

eLearning solutions for teaching software tools used in health care and business administration

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1. Preface

The electronic form of the education is widespread for now. The huge advantage of the eLearning materials that is realistic, so the students can do the basic tasks just like in the everyday life. The iterative, practical exercises, checking questions, summaries can help the user to easily memorize the lessons.

Just like in the other areas, the life without the usage of computers and the different software tools is unimaginable in the health care too. The newest software tools are pretty complicated and if we should have to learn thousands of people to use it in their works, well, it is not an easy thing to do! Just think about the fact that these kinds of materials are not teachable in auditorium with more than one hundred seats. Because of it, for example when brand new software has to be installed at a hospital, the education draws on a lot of time, work, human and financial cost and energy. In West-Europe and America, electronic learning trainings are available to solve this problem. This is the way, we should have to follow.

2. More important advantages

There are several positive attributes of the usage of eLearning methods. Here are some of these, for instance:

- Reduce the costs: our main inducement. It contains the human and financial costs too. With eLearning the employee travel cost, the training administrative cost can also be decreased. Right next to it, the time factor as cost is also important for us.

- eLearning is real time: the student can choose the perfect time to learn.
- eLearning is comprehensive: eLearning provides learning from many sources, covering every topic, always up to date.
- Interactivity: eLearning allows the student to learn as fast as possible. The interactive learning is the most effective form of the teaching methods. This method called “learning by doing”.
- eLearning is easy: Every lesson is short (about 30 minutes long), it process only a given subject without by-passes. It confines itself to the point. So it is very easy to learn. And with the previous aspect, the interactivity, it is the most effective way to make the student easily remember.

3. International overview

We can easily find several companies from the different area of the business world which use well functioning eLearning tools to teach their colleagues or customers for the needed knowledge used during their work in the everyday life.

- AllianceCare University For example the AllianceCare University runs a web-based homepage where all of its employees can access so many courses as they like for free. Some example:
 - Mandatory compliance training for all employees
 - Trainings for full or part time nurses or therapists
 - A wide selection of management and general interest courses
 - Access to interactive, web-based seminars and conference where they can watch a live presentation just by using a web browser and a phone
- InfoLogix is a leading provider of compliance and workforce e-Learning solutions. InfoLogix has developed a Computer-Based Training System that also incorporates a Learning Management System (LMS) that monitors usage and scoring, and tracks completed modules. This allows an administrator to assess and certify individual and group performance by accessing a simple web-based application where all this information is stored.

PACS - PACS is an acronym for Picture Archiving and Communication System, designed by Agfa. It is a filmless method of communicating and storing radiographs.

Through the PACS system, radiographs are made available for viewing immediately. There is no chemical processing involved. Moreover, the images can be viewed by a radiologist from a local office, a remote office, or home using a web browser.

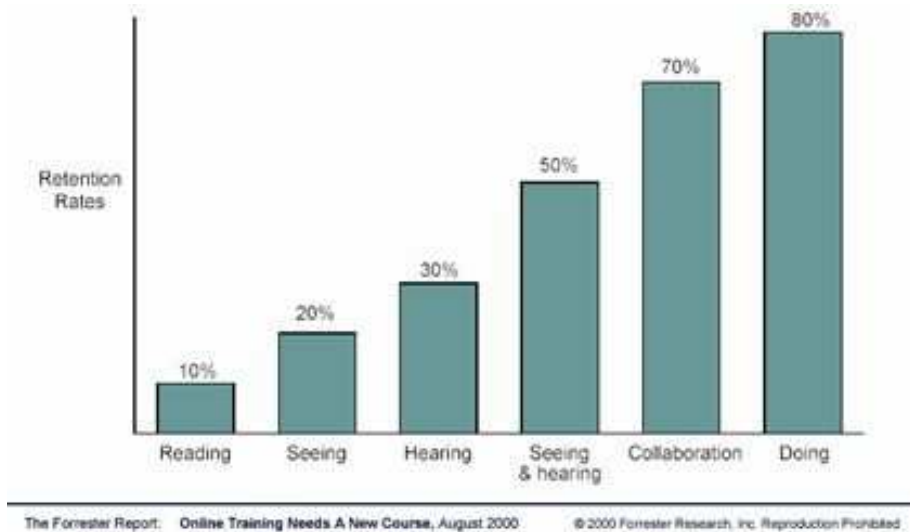
The infologix’s e-Learning course discusses the various medical image types, characteristics and issues. The acquired knowledge is important for people who

work in the medical imaging domain and seek a better understanding of its complexities, or for people that want to get into the medical field and need to get a basic understanding of this subject. Different imaging techniques and their characteristics are discussed with sample images, such as CT, MRI, nuclear medicine, X-ray, ultrasound and other modalities.

