
E-CONTENT FOR MEDICAL STUDENTS

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ABSTRACT

Blended learning, i.e. traditional methods used with modern computer and internet based technology, can enhance the effectiveness of training. We have created an e-content for the dermatology training of medical students and a testing system with Microsoft Learning Content Development System and Hot Potatoes JQuiz, both are free software. The SCORM compatible e-content covers the different types and characteristics of primary and secondary skin lesions. The content which can be used online or offline as well in a browser helps the students to deepen their knowledge with tests and playful quizzes. The html and JavaScript based testing system gives the tutors a quick and objective method to evaluate the performance of the students. We have used technologies which are supported by several authoring and learning management systems in order to be able to modify and transfer our work in other, even more sophisticated applications in the future.

INTRODUCTION

Modern technology changes our lives in every aspect. Computers and internet have become part of our lives in the last two decades. These state of the art tools play an increasing role in education as well. This does not mean that computer systems supplant traditional teaching methods, but they can make teaching and learning more efficient when properly used.

One way to use the modern technology in education is called blended learning (also called hybrid or mixed learning). According to a definition, blended learning is "facilitated by the effective combination of different modes of delivery, models of teaching and styles of learning, and is based on transparent communication amongst all parties involved with a course" (Heinze, Procter, 2004). So this type of learning refers to a mix of different learning environments, like electronic learning (e-learning) or mobile learning with other traditional methods and resources. Sometimes it includes e-mentoring or e-tutoring – besides human interaction of a tutor – as well.

To utilize blended learning, a computer system – with a network connection if possible – is needed. Any computer system which provides customized instruction or feedback to students without the intervention of humans is an intelligent tutoring system (Psotha et al., 1988).

First of all one needs a material, a content which is to be used for e-learning. The e-content is defined as instruction delivered on a computer via internet or other storage device (optical disk, USB drive etc.). (Clark, Mayer, 2007) It can be self paced or instructor led. It can use different types of media – text, graphics, (streaming) audio and video –, so it contains multimedia elements.

A program (software) which allows the creation of the e-content is also necessary. An authoring system is a computer based system which allows a general group (including non-programmers) to create, to author content for tutoring systems. It provides high-level visual

tools which make it possible to manipulate text, graphics, audio and video and define interactions etc. and to design a complete system without writing any programming code. (The programming features are generally hidden behind buttons, menus or other tools. Figure 1.) In many cases a proprietary authoring language may also be included in the system to fine tune the elements of the developed e-content.

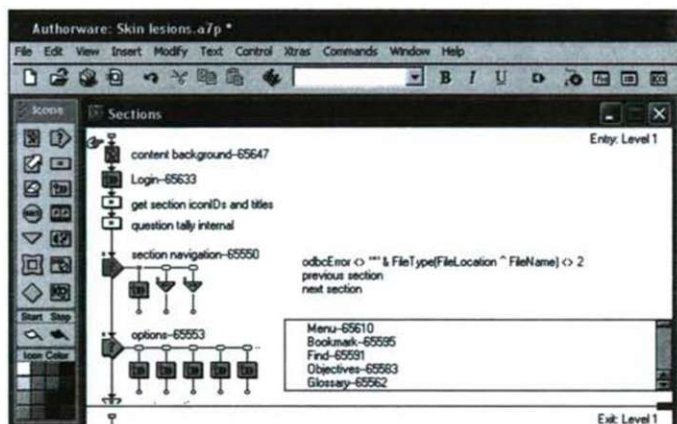


Figure 1. User interface of Adobe Authorware authoring system

The e-content can be written and stored in many different formats which can be the proprietary form of the used authoring system and besides that a widely used format, like hypertext markup language (html) or Shareable Content Object Reference Model (SCORM) etc. can also be used in most cases. The html is the standard format of web pages which can be easily edited with web editors (or any programmes which can save documents in html format) and viewed in browsers. SCORM is a collection of standards and specifications mainly for web-based e-learning. It defines how to create "shareable content objects" (SCOs) which can be reused in different systems and contexts and it also defines how the content may be packaged into a transferable compressed file (Rustici Software, 2010).

A programme is needed to use, to view the finished e-content, i.e. the e-learning material. As mentioned before, this can even be a simple web browser in most cases. For a higher level of blended learning, there are so-called learning management systems (LMS). These programmes are able to administer, document, track and report the advance of the students, and manage many curricula or classrooms over a network (Ellis, 2009).

