

INTERACTIVE PLATFORM FOR STUDENTS. ONLINE LEARNING REFRIGERATION

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Abstract: *All research proves that learning is the result of the exercise, or actually seeing what was learned. This leads students to process information and give it meaning. Over time, it was found that teaching on blackboard with chalk and implement a written course are a minimum mandatory but not sufficient, as proven by many of today's courses are made using digital presentations. Studies points out that interactive teaching methods create a deeper learning, students develop better thinking skills by presenting concrete examples and students demonstrate better memory and are more appreciated. This paper presents a new method of teaching and learning Refrigeration, for students enrolled in Building Services specialization, in the Faculty of Civil Engineering, part of Transylvania University from Brasov.*

Key words: *online courses, refrigeration, new teaching method.*

1. Introduction

Among the subjects studied on Building Services specialization in the Faculty of Civil Engineering Braşov is found also Refrigeration, about some may say it is a matter more "curious" for students because it combines knowledge from many fields such as hydraulic, heat and mass transfer, chemistry, thermodynamics, automation etc., so that students are not very used with.

All research proves that learning is the result of the exercise, or actually seeing what was learned. This leads students to process information and give it meaning. Over time, it was found that teaching blackboard with chalk and implement a written course are a minimum mandatory but not sufficient, as proven by many of today's courses are presented on CD or completed with digital presentations.

Studies points out that interactive teaching methods create a deeper learning, students develop better thinking skills by presenting concrete examples and students demonstrate better memory and are more appreciated.

2."Project" Description

The overall objective of the "project" started last year is to give students access to a new method of learning through an online site that follows the syllabus of the written course "Refrigeration Installations" [Alexandru Serban, Florea Chiriac - Refrigeration Installations – "University courses. Masters." AGIR Publishing, Bucharest, 2010], except that it is more explicit and also interactive. Website realized with the support of society Galati SC AltFactor SRL, which develops educational products full of e-learning has the web

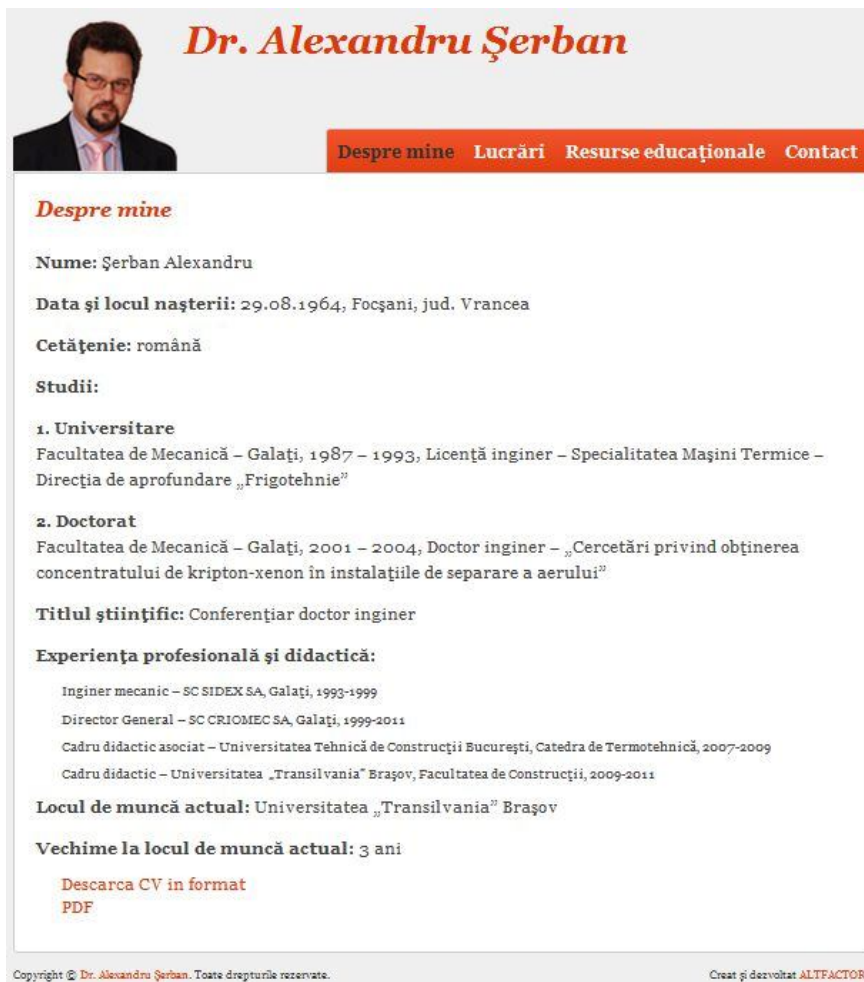
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address www.dralexandruserban.ro and is an educational product that provides a modern and flexible training, a solid educational foundation, a component of comprehensive information, interactivity and attractiveness.