Here are the more important courses:

- **Introduction to PACS eLearning:** This module describes the major PACS components. It shows several scenarios where a PACS system is being used. Each component of the PACS system, acquisition, interfacing, archiving, viewing, printing, networking and its associated security is discussed. This course is beneficial for anyone who wants to learn about PACS.
- **Cardiology PACS eLearning:** This module begins with a basic introduction about Cardiology PACS, all the components and what they consist of. Then, it addresses all of the individual components of the PACS itself, such as Acquisition, Archiving, Viewing and Networking Interfacing.
- **Radiation therapy imaging eLearning:** Radiation therapy is an area where digital imaging is used extensively for the purpose of diagnosing, treatment planning, and tracking of the treatment process. This course shows several imaging modalities, their role in cancer treatment, and details the workflow in a typical department from an imaging perspective.
- **PACS System Administration e-Learning:** This module describes the basic functions and activities that a system administrator of a PACS system in a medical imaging department has to perform. It describes what system administration is all about, including maintenance and support, technical and clinical coordination as well as the coordination between the different parties involved with this system.

In the next diagram we can see that how much effective the different teaching methods. It shows that the simple reading is the less effective and the doing is the most usable form of the teaching methods.



4. Usable eLearning methods in the health care

There are more usable solutions for the electronic education. One of the base possibilities is the spreading the information on a data medium, just like CD or DVD. This is not the most perfect way, because of the cost of the copy. This is also usable in the conventional education as a thematic.

We can use web-based eLearning procedures. We have got more chances to use it. For example, any user can access the needed eLearning courses via net. They can go through the curriculum with an internet browser. The other way is the online seminars, where the webex video-conference method is usable. To use it, an internet browser, a headphone needed for the users and a webcam for the tutor. The course must be finished by a test.

Of course the most effective way is when the students get the lessons, learn it alone, within an appointed term, then take an exam on an organized exam or the users can print a certificate about the course after they read every page, made all exercises, asked for all the questions.

5. Considerations of the structure of an eLearning course

Every course must be started with general using information, where the users can learn about the basic things about the system, just like the act of the mouse, keys, the used colors, usage of the icons, screens, list, calling help programs, login information, and so on.

Every course must be user-friendly, so it must be handy and perspicuous. Simple color-usage needed. A page cannot be overcrowded. Too much link to other pages ruins the progressive learning principal.

The interactivity is the most important attribute of the eLearning. Remembering for the Infologix's diagram, "Learning by doing" is the most efficient way to teach. For this reason, a lot of practical exercises required. These exercises must be similar to real workflow.

The course should have to be enriched by audio-visual elements, flash animations, pictures, and so on, helping the user to know the lessons. A page cannot contain more line than how many lines fit on a screen. The scrolling is not supported. The used colors must be the same on every sheet (Common Style Sheet usage). Every picture, video must have the same resolution.

Every course must be finished comprehensive checking questions to measure the knowledge of the students.

A feedback is required from every eLearning material for make the content better and better.

6. Additional eLearning tools

After the education, during the conning period, every student needs for further help to use the applications correctly. Well, the most efficient way for this the context-sensitive help usage. This is a very easily usable tool, if we want to get quick information about a given function. With maintenance of a so-called "help database" always the newest, freshest help pages can be generated helping the users to be up to date.

After a longer leaving or omission, the e-book is a very good way to refresh the basic information. E-Books also can be generated by the "help database", so it can always be topical.

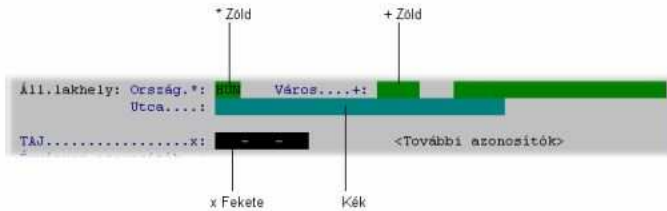
But important to notice, these tools do not substitute the basic eLearning educations, these can only help after the training to fill the gaps.

7. Main structural elements of the already available eLearning materials

The lesson itself mostly contains textual data with graphical elements, for example pictures, animations, videos.

In the 1st picture we can see a simple picture with side labels. It presents the main elements of a screen. Under the picture there is a description about the meaning of the colors.

Az egyszerű kezelhetőség segítésére **speciális** jelölésrendszert használ az alkalmazás. A **különböző színek** különböző funkciókat takarnak. Mivel nem minden munkahelyen használnak színes monitorokat, ezért a különböző funkciókat különböző jelek is segítik.



A legfontosabb **jelölések és színek** a beviteli képernyők esetén:

- x - Fekete háttérszín:** A mező kitöltése kötelező, valamilyen adatot be kell írni. (Pl. Vezetéknév)
- * - Zöld háttérszín:** A mezőhöz sügő tartozik és kötelező kitölteni. (Pl. Állampolgárság)
- + - Zöld háttérszín:** A mező kitöltését sügő segíti, de nem kötelező kitölteni. (Pl. Családi állapota)
- Kék háttérszín:** Beviteli mező, mely megadható, de nem kötelező. (Pl. Titulus)

8. Common parts of the screens



Every page has the same color set, because CSS is used. Every page has a header with the names of the product and the module and under it there are the main- and the subtitle of the current sheet. On the left there are two links, one for the content and one for the help.