Creating such system is resource intensive, it can be very time-consuming and costs a lot of money, but nowadays there are several ready to use tutoring systems (even freeware) which can be tailored to the developers' needs. Accordingly, the user, the content creator can focus on developing the e-content.

TEACHING DERMATOLOGY FOR FOREIGN MEDICAL STUDENTS AT THE UNIVERSITY OF PÉCS MEDICAL SCHOOL

The dermatology training of foreign medical students in English language started in 1981. Dermatology is taught in the fifth year. Each year there are about 40 students in the class. The basic lessons are the foundation of dermatology, without which it is impossible to

describe a skin symptom. Students often find it difficult to correctly identify the basic lesion. With the created electronic material we hope to assist the dermatology studies of the students i.e. to learn and practice the types and characteristics of skin lesions and then test their skills.

E-CONTENT DEVELOPMENT

The material contains the absolute necessary knowledge (the main characteristics of the lesions with images) and does not substitute the professional literature or the lectures, but helps the students to drill knowledge. The authoring system we used for development was the Microsoft Learning Content Development System (LCDS), a free tool to create high quality, interactive online courses. (Figure 2.) Microsoft LCDS is able to save the created contents in many formats, including SCORM, thus our material can later be exported and modified in any SCORM compatible authoring system. (Microsoft, 2010)

We have compiled our work into a single SCO Package. This format can be used in any Microsoft Internet Explorer compatible browser with Microsoft Silverlight plug-in.



Figure 2. User interface of Microsoft Learning Content Development System

We have also created a test in another system. The test was created for the tutors to help them to evaluate the students during exams. Since we needed a free authoring system which focuses mainly on test creation, we have chosen Hot Potatoes. This application package includes six programmes to create interactive multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises. The compiled e-content is an html file and can be viewed in any JavaScript enabled browser. (Half-Baked Software, 2009)

We used a high-performance personal computer (Intel® Core™ i7-920 2.67 GHz, 12 GB RAM, Microsoft Windows 7 Ultimate 64 bit) for the development. The finished product runs on an average PC which has adequate resources to run Windows XP, Windows Vista or Windows 7.

E-CONTENT FOR THE STUDENTS

The content for the students include the following:

- Introduction. The purpose of the e-content: Why was it created? What will the user achieve if he or she learns the material? What type of knowledge or competency will he or she get? Knowledge requirements: What former knowledge or competency is required to study the content efficiently? Hardware and software: This part informs the user about the minimum hardware and software requirements to use the material. Legal notices: Who are the creators and the editors of this work? Who is the owner and what are the terms of using the material?
- Concepts associated with lesions: What is a lesion? What can cause tissue damages? How many types of lesions are there and how many ways can they be classified?
- Primary lesions: What are the main characteristics of the primary lesions? What types of primary lesions are there and what are the characteristics of each of them: macule, papule, plaque, tuber, nodule, tumour, wheal, vesicle, bulla and pustule. Besides the text guide, each lesion is demonstrated with sample images.
- Secondary lesions: What are the main characteristics of the secondary lesions? What types of secondary lesions are there and what are their characteristics: scale (squama), erosion, excoriation, fissure, rhagias, crust, ulcer, scar (cicatrix), atrophy and lichenification. The secondary lesions are also demonstrated with sample images.
- Self tests: The purpose of this section is to playfully check the students' knowledge. Drag and drop test: The goal is to sort the types of lesions as quickly as possible into their associated categories. Tile game: The student has to click the tiles in a row and column until all tiles display primary lesions or secondary lesions. If a row or column is correct, the tiles disappear showing a part of an image in the background. True or false test (Figure 3.): twenty statements are presented based on the previous sections of the e-content and the learner has to decide whether they are true or false. Multiple choice test: The characteristics of the lesions are displayed and the student has to choose the correct lesion from a list containing five possible answers. Essay question: The student has to type in all primary and secondary lesions. While the other tests are checked automatically by the computer, this one has to be checked by student after completing it.

