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EDUCATION

Let's learn easily and quickly – lifelong

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The building of eLearning, the Internet has been built. The classrooms, in other words the local Intranet networks equipped with systems of learning organization are being built. The computers – the most modern desks – are ready to welcome students. Multimedia devices providing all the imaginable and unthinkable forms of demonstration, as blackboards and presentation software as boxes of chalk - are available for teachers.

Now in this well-equipped building the only questions to be answered are:

– Who should be eTaught?

– What to eTeach?

– Who should eTeach?

– How to eTeach?

This study tries to answer these questions, and reviews the authors' multimedia curriculum[1] entitled Research & Development in Military Technology.

Introduction

Live and learn – as the phrase goes. However, up to the middle of the last century, in general it was true for those whose gene contained too much curiosity or, they were military men who in peacetime had to participate in trainings and exercises regularly. Most people who went through the shops or took a diploma were able to live on for life.

In the second half of the 20th century development in science, technology and society was so rapid that the knowledge acquired at schools became obsolete many times in the active period of human life, therefore it was necessary to buckle down to learning again and again to keep up competitiveness in the labour market. By the end of the century the want of lifelong learning (LLL) had been formulated.

According to the study[2] made in 2004 by the National Institute of Vocational Education, the Committee of Informatics Branch, the Hungarian Association of Content Industry and the Hungarian Online Education Foundation:

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"*Lifelong learning*: providing general and continuous access to learning, acquiring and steady renewing knowledge and skills that is essential for sustained participation in knowledge-based society…"

The conventional scholastic system of education, of course cannot meet this requirement. For this reason – following a thousand-year-old tradition of armies – the big companies themselves organize systematic training of their employees, while for the smaller ones professional educational firms provide systematic retraining.

Beside demand, the 20th century also created efficient means of teaching and learning. In the last few decades, recording motion picture and voice revealed itself at the beginning of the centaury by means of computer, digital data recording and transmission – in other words info communication technology (ICT) – made technical opportunity of such efficient education that was inconceivable before.

For example, lectures of best professors can be presented on TV for the whole country, and they "conserved" by means of digital video recording can be repeated for anyone, anywhere and any time – this also contributed to the success of the so-called Omniscience University, a popular scientific series of the Hungarian TV.

This infocommunication technology – the possibility of eLearning or eTeaching – today "in small" is already available for educational institutions and organizations of almost every level, which enables the efficient lifelong learning to be organized.

The form of eLearning

The eLearning looks back on a very short history. The first Internet lessons started in 1997.[3] The conception itself is construed in several ways.

According to the competent committee of the European Union:[4]

> "*eLearning* means using new multimedia technologies and the Internet to improve the quality of learning by facilitating access to facilities and services as well as remote exchange and collaboration."

According to the Distance Learning Centre of the Technical University:[5]

> " *eLearning => electronic open education*
> *electronic open education*
> The form of open education (including distance teaching) supported by means of informatics in which organization of learning process and/or information exchange required to acquire store of learning (competence) is basically realized in an electronic manner. (This is the vital difference in comparison with the

> teaching and learning supported in almost traditional electronic way – by computer.) In the frame of electronic open education a learning person can also be supported in another way and by another means."

According to the abovementioned study[2] on lifelong learning:

> "*eLearning*:
> an interactive teaching-learning process supported by both technology and methodology in a virtual (electronic) environment where the contact between the teacher (mentor, tutor) and the student is realized through ICT."

While in Europe there is a debate on the definition of the conception, in 1997 in the United States the Pentagon having the support from the White House launched the Advanced Distributed Learning (ADL) Initiative,[6] a programme substantiating the widest definition and practice.

"Advanced Distributed Learning (ADL) is a collaborative effort to harness the power of information technologies to modernize structured learning. ADL, therefore, employs a structured, adaptive, collaborative effort between the public and private sectors to develop the standards, tools and learning content for the learning environment of the future."

"The vision of the ADL Initiative is to provide access to the highest-quality learning and performance aiding that can be tailored to individual needs and delivered cost-effectively, anytime and anywhere."

The SCORM[7] (Sharable Content Object Reference Model) established by the ADL initiative in 2001integrated into itself most of the tutorial-learning standards elaborated by various organizations – Aviation Industry Computer-Based Training Committee (AICC),[8] Alliance of Remote Instructional and Distribution Networks for Europe (ARIADNE),[9] IEEE (Institute of Electrical and Electronics Engineers) Learning Technology Standards Committee (LTSC), IMS (Integrated Management System) Global Learning Consortium[10] etc. (Figure 1), and by 2004 it became a standard adopted all over the world by the most prevailing frame systems like Learning Management System (LMS),[11] Learning Content Management (LCMS).[12]

The essence of the SCORM standard is an organization of training units – lesson, topic, field or chapter – built from Internet elements into Sharable Content Objects (SCO) (Figure 2). The course (subject) developed from objects "packaged" in this manner is "controlled" by a Learning Management System (LMS) on the basis of data contained in a special descriptive-adaptation-managing file (Figure 3).