In the traditional school, the teacher has full control over knowledge, but introducing interactive component scheme, the school is student-centred, making it the core of the problem, which coincides with the current educational policies geared more and more towards a pedagogy that

involves direct involvement of student learning. Scientific-pedagogical approach taken in this sense is part of late didactics development trends.

By accessing the web address www.dralexandruserban.ro users are greeted by Mr. Alexandru Serban Associate Professor Ph.D., professor at the Faculty of Civil Engineering Brasov, Building Services Specialization, and is presented by displaying his Curriculum Vitae.



Dr. Alexandru Şerban

Despre mine Lucrări Resurse educaţionale Contact

Despre mine

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Facultatea de Mecanică – Galaţi, 1987 – 1993, Licenţă inginer – Specialitatea Maşini Termice – Direcţia de aprofundare „Frigotehnie”

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Inginer mecanic – SC SIDEX SA, Galaţi, 1993-1999
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Locul de muncă actual: Universitatea „Transilvania” Braşov

Vechime la locul de muncă actual: 3 ani

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Fig. 1. Presentation page of the website www.dralexandruserban.ro

By clicking on the link “Resurse educationale - Educational Resources”, the user is displayed a page where at this stage, it can access the Refrigeration Course, in the form of seven major chapters, as shown in Fig. 2 shown below.



Fig. 2. *Educational Resources page of the website www.dralexadruserban.ro*

As can be seen in the figure above the Refrigeration Course is divided in seven chapters:

1. Mechanical Vapour Compression Refrigeration Systems;
2. Vapour Absorption Refrigeration Systems Based on Ammonia-Water Solution;
3. Vapour Absorption Refrigeration Systems Based on Water-Lithium Bromide Solution;
4. Refrigeration Compressors;
5. Condensers;
6. Evaporators;
7. Applications of Artificial Cold.

With a click on the first chapter the user begins the interactive training module that includes a number of components common to all chapters and facilitate the conduct of the course in a way as simple and as intuitive. The main components of interactive mode are: course title in the top of the page, the title section, immediately beneath the left panel content page that can be displayed or hidden, glossary button to identify unfamiliar terms in the upper top right, represented by an open book, the

"Info" button, "Full screen" button to switch to full screen view mode, progression-back buttons in the lower right corner and in the middle of the course page itself. All the items above can be seen in Figure 3, shown below.

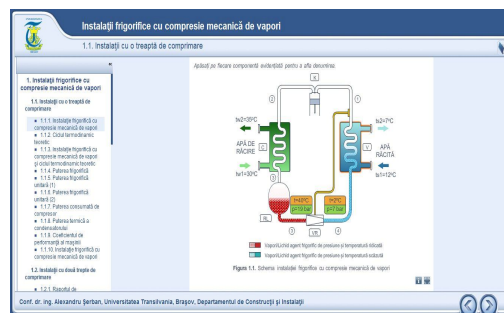


Fig. 3. *First page of interactive course “Mechanical Vapour Compression Refrigeration Systems”*

On the first page of the course is shown a diagram of one stage mechanical vapour compression refrigeration system which interactivity consists of many actions that the user can perform on the page course such as pressing system components to highlight their name, pressing "Play" to animate the installation diagram and highlighting its operating principle, pressing the "Info" to highlight additional information about the current course page, which in this case in the form of text is the operating principle for one stage mechanical vapour compression refrigeration system in one stage, for a better understanding of animation and hence the scheme.