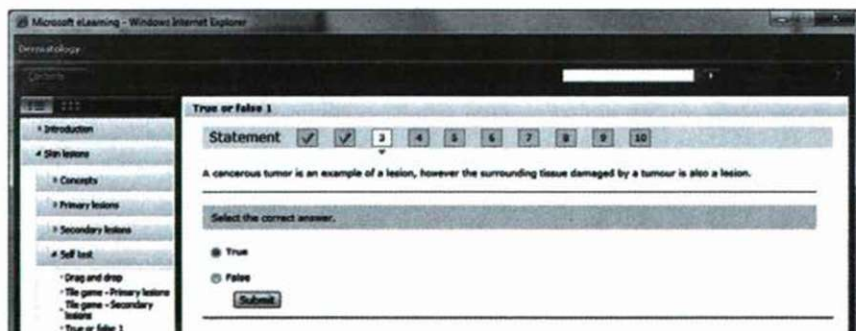


Figure 3. E-Content for the students – True or false self test

THE TESTS

We used the JQuiz programme of Hot Potatoes to create the test to check the knowledge of the students. (Figure 4.) We made two kinds of tests:

- True or false test with and without time limit: The student has to decide whether twenty statements are true or false. The statements appear randomly every time the test is started. The statements can be viewed one by one after each other or all at once. The answers are evaluated by the computer and the students get their results at the end of the test: the percent of the correct answers. When run in time limit mode, the students have five minutes to complete the test.

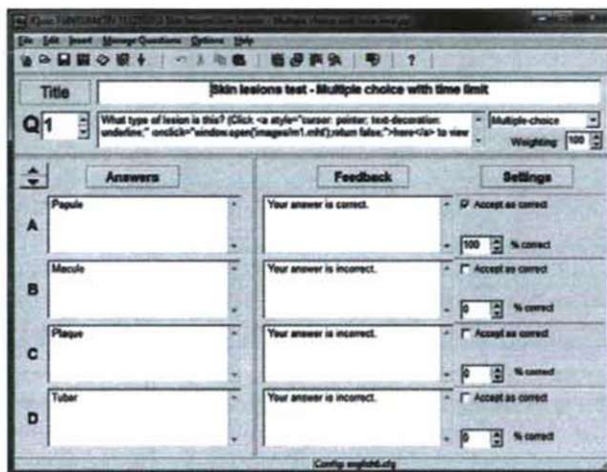


Figure 4. Multiple choice test editing in Hot Potatoes JQuiz

- Multiple choice test with and without time limit: The computer presents nineteen statements with the the main characteristics and the sample images of each primary and secondary lesions. The students have to select the right answer – the correct lesion – among five possible answers in each case. Both the statements and the answers appear randomly each time the test is run. In case of a wrong response the student has to choose another answer until he or she clicks the correct one. The evaluation is done by the computer, it presents the percent of the correct answers at the end of the test. If the test is run in time limit mode, the students have five minutes to finish it. (Figure 5.)

FINAL THOUGHTS

We have created this e-content on the one hand to help medical students to deepen their knowledge in a basic, but important area of dermatology. The students can study the material on an average performance computer wherever they want at any time and check their knowledge in a playful way. They can spend as much time as they need to practice, since the computer will never get tired or nervous. We hope this way of learning will help the students to acquire the knowledge of this area extensively.

On the other hand we have also created a material for the tutors which makes it easier and quicker for them to check how their students master the area of skin lesions. It removes the burden of correcting papers and provides the possibility of objective evaluation. Since the e-content is SCORM compatible, it can be easily transferred and integrated into other, more sophisticated SCORM and Learning Management Systems.

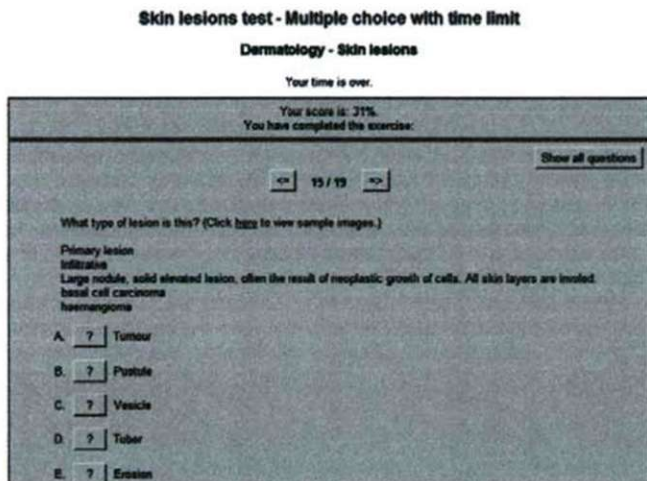


Figure 5. Multiple choice test in a web browser.

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