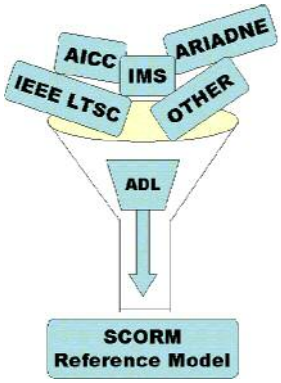

Figure 1. Sharable Content Object Reference Model (SCORM)

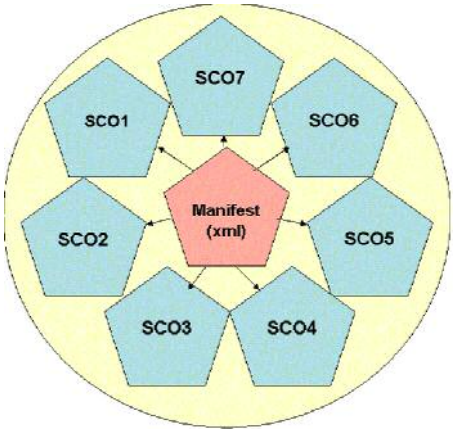

Figure 2. Sharable Content Objects (SCO)

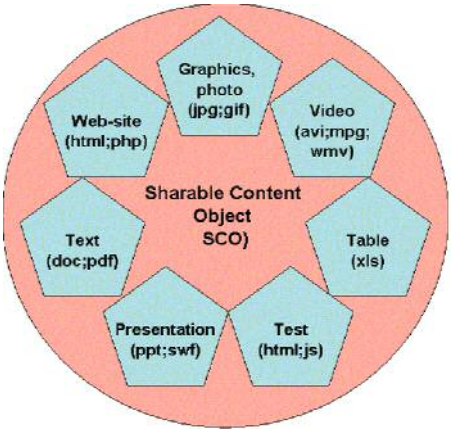

Figure 3. Learning Management System (LSM)

In the last few years in Hungary eLearning has taken on, but the status of its application reported by the abovementioned study[4] of the Distance Learning Centre of the Budapest University of Technology and Economics is as follows:

- "While the amount of subsidies won in domestic and international applications on the one hand and granted indirectly and directly from the budget on the other hand, has increased significantly (in the last decade it exceeded 5 billion HUF), the benefit from these supported forms has remained at a low level;
- Presumably there are only few countries in the world where there is as big negative prejudice against open education as in our country."

However, to make the picture full it must be said that the eLearning begins to gain ground in education of IT experts, in learning languages and in continuative education of experts of multinational companies. The frame systems supporting multimedia education and online distance teaching are used in the intranet systems of more and more Hungarian companies and educational institutions, but proper Hungarian educational content provided does not allow, in general, full utilization of their capabilities yet.

In the Hungarian Defence Forces eLearning is coupled up with distance teaching. In 2004 the Distance Teaching Directorate of the Miklós Zrínyi National Defence University (NDU) made a survey in the circles of staff members and students. Distance Learning Director at NDU Miklós Vörös in his study[13] titled *Are We Prepared for Distance Learning?* states:

> "In the Hungarian Defence Forces progressing towards professionalism it is a strategic objective to maintain and develop professional skills. Decreasing strength and less and less opportunities for replacement make it more difficult to organize the schooling of regular students. Thus the role of continuous self-education and the need for distance teaching as one of the forms of its realization increases."
>
> "…in the following years the distance learning will play a significant role in the training and retraining system of the Hungarian Defence Forces,…"

To achieve this aim, there has been established the frame system of military academic distance learning within the frame of the IT infrastructure of the NDU. This system, according to the abovementioned study:[13] "makes it possible for students living in different places of the country to enter into the ORACLE iLearning system, thereby it ensures synchronous and asynchronous learning/teaching, the possibility of online team-work, the information exchange."

The extension of eLearning

So, the building of eLearning, the Internet has been built. The classrooms, in other words the local Intranet networks equipped with systems of learning organization are being built. The computers – the most modern desks – are ready to welcome students. Multimedia devices providing all the imaginable and unthinkable forms of demonstration, as blackboards and presentation software, as boxes of chalk – are available for teachers.

