Chapter 22
Medical Hybrid Learning Tools

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ABSTRACT
This chapter describes original modalities of combining traditional methods and technologies in medical learning with good results. The electronic tool is TESYS, a non-commercial e-learning platform designed for completing and improving traditional medical learning by using new methods. Traditional learning is thus blended together with e-learning, offering the students and teachers the possibility to permanently evaluate the learning and teaching process. Besides the usual functions of an e-learning platform, TESYS includes elements of originality. The first one is a database with medical images collected during the process of diagnosing patients, which also include other useful information (diagnostic, treatment, evolution) in order to complete the currently limited number of images found in university courses and medical books. The second element of originality is the content-based visual query module designed for this multimedia medical database, which uses features that are automatically extracted from images (color, texture, regions). The content-based visual query used both in the e-learning and e-testing process stimulates learning by comparing similar cases along with their particularities, or by comparing cases that are visually similar but with different diagnosis.

INTRODUCTION
Medical teaching is probably one of the most important areas where the application of the hybrid solutions for students training can prove very useful. Engineering teaching is another area where hybrid learning offers a lot of advantages. If we consider specialties like economics or exact sciences, they can be entirely and successfully based on electronic learning. This is not applicable to medical teaching. In this case it cannot be obtained the direct transfer of knowledge, teacher’s experience, especially for the practice classes made in hospitals, where the teacher presents the medical case, the investiga-
tions, the diagnosis, the treatment, an overview of the patient evolution or comparative studies with other cases from his medical practice. In these cases, the student can directly follow the teacher’s logic, the way he analyzes the medical case and the evolution of the patient. Each of these cases is practically unique because the disease and the patient are unique.

Taking into account technological development and advantages of the electronic learning, we consider that it is a good idea to introduce the hybrid learning in the medical domain, because (Masie, 2002):

- Web-based learning activities are introduced to complement face-to-face work
- “Seat time” is reduced, though not eliminated altogether
- The web-based and face-to-face components of the course are designed to interact pedagogically to take advantage of the best features of each
- Students can learn via the Internet while in different places and at various moments of time

As a result, it was designed and implemented an e-learning platform that enhances the traditional learning methods, allowing students to access modern methods to pass information and test their knowledge.

This chapter presents the non-commercial e-learning software tool, TESYS, designed for medical education. The software platform is intended to complete and improve any traditional learning methods, offering teachers and students modern of learning and assessing methods. The TESYS platform also contains a series of modules for evaluating the activity and involvement of both teacher and student in the e-learning process, while the analysis made conducts to the elaboration of a recommendation to each of them regarding the improvement of the quality of training. The platform is already used together with the traditional method at the University of Medicine and Pharmacy from Craiova, for teaching the disciplines of gastroenterology and urology. Of course, other faculties of the University of Craiova use also the TESYS platform for normal and distance learning (Stanescu et al, 2007; Burdescu and Mihaescu, 2006; Burdescu and Mihaescu, 2008). The chapter also presents a number of scenarios for medical hybrid learning.

For example, the student can attend the course in the classroom and then he can use the software tool from anywhere and anytime in order to download the course files, to follow the bibliographic references to other additional materials proposed by teacher. Also, the users can use the platform for communicating with other students, teachers, secretaries and administrator.

Unlike other similar platforms, which are used on a large scale in different domains including the medical one, TESYS offers several elements of originality, which allow students to benefit from an increased volume of knowledge and a better modality of checking and assessing their professional training.

The first original element brought by the TESYS platform in the hybrid learning is a multimedia medical database, updated by specialists with images acquired from different patients during the diagnosis and treatment processes. Each image can include a series of alphanumerical information: diagnosis, treatment, and patient evolution. It means that along with the electronic teaching documentation for the classic teaching methods, there is a database with medical images.

In the medical learning process, the courses in traditional or electronic format are accompanied in many cases by a series of images. For example, at a gastroenterology course, for the presentation of the ulcer diagnosis, the teacher shows students images that are relevant for this diagnosis, highlighting the changes in color, texture or shape of the sick tissue, in comparison to a healthy one. In general, the number of images that are presented is minimal. Accordingly, the existence of
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