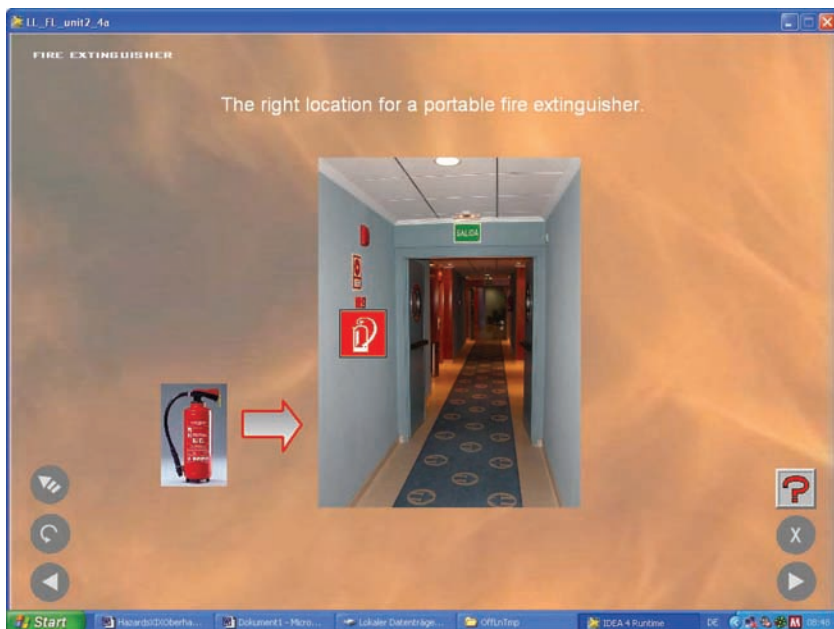
Industrial safety is related to the occupational health and safety (OHS) discipline, but it contains different concepts and points of view. Being the Technology Platform devoted to industrial safety, the specific focus of the group will be on education and training and benchmarking of both the workers and the people at the various moment of their life, from school to universities and during the work time.

Training and Education has Major role in:

● deployment phase for research results
● establishing competence needs
● maintaining competence
● identifying and managing risks (multi disciplinary)

The strategy for innovative research actions will always consider questions like:

● How people learn in the academic and industrial environment
● How learning is translated into action
● How knowledge is maintained (with and without continuous use)

At the moment the following topics have been identified as important for this focus group.
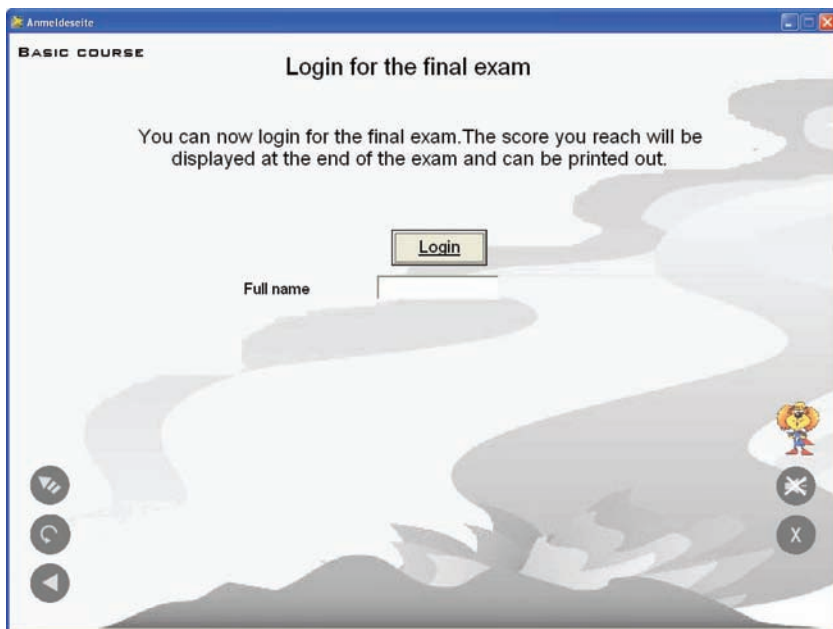
MAINTAIN COMPETENCE

A lot of knowledge is lost year by year as competence centres in larger companies will be closed or outsourced and research centres stop their activities (e.g. In Germany the number of research institutes or universities working with safety aspects has been reduced from the year 1970 to the year 2000 from about 30 to about 15). The problem is how to maintain the European competence on this topic as the knowledge on safety aspects is an important factor for the competitiveness of the industry.

OPEN PLATFORMS FOR EDUCATION AND TRAINING

Existing software for the development of e-learning courses is available on a commercial basis. This software has three limitations. It is very expensive. There is no upgraded version available which allows an easy modification and update of the content. There is now database application available which allows as network activity the translation of the content by national organisations and the automatic generation of the courses based on the material in the database. This software should also allow for benchmarking approaches such exchange of best practices within and between companies and industrial branches.

SIMULATION – USING VIRTUAL REALITY

During the last years different simulators have been developed. They are in use for training in e.g. aircraft, ship, nuclear and chemical industry. The main training aspect is the handling of a complex industrial application. The use of simulators for training of safety aspects is not very common. On the other hand there are different software codes available for the calculation of the consequences of accidents like fires and explosions and for the safe design of apparatus and plants.