

# A project of Human Anatomy e-learning

DI COMITE MS, FANELLI V, FAVIA A  
Department of Human Anatomy and Histology  
University of Bari  
Piazzale Giulio Cesare, Bari  
ITALY

*Abstract:* - In this paper we describe a project of Human Anatomy e-learning devoted to the students that failed to get a degree in "Scienze Biologiche" in the minimum time prescribed (5 years) and cannot more attend lectures on this subject. Our goal is to furnish a support for the Anatomy study by a collaborative asynchronous learning so that they may complete their preparation easier and sooner.

*Key-Words:* - E-learning, biologist student, human anatomy, personalization, e-learning content, tests

## 1 Introduction

With the great diffusion of Internet technologies formation of virtual classrooms and a computer-based training are possible. The collaborative e-learning could be synchronous or asynchronous and the students undertake an active role in personalizing instruction [1, 2, 3, 4, 5, 6]. In particular, the asynchronous accessibility offers the advantage to use the digital content anytime and anywhere the e-learners want. Moreover, they have the possibility to choice the didactic iter that better corresponds to one's bents and background. We want to apply this method to a particular type of students. In the past year the course of degree in Biology has been definitively concluded and substituted by shorter and greatly modified others. Unfortunately there are still many students that failed to complete their curriculum in time. They have still to take many examinations without the possibility to further attend lectures of various matters, among which Human Anatomy. It's very difficult for a student to study the gross anatomy and the microscopic structure of the organs without a support of lectures and drill-lessons, so we have tried to meet this requirement creating an hypertext. At the first time we had only the possibility to produce a cd-rom as delivery system. Now another opportunity has been furnished by the activation in our University of the formative program "PROTEO II project" that makes use of the NetLerning platform and the Lectora software.

## 2 Why creating an Human Anatomy e-book for Biology students

There are many commercially available anatomy software, multimedia and web sites of digital anatomical images. They are directed to Medicine

undergraduated students and, so, they appear inadequate for Biology ones. In fact, they are too much extensive and with many references to topographic and clinical anatomy. On the contrary, the anatomical approach for the Biology undergraduated students is mainly focused on the microstructure and function of the organs. For this motive we are creating an appropriate digital book in which the student could easy learn the bases of gross anatomy and increase one's knowledge on microscopic and ultramicroscopic structure of the organs. Moreover, particular attention is reserved in underlining the strictly connection between structure and function. The content, ranging from discrete items to larger instructional modules, for the most part must necessarily given up to the acquisition of a good method for analysing microscopic sections. In this way the student, comparing more microscopic fields, can point out their main features and, then, may be able to identify various organs. In other words, our goal is to provide the students with a mean to facilitate learning and to assess their competency.

## 3 E-book structure

Creating e-learning material particular attention was kept to design a database adequate to the target of our students. Learning objects contain units of instructional materials that are assembled in sessions and subsessions (Fig. 1), whose spatial sequence responds to a sequential approach of anatomical concepts.

Navigation links between session and subsession have been set up, so that the student, that does not follow the spatial sequence, may choice the apparatus or the organ to examine and, with a simple click, go in other units to better set it against an anatomical

background. For example, if the student is studying the irrigation of an organ he may click on the artery name and go to the session of the Circulatory Apparatus.

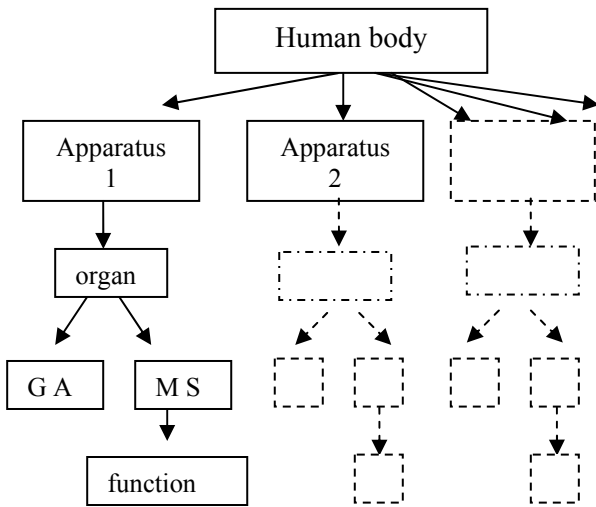


Fig. 1: Architecture of sessions and subsessions . G A = Gross Anatomy; M S = microscopic structure

The content structure provides for a brief and clear text in which the essential data are reported. A larger space has given to schematic figures, animations and images.