If we were to draw a parallel between the written course and the interactive website, those two would look like in Figure 4. As can be seen the interactive course copy the exact schemes from the written course but with the major differences that the components and the working fluids are colored differently, depending on fluid's state and user / reader can actually see

what happens inside the system. This way the learning process take less time, is more enjoyed and increases learning.

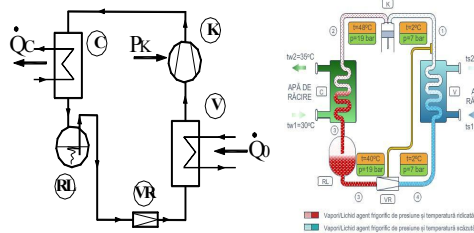


Fig. 4. Comparison between the traditional and the interactive scheme

On the second page of this course the user can see the theoretical thermodynamic cycle analysis for the refrigeration system shown in the previous diagram temperature-entropy and pressure-enthalpy diagram. The user can click on each segment on the theoretical cycle represented to highlight the process that occurs from the point x to point y state. On this page the "Info" button explains the user all cycle transformations.

On the next page of the course, the user is presented both the system diagram and its theoretical thermodynamic cycle, so that the user can more easily make the connection between the two. The second and the third page of the first course can be seen in Figure 5, hereinafter.

Of course both thermodynamic cycle and the scheme are animated for a better understanding of the phenomena that occur inside a one stage mechanical vapour compression refrigeration machinery.

Each of the seven courses at the end of a page has the text "Questions?" To the end of the course gives students the opportunity to interact with the teacher, when the college course is conducted on the interactive whiteboard to clarify any issues or additional questions.

Due to the positive feedback from students at the end, we want in the future to perform other several courses of this type and to diversify the interactivity on the site to be even more attractive.

3. Conclusions

In our current society, there is a dynamic process which requires all walks of life to keep up with the evolution of society and therefore education. The application of new learning methods require time, diversity of ideas, commitment to action, discovery of new values, teaching responsibility, confidence in personal ability to apply them creatively to streamline the educational process.

This mode the Refrigeration course is more easily assimilated by the students and motivate them for choosing this area in future engineering profession.

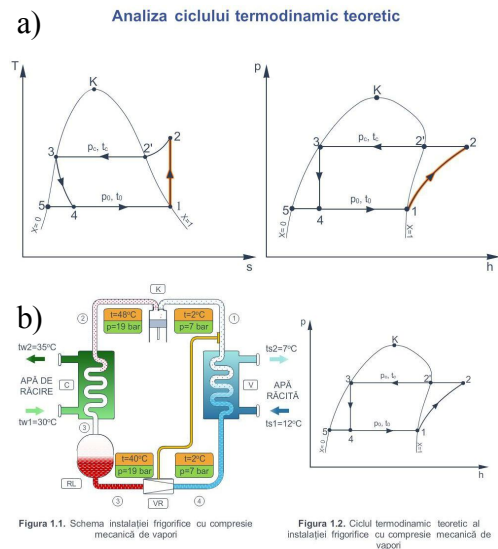


Figura 1.1. Schema instalației frigorifice cu compresie mecanică de vapori
Figura 1.2. Ciclul termodinamic teoretic al instalației frigorifice cu compresie mecanică de vapori

References

1. *** www.dralexandruserban.ro.

Fig. 5. Page 2 of the first course (a) and page 3 (b)