Now in this well-equipped building the only questions to be answered are:

- *Who* should be eTaught?;
- *What* to eTeach?;
- *Who* should eTeach?;
- *How* to eTeach?

The answer to the question of *Who should be eTaught*? is relatively simple: everybody – sooner or later.

After its "invention", human speech as the first teaching aid became a common form of teaching for thousand years – he who wanted to learn that first of all had to learn to speak.

Invention of writing and then printing greatly increased efficiency of knowledge transmission accumulated by the mankind – literacy is a prerequisite for learning for centauries.

The use of means of image and motion picture and voice recording in teaching and learning became general and efficient only by the application of multimedia devices in eLearning, digital data recording and transmission and displaying, computers, and local and global computer networks – "digital literacy" has been a prerequisite for eLearning.

Nowadays not everybody meets this requirement yet – they can only be taught in conventional way. However, the generation growing up in kindergartens with "childproof" (or in Hungarian usage "cocoaproof") computers will surely be an eLearner.

But even today there are target teams for whom digital literacy – user-level knowledge of computer and Internet – is one of the job requirements. For example, eLearning can be an ideal solution for employees of big firms, public employees and professional strength of the Army to meet lifelong learning requirement.

According to the abovementioned survey,[13] at the National Defence University where technical conditions are available for years:

> "There are too few applied electronic curricula and lessons given to the students and to be solved with the aid of computer."
>
> "Too few teachers prepare electronic and multimedia curricula."
>
> "…significant part of students does not regularly use capabilities given by computing neither in teaching periods, nor during preparations."
>
> "In effect, capabilities given by computer networks are unexploited."

The question of *What to eTeach*? can be answered similarly: everything – sooner or later, that has to be acquired within an organized framework.

eLearning enhances not only efficiency of conventional theory teaching, but the most varied virtual models, simulators and character games can greatly improve cost-effectiveness of practical training as well.

To answer the question of *Who should eTeach*? is much more difficult.

In a conventional school it is the teacher who gives a lecture on a specified or selected curriculum, coaches students and then checks or examines and evaluates acquirements.

The question of *Who teaches*? comes up in the case of a multimedia curriculum package elaborated for acquiring a set of knowledge – subject, topic etc. – by eLearning.

- Is it the teacher, who selected and worked the curriculum up?
- Is it the graphic designer, who composed the presentations facilitating understanding?
- Is it the information specialist, who wrote the screenplay?
- Is it the narrator, who gave the lectures?
- Is it the programmer, who recorded the result in a digital data medium or an assigned network address, in a form easy to handle by the student?
- Is it the tutor, who holds intercourse with the students during distance learning?

It would seem the simplest solution when some one person would perform all these tasks, however it is impossible and unnecessary to prepare every teacher for studying so many professions. The knowledge standards mentioned in introduction make it possible to organize curriculum-objects worked out by prominent experts of the country or a linguistic area into content-storehouses from where teachers, schools or other educational institutions can collect material for compiling curriculum suitable for their aim. Of course, eCurricula necessary for subjects of institutions of higher education and special courses require mostly individual working-out, and close co-operation from participants performing abovementioned tasks ranging from working-up curriculum to checking acquirements.

To the question of *How to eTeach*? so many answers can be given as many forms of education, schools, subjects and teachers exist. The only undertaking of the authors of this study is to present the model of eLearning of a university subject named Research and Development in Military Technology. This model has been worked out for BSc, MSc and PhD students participating in regular and correspondence or distance education at the Miklós Zrínyi National Defence University, but it can be used for related courses, self-instruction or distance teaching of students and research-workers interested in the subject, as well.

An eLearning model

The multimedia curriculum Research and Development in Military Technology suitable for eLearning is based on the conventional lecture notes of the subject. The content of

the chapters practically corresponds with the text of the lecture notes. So, what is the surplus for what it was worth developing the multimedia version of the curriculum?

The curriculum contained on a CD has an Internet portal design and starts automatically. This enables students sitting in front of the monitor of a computer to surf among any points of a library and the world, if they have Internet connection. Students can display the text of the curriculum in a printable form and can print it for them – in compliance with the copyright.

In addition to the curriculum itself, the portal contains presentations illustrating lectures and sources. Furthermore, the CD also contains authors' references underlying the chapters; their publications recommended for deeper studying and further research; and presentations of their papers read on scientific conferences. Moreover, on the CD there are a lot of important and interesting documents, which can be accessed by a mouse click in a proper phase of learning and would otherwise be found after a long search and effort.