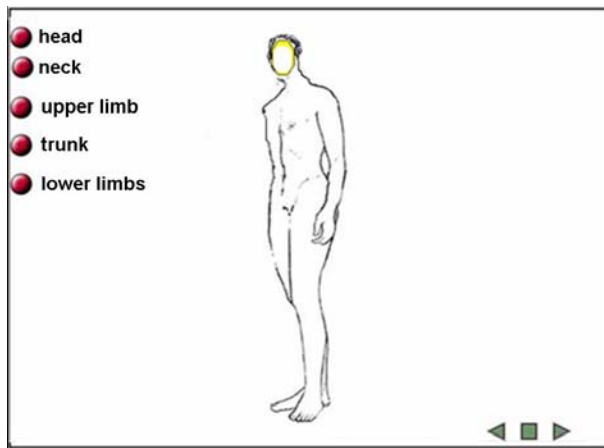


Fig. 2: Example of schematic figure with object buttons that allow the identification of regions

To obtain better outcomes in learning the nomenclature of the gross anatomy, within the schematic figures the student must push a series of buttons to relate names to the regions. Once the student familiarized with a schematic figure, a corresponding cadaveric section comes out and he will easy recognizes the various regions or their different aspect in relation to the orientation of the section planes.

For the subsessions of the microscopic structure we try to simulate the observation under the light microscopy. Microscopic sections of the organs are shown at increasing magnification in a binding sequence. In this way the students pass, from the general aspect and organization of the organ, to the morphological features of the single tissues inside it (Fig. 3).

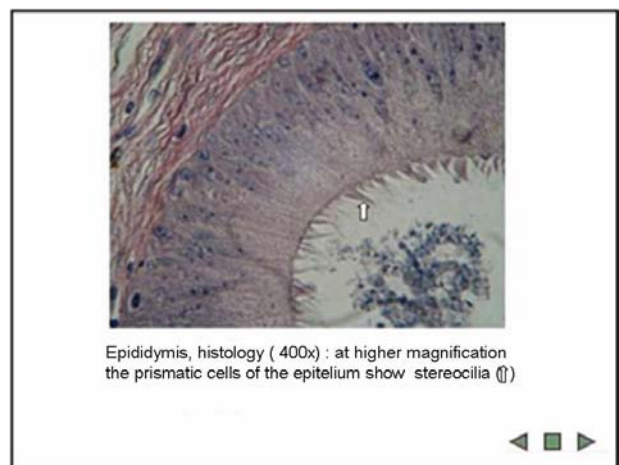
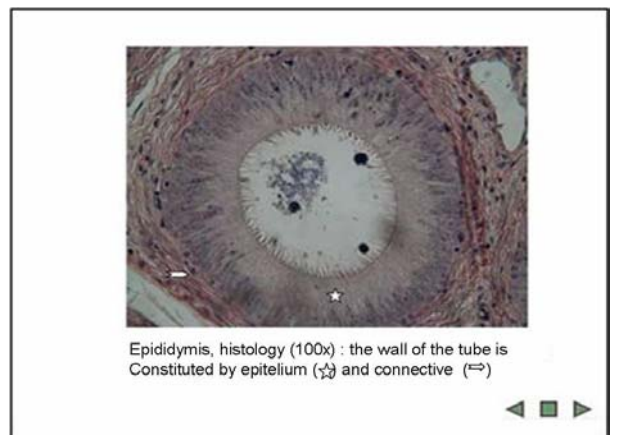
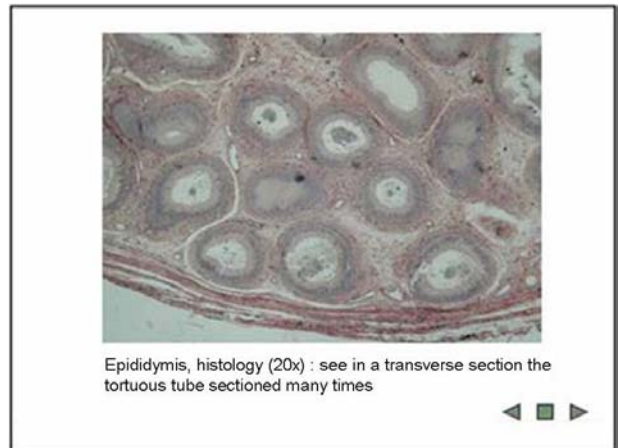