In the next image we can see the table of contents window. As a matter of fact it is a link collection to the pages. Using it, we can reach the different parts of the lesson directly.



The next one shows the help window. It is a user guide. It describes the structure of the lesson, the main parts of the windows and the usage.



9. Animation

There are more possibilities to present a given process. The best way is the usage of animations. We can use flash animations, animated gifs, and so on.

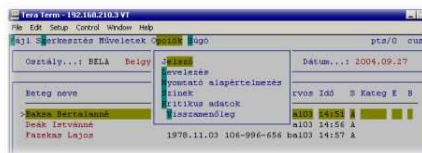
In the next two images we can see a simple animation that shows the main menu system of the program as if the user would change between them with the

cursor keys. These two pictures have taken from the same animation in different times.

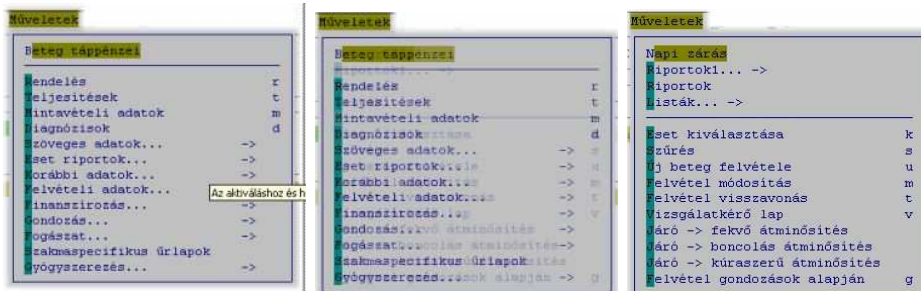
A MédSolúción képernyők a következőképpen épülnek fel:
A képernyő **legfelső sorában** látható a menü: **Fájl, Szerkesztés, Művelet, Opciók, Súgó**, a terminál azonosítója és a maximum öt karakter hosszúságú felhasználó azonosító.



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Other form of the animation when transitions there and back are also visible.



10. Interactivity

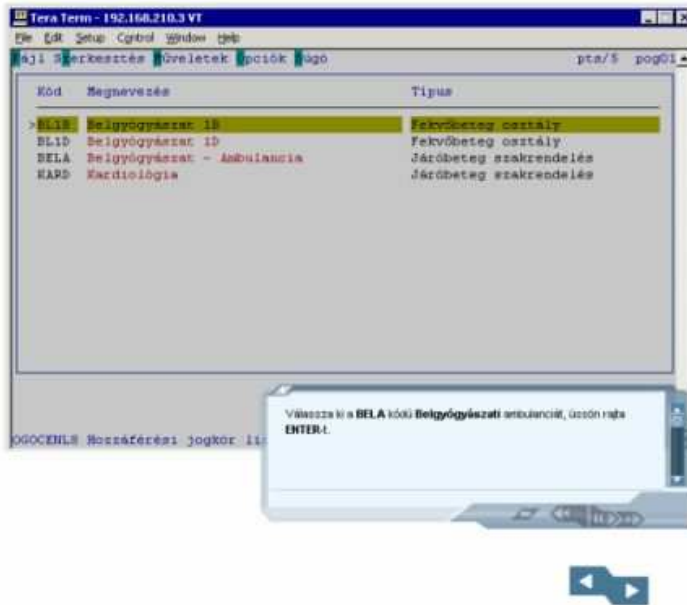
Interactivity is the most significant attribute of the eLearning. In the next picture we can see an interactive exercise.

On the head we can read the exercise itself. There is a flash control. On the right bottom we can see the command window, where we can read the next step of the process of the given exercise. At the same time, we can use a speaker, because audio also belongs to it. We can hear the next step. This is the best way to memorize: reading, hearing, doing.

After the current step is done, we get the next one, until the exercise is finished. It is very realistic, a perfect copy of the original program.

Oldja meg a következő interaktív feladatot!

Vonja vissza a **belgyógyászati** rendelőbe felvett **Kovács Mihályné** számára rendelt **röntgen** vizsgálatot, melynek oka a **01-es** kódú **helytelen rendelés**.



Diagrams also help the user to overview the given workflow.

After the lesson the user have to fill a test. These tests mostly radio- or toggle-buttons test. At the end of the questions the evaluation button is found that is show the result of the test in a pop-up window. It contains the title of the lesson, the result in percentage form, the right and the wrong answers. The result should printable from here.

At the end of the lesson there is a short summary about the learnt things.