The curriculum Research and Development in Military Technology is available in the distance teaching system *ORACLE-iLearning* of the intranet of the NDU and thus, having proper authorization, it can be accessed through the Internet. It enables students to exchange their experiences on open forums, to release outcomes of their research on bulletin-board, to talk publicly with each other and their tutor and, to obtain soon new teaching packages containing updates of the curriculum.

The hello screen contains access of steps necessary for starting, and continuously viewable table of contents facilitating orientation through the curriculum and surfing by the reader's wish (Figure 4).

Since the distance learning multimedia on CD and at the NDU website is in Hungarian language we show Figures 4, 5 and 9 in original.

In case of the multimedia version of the curriculum interactive presentations and video clips help understanding instead of the figures of the printed lecture notes. Interactivity makes it possible for student not only to build by mouse clicking the appropriate layout, model or flow chart (Figure 5) by his wish, but also to surf independently among interdependent flow charts (Figure 6).

To close a given topic of the multimedia curriculum Research and Development in Military Technology students can check necessary encyclopedic acquirements by the use of self-checking tests before elaborating prescribed task (Figures 7 and 8) settling the topic and adequate to their training level.

Figure 4. Research and Development in Military Technology

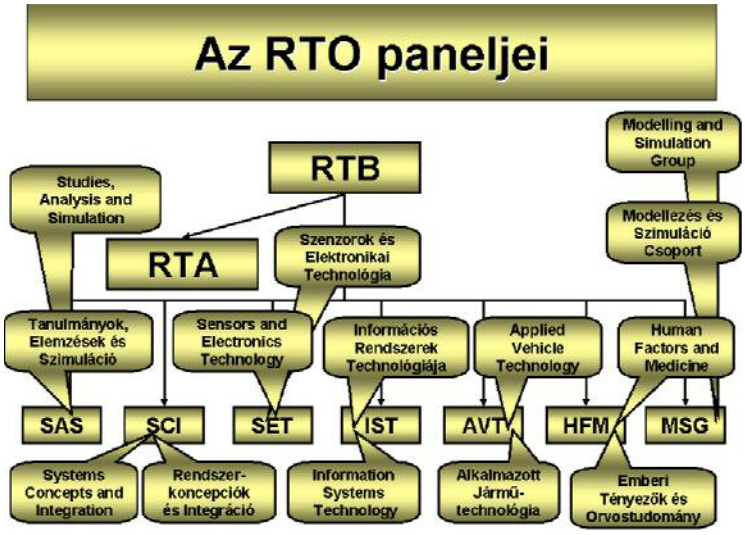

Figure 5. The panels of RTO

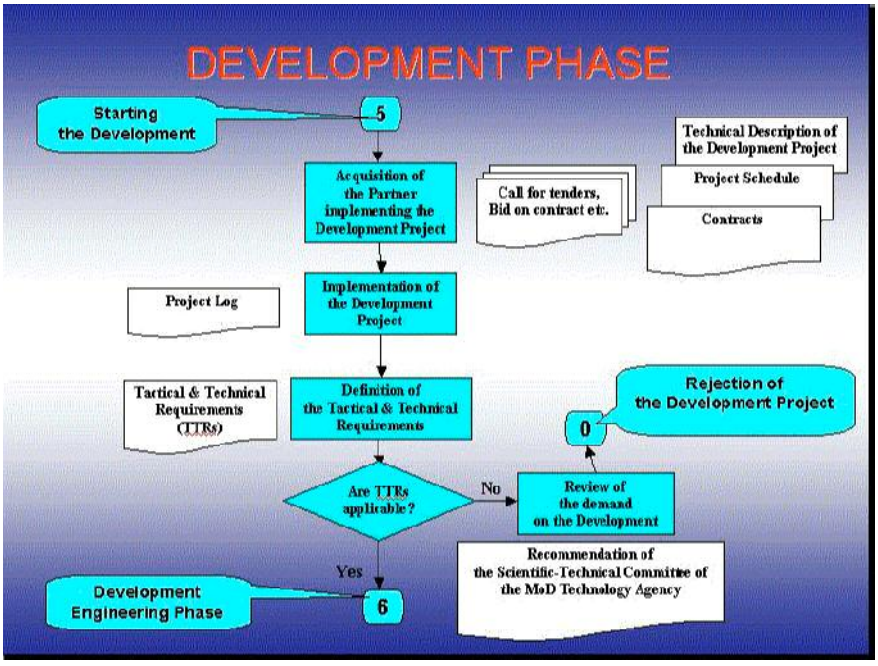

Figure 6. Development phase

Self test: Organization Panels

Task for BSc and MSc students:

Search for some programs of the NATO RTO panels from your specialty. Send the results to the e-mail address kpluszf@zmne.hu szakterület

Task for PhD students:

Search for some programs of the NATO RTO panels in which Hungarian experts participate. Search domestic and foreign publications related to Hungarian participation. Send the results to the e-mail address kpluszf@zmne.hu

Figure 7. Self-checking test

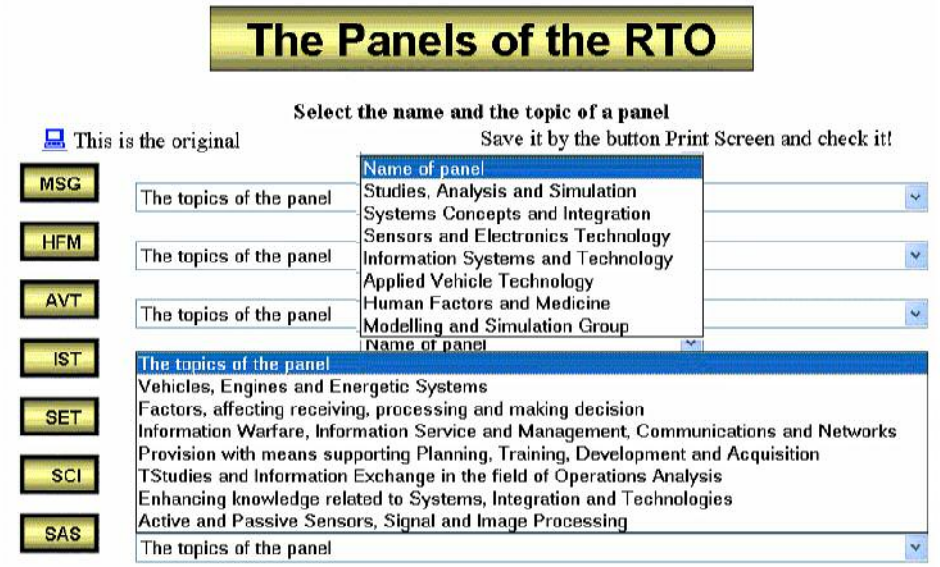

Figure 8. The panels of the RTO

During eLearning the students can use the services – forum, chat and bulletin-board – of the *ORACLE-iLearning* Learning Management System from the class-room of any campus of the university or from college-rooms through the Intranet (Figure 9).

Figure 9. *ORACLE-iLearning*

The students participating in distance learning themselves can organize their learning and can hold intercourse with the tutor of the curriculum through the Internet. After taking over the curriculum and related CD and guide, students have to apply in a prescribed e-mail format to the senior master.

The application e-mail contains:

- the applicant's personal data;
- the applicant's availability data;
- the month of the planned examination;
- the planned user name and password for the application to the senior master (tutor);
- in relation to the multimedia curriculum
  - hardware and software required for its application;
  - level of knowledge needed for learning it;
- other data the student intends to inform the tutor.

The tutor informs by e-mail the applicant about acceptance of the application and the information necessary to register at the Intranet system of the University. Then, the applicant in accordance with his individual plan begins the process of learning during which he can use services of the *ORACLE-iLearning* distance learning system of the University through the Internet – as regular and correspondence students do.

After completion of a topic (chapter, case study) the student can do a self-checking to test his encyclopedic acquirements, then he elaborates the task adequate to his level and sends it to the tutor by e-mail, who after evaluation informs the student by e-mail about the result.

When all the prescribed tasks gained positive evaluation, the tutor, via e-mail too, allows the student to apply for examination.

Having admission to examination the student elaborates the class-task adequate to his level and sends it to the address of the tutor so that it is to arrive at least one week before the chosen date of the examination.

The comprehensive course-task will be evaluated during the examination.

Summary

The multimedia curriculum Research and Development in Military Technology can be used in all forms of education and research at universities.

The curriculum available on multimedia CD and *ORACLE-iLearning* system of the NDU as the supplement to the printed lecture notes or as its alternative provides an opportunity for students participating in regular and correspondence education to learn

and prepare for examination independently. For the teachers giving contact lessons it provides presentations to illustrate lectures.

The multimedia CD can also be useful for research fellows studying certain topics of the subject Research and Development in Military Technology. The reason is that – in addition to the curriculum itself, the publications and presentations of the authors – the CD makes it possible to access a great number of related bibliographies directly or through the Internet.

We have tested the CD containing the multimedia curriculum with the contribution of two groups of students participating in university courses and PhD education. We have taken into account their comments and recommendations when we finalized the material.

Trial English version of the 1st Chapter of curriculum is ready on the Web[14] for the Central European Exchange Program for University Studies (CEEPUS).

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