Fig. 3: Increasing magnifications of the same microscopic field.

A brief text relates these features with the function/s proper of the single organ, so the learners can understand why there are some types of cells and tissues rather than others.

The Lectora software allows to insert tests and multiple question types ( True/False, Multiple Choice, Short answer, Drag and drop....). Now we are creating a lot of tests for any subsession and a lot of tests for groups of sessions by which each student might verify one's knowledge and, so, decides whether to tackle a new subject, or to go back to previous sessions or subsessions.

Moreover we want activate an email address to establish a dialog with students.

### 3 Conclusion

The aim of our project was to furnish an e-learning delivery that would aid Biology undergraduate students in the Human Anatomy study. They cannot more attend lectures in this matter and come up against many obstacles during their preparation. The course structure presents both the giving of content items in sequences adaptable to student needs and lot of tests for student self assessment.

We have been encouraged in realizing this type of delivery by the results obtained in a first experiment conducted on a few students, residing in Bari, that could use a cd-rom with similar contents in our Department. On the other hand is well documented the good e-learning impact in medical education either for the basic subjects, like Anatomy, (7, 8) either for the clinical ones (9, 10, 11).

The web e-learning allows a widespread circulation of the contents, so also the students that are located far or work can accede to them. Thanks to email communications, we have the possibility to change some didactic unit if not well clear to the users or suggest how to improve the approach to Anatomy learning. In this way we become not only distributors of contents but also facilitators of learning and, sometimes, assessors of competency.

#### *References:*

- [1] Calvani A, Rotta M, Comunicazione ed apprendimento, in Internet Erickson, Trento, 1999
- [2] Rosenberg M, E-Learning: Strategies for Delivering Knowledge, in the Digital Age. McGraw-Hill, New York, 2001
- [3] Phelps C, Michea YF, Learning management systems' evaluation focuses on technology not learning, AMIA Annu Symp Proc, 2003, 969
- [4] Bernard R, Abrami PI, Lou Y, Borokhovski E, How does distance education compare with classroom instruction a meta-analysis of the empirical literature, Rev Educ Res, Vol. 74, 2004, 379-439
- [5] Letterie GS, Medical education as a science: the quality of evidence for computer-assisted instruction. Am J Obstet Gynecol Vol. 188, 2003, 849-853
- [6] Hawkridge D, Le tecnologie didattiche oggi, in Argomenti di tecnologie didattiche, Ed. Menabo, Roma, 1998
- [7] Ruiz Jg, Mintzer MD, Leipzig RM, The impact of E-Learning in Medical Education, Academic Medicine, Vol.81, No.3 2006, 207-212
- [8] Bacro T, Gilbertson B, Coultas J, Web-delivery of anatomy video clips using a CD-ROM, Anat Rec Vol. 261, N° 2, 2000, 78-82
- [9] Devitt P, Palmer E, Computer-aided learning: an overvalued educational resource? Med Educ, Vol. 33, 1999, 136-139
- [10] Asgari-Jirhandeh N, Haywood J, Computer awareness among medical students: a survey, Vol. 31, 1997, 225-231
- [11] Harden RM, Hart IR, An international virtual medical school (IVIMEDS): the future for medical education? Med Teach, Vol. 24, 2002, 261-264