An eLearning platform for self-paced learning for Greek Paleography

A.S. DRIGAS*, A. TAGOULIS*, P.KYRAGIANNI*, P. NIKOLOPOULOS**, D. KALOMOIRAKIS**
S. PERADONIS****, D. KOUREMENOS*, CH. EMMANOUILIDIS***
J. VRETTAROS*
Net Media Lab, Demokritos,**IIT Demokrotos, **Athens University, ***Zenon S.A
* Patriarxou Grigoriou – Ag. Paraskevi, **Mount Sinai Foundation, *** Glyka Nera
GREECE
* dr, jvr, dkourem, tkyro, atagk {@imm.demokritos.gr}
* http://imm.demokritos.gr/
** kalomirakis@acn.gr, http://www.acn.gr/
*** christosem@zenon.gr, http://www.zenon.gr/

Abstract: - Today all around the world are taking place efforts for the preservation of antique documents and valuable manuscripts, which constitute a part of our vast artistic and cultural heritage. Could such an effort contribute to the preservation of manuscripts and simultaneously be used for educational purposes? That is the goal of the e-learning system that is presented in this paper. The content of this e-learning system is a meeting point of the past and the future, providing historic content, taking advantage of the new technologies with an original and interactive educational way. The system aims to provide fundamental knowledge to scholars in the Greek Paleography of the Byzantine era, through the processed presentation of authentic manuscripts taken from "The Book of Jove", and through interactive and multiform lessons. This paper has been supported by Net Media Lab.

Key-Words: - e-learning, paleography, manuscripts, transcription, interactive-learning

1 Introduction

Everywhere one looks, the Internet and the Information and Communications Technologies (ICT)[20] have transformed the way of working, governing [18,19], and communicating [17], as the technology has enabled and provides new ways for their realization.

E-learning is one of the revolutions that where born through the growth of the new technologies and the Internet and changed everyone's point of view about education and the delivery of knowledge [2,3,4]. The e-learning gives the opportunity to the user for distant learning through the Internet with such means as text, picture, audio and video. Some of the educational purposes of e-learning, are history [7,8], art [5,6] and literature [9,10]. Paleographic manuscripts are part of the three of them. Today somebody can find on the Internet a large number of e-learning platforms, partly from universities, which aim at the education of the users in paleography, through the provision of content [11,12,13,14,15].

The content is founded on the manuscript taken from "The book of Jove" and specifically the Sinaiticus Codex. The manuscript was elaborated in association with the Mount Sina Foundation and was integrated in the e-learning system in a unique way, in order to provide interactive education to the users [16].

The e-learning system is available via Internet and as a cd-rom, based on the standard of the platform independency.

2 Development of the learning material

All the material is based on e-learning standards and it follows a specific structure of consecutive difficulty levels, simultaneously taking into consideration the gained experience, as well as the clarification of the constituents of paleography, from the users during the educational process.

2.1 Material Standards

The material structure follows the e-learning standards of NLN (National Learning Network)[1]. The material comprises the elements of introduction, task, and assessment, on which the learning strategic of the system is based on (Fig.1). This strategic is clearly visible as every type of lesson, begins with information and instructions, continues with leveled lessons and ends with a lesson that the user can evaluate the gained knowledge that he obtained from every lesson.

Also the use of graphic images follows the rules that are defined for their use. Every image in the e-learning platform is used for instructional,

motivational, or attention focusing effects, and not simply for the sake of including them on the screen. Every item on the screen earns its place. Graphics are crisp and clear. Where graphics are used there is also a text alternative to every image. One can realize this through the high-resolution images of paleographic manuscripts and the images of letters, combinations of letters, abbreviations, words and senteces, which are only used for learning purposes, in order to enhance and enrich the content for an easier and more effective education of the user.

Furthermore the system provides effective correction processes to the user in order to replace the absence of the tutor. In every lesson there have been developed mechanisms for presenting the correct answers to the user and simultaneously highlight the difference between the correct answers and the answers given by the user, in order to substate the absence of the tutor.
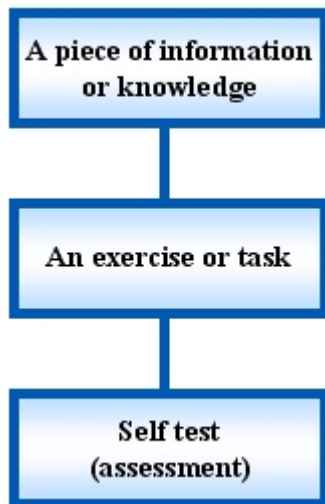
and the second type consists of letters represented by a symbol. From the experience so far, the user can distinguish the letters, the combinations of letters and the cases that are used, and in this level the user is simultaneously trained on abbreviations.

3 Structure of the e-Learning Environment

The system consists of the introductory note, the theory courses and the transcript interactive lessons, the manuscript interactive lessons, and the user forum. The user's access to these features depends on his access level. There are three kinds of user levels (Fig.2).
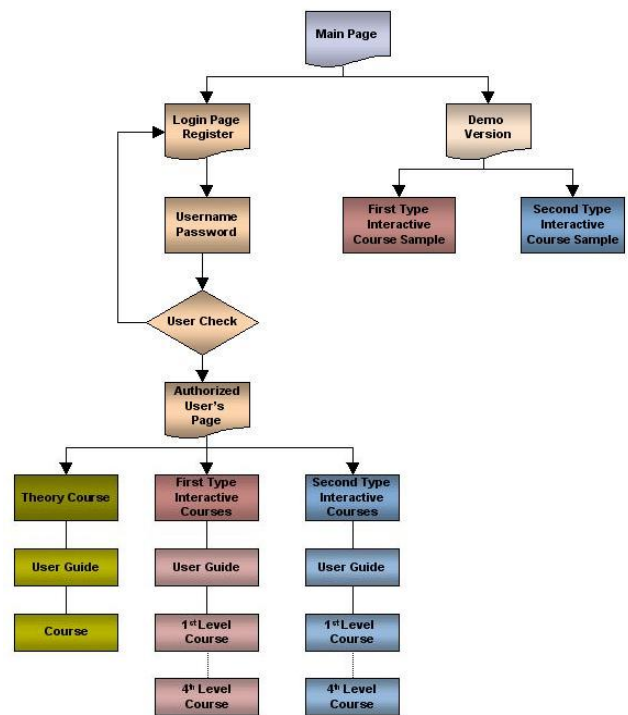

Fig.1 Elements of e-learning standards

Fig.2 User Levels

2.2 Material Structure
At the first level lessons, examples of paleographical words, that contain letters only, were used, as the user for each letter has more than one selections, giving the user the opportunity to understand which letters are used in specific words and in which cases.

At the second level lessons, examples of paleographical words, that contain letters and combinations of letters, were used advancing the difficulty level.

At the third level lessons, examples of paleographical words, that contain letters, combinations of letters and the first type of abbreviations, were used.

There are two types of abbreviations. The first one consists of letters that are represented by joint letters

3.1.1 Administrator
The administrator has access to all the tools of the system, and also can make changes. He is responsible for updating the system and the enrichment of the educational content, according to the structure of the content.

3.1.2 Authorized User
The authorized user has access in all the courses of the educational content. The system provides him with the ability the type of course and the level of difficulty that he wishes to be educated in.

3.1.3 Unauthorized user

The unauthorized user has access to a demo version of the content. The system provides him with the ability, of choosing between the first and the second type of the interactive courses, where he can be educated in a small number of examples that they have been taken from the full version.

4 New Features & Lessons

The e-learning system is enriched with new features such as pictures of the authentic manuscript of the "Book of Jove" and also a new interactive lesson for the Theory Lessons and a new section called, Theory Interactive Lessons, has been developed and integrated.

4.1 The Introductory note

In the interactive lessons we chose not to include cases of letters, combinations of letters and abbreviations that appear rarely in "The Book of Jove" and in Greek Paleography in general, in order not to deviate from the educational purposes of this e-learning system. These rare cases of the constituents of Greek paleography may not be used in the lessons but they are reported and described in the Introductory Note, so that the user can have an integrated view of the constituents of the Greek pearlscript paleography.

The introductory note also includes a map of the Greek polytonic keyboard layout and the Greek polytonic key combinations for Windows users (Fig.3). There are 25 diacritical marks and combinations of diacritical marks that are used in Greek paleography and are available through key combinations; hence the presence of the map was necessary for the users.

Fig.3 Example of key combination

4.2 The Theory lessons

The Theory lessons have been enriched. The design has been changed and there are new features and a new interactive lesson.

4.2.1 New Design

Entering this lesson the user comes across the instructions that have to be followed. The user is given the opportunity to study and learn the spelling of paleographic words, through a large number of representative examples. There is a column containing the letters, the combinations of letters and the two types of abbreviations that are included in the educational content. For each one of them, there are examples, where the user can study the letters, the cases and the words as well as part of the words where each letter, combination of letters and abbreviation is used in Greek paleography (Fig.4, Fig.5, Fig.6). Many of the examples that the user can study in this lesson are common with the examples that the user is trained in the interactive lessons in order to make the educational process of the user easier.

Fig.4 Sample of the Theory Lesson
(Example of letters)

Fig.5 Sample of the Theory Lesson
(Example of combinations of letters)

Fig.6 Sample of the Theory Lesson
(Example of abbreviations)

4.2.2 New interactive lesson

The theory course has been enriched with an extract from the Sinaiticus Codex of the "Book of Jove". There, the user has the opportunity to study the letters, combinations of letters and the two types of abbreviations automatically distinguished in the book, by pressing the corresponding button. For example if the user presses the "Combinations of letters button", the combinations of letters appear (Fig.7). The book extract is the same as the examples for the interactive lessons are based on, in order to facilitate the educational course of the user through the whole content.
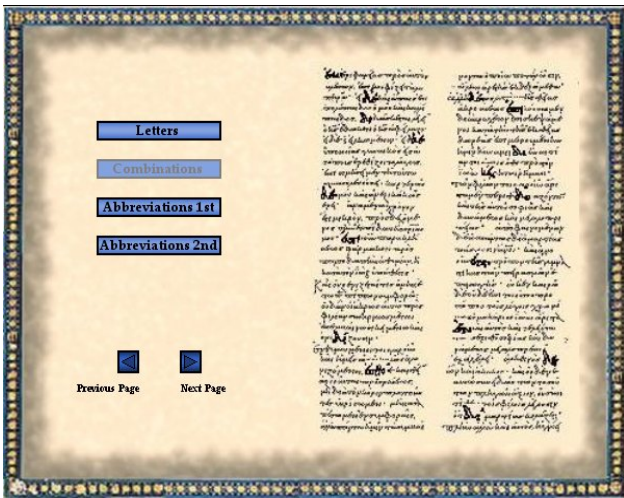

Fig.7 Sample of the interactive lesson

By pressing the "Clear button" the elements appeared vanish, and the book extract returns to it's original form. Then the user can press again one of the buttons for letters, combinations of letters and abbreviations first or second type.
When the user has completed this page he can proceed to the next one by pressing the "next page button".

4.2.3 New Features

The content has been enriched with pictures of the manuscript, from the Sinaitucus Codex of "The Book of Jove"). A section was created where, each page of the extracted manuscript is presented accompanied by its translation, giving the opportunity to the user to read and study the authentic manuscript of the Sinaitucus Codex (Fig.8). By pressing the "next page button", the user is transferred to the next page.
Apart from the extraction of the manuscript and it's translation, as the user turns the pages, can also see images that contain text and pictures, taken from the authentic manuscript, for a complete sense of the art of paleography.
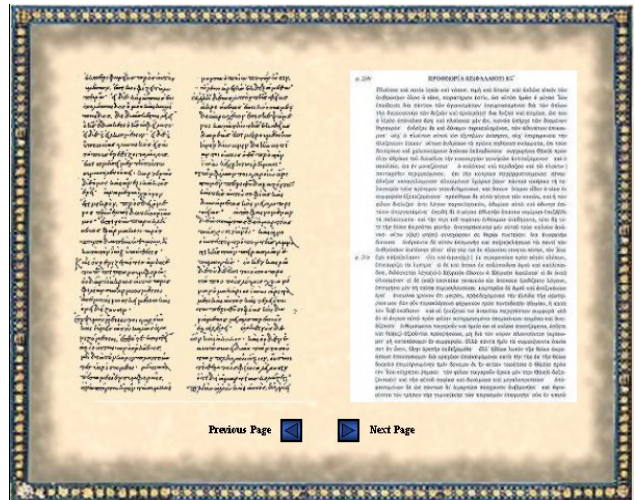

Fig.8 Sample of "The Book of Jove"

4.2.4 The Theory Interactive Lessons

A new type of lesson was developed that is considered important for leveled and integrated education of the user in Greek paleography, namely "The Interactive Lessons". Though this lesson the user is trained and simultaneously evaluates his/her ability in distinguishing the letters, the combinations of letters and the two types of abbreviations (Fig 9). This lesson contains sentences where the letters, combinations of letters and the two types of abbreviations have been distinguished in a non-visible way for the user. This lesson follows the content structure on which the e-learning system is based. Hence, the user is primarily trained in distinguishing the letters.

For example by pressing a part of the sentence that the user thinks is a letter and, the application informs the user if it is correct or wrong, and what the part of the sentence that the user pressed, represents.

Fig.9 Sample of the Theory Interactive Lessons

By pressing the "clear button", the user can clear his last selection. By pressing the "clear all button" he can repeat distinguishing the letters, combinations of letters and the abbreviations for the present sentence from the beginning.

From the theory and the theory interactive lessons, the user has obtained high skills in distinguishing and comprehending the letters, combinations of letters and the two types of abbreviations before proceeding to the interactive transcript and manuscript interactive lessons.

4.2.5 User Forum

A user forum was added to the site aimed to be a meeting point of the scholars for the sharing of questions and answers, opinions about the e- learning system and knowledge for Greek paleography (Fig.10). This forum is going to be the main guide for the enrichment of the content and the development of new features.
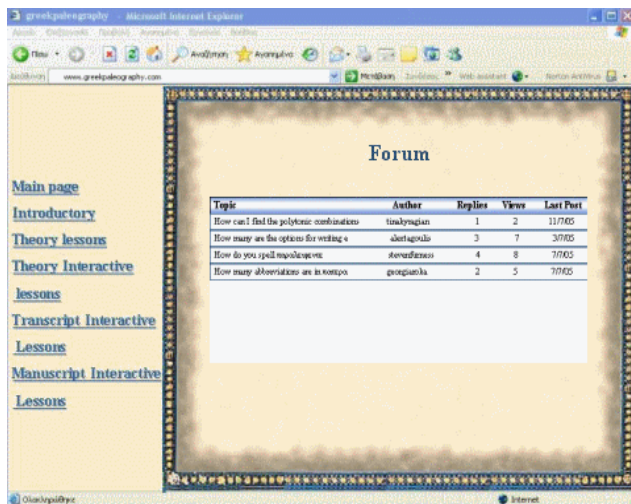

Fig.10 User Forum

4.2.6 Transcript Interactive Lessons

Entering this lesson the user comes across with the instructions for this lesson, and the selections for the four difficulty levels of the lessons. By choosing one of the difficulty levels, the corresponding application appears. In this application the user is asked to transcript the word the word given.

The application gives the opportunity to the user to transcript the word using Greek polytonal system, which is tool of vital importance for the education in Greek paleography. After having transcripted the word the user can press the "Comparison" button, to see the result of the comparison.

Fig.11 Sample of the Transcript Lessons
(Correct result)

If the word is transcripted correctly, a message appears saying "You passed successfully to the next example" (Fig.11). If the transcription is wrong, the correct transcription of the word appears, such as the word typed by the user and the equivalent errors character by character (Fig.12). Then if the user wishes, he can press the "Clear" button and try to transcript the word again. If he thinks that he is over with this example he can pass to the next one.
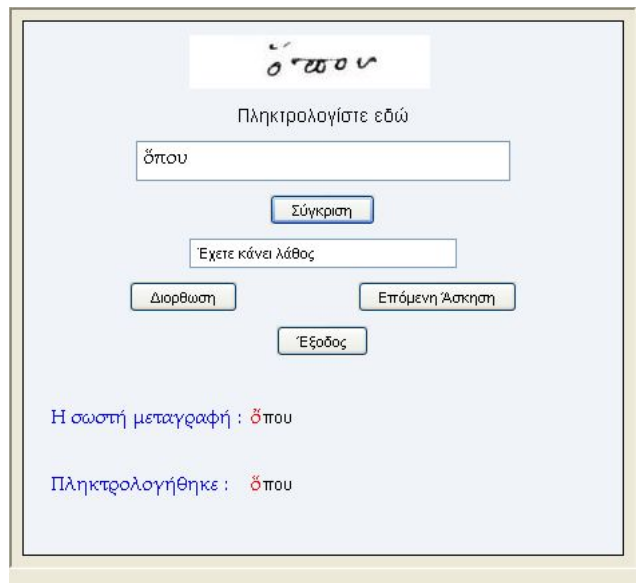

Fig.12 Sample of the Transcript Lessons
(Wrong result)

4.2.7 Manuscription Interactive Lessons

Entering this course the user comes across the instructions that have to be followed, and the

Fig.13 Sample of the Manuscript Interactive Lessons
(Wrong result)

selections for the four-difficulty levels of the lessons. By choosing one of the difficulty levels, the corresponding application appears.

In this application the user is asked to manuscript the transcripted word given by using the keyboard. If the manuscripted word is wrong, the user can erase the wrong letter-not the whole word- using the "Correction" button.

Then by pressing the "Comparison" button, the result of the comparison appears. If the word is manuscripted correctly, a message appears saying, "Congratulations the word is correct" (Fig.14). If the manuscription is wrong, the correct manuscription of the word appears, so as the user can locate his mistake (Fig13). Then if he wishes, he can press the button "Clear" and try to manuscript the word again. If he thinks that he is over with this example he can pass to the next one.

Fig.14 Sample of the Manuscript Interactive Lessons
(Correct result)

5   Development of the e-Learning Platform

For the development of the e-learning system environment the java programming language was used. As far as the Internet platform is concerned, the java server pages (jsp) provides many benefits, such as, separated content and display logic, support of the software reuse through the use of components, platform independency, better tool support, portable to multiple servers and operating systems, extensibility, and it's better for the development of dynamic parts. When exploring the opportunities that jsp gives, it becomes clear that the e-learning system Internet platform has gained a whole new look (Fig.15).

Moreover, as far as the development of the user interface is concerned, Java offers many advantages. It is platform independent, in order to give access to the content for any user, either he uses it via Internet or via cd-rom. Another advantage is multithreading, that is, the possibility for executing many processes simultaneously.

Multithreading was a basic requirement, especially for the development of the paleographical keyboard, where there was the need for presentation and usage of images and, simultaneously data input from the user.

The evolved libraries, Swing and AWT, made possible, the simultaneous presentation and usage of labels, buttons, text fields, and images for the development of the graphical user interface, in a window environment. Moreover, the constituents of the Java libraries are considered as lightweight, meaning that they are all written in Java, and therefore there aren't visible differences, in the speed of the applications, despite the use of numerous images.

Using special methods for the text constituents, a comparison between the data given by the program, and the data input by the user, character by character, was achieved at the manuscript interactive lessons, resulting in a more efficient education of the user.

Through the libraries that contain classes and interfaces for the support of text constituents, and through the ability given by the nature of Java, for selecting the desired font, the use of the Greek polytonic system, by the user for data input and from the content of the database, became possible.

Integrating the Greek polytonic system to the platform was not very easy, as it was recently included in the Windows software. Therefore, it is easy to understand that the Greek polytonic system is not included in any programming language development platform. Through special processes we integrated to the development platform a Greek polytonic font and managed to achieve the usage of the Greek polytonic system.
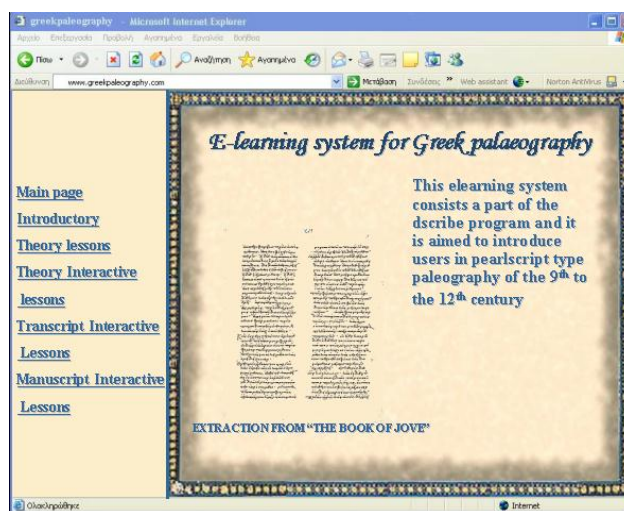

Fig.15 The new look of the site

Conclusion

The effort for the revival of Greek manuscripts is in its beginning. We intend to continue this effort by enriching the content, with more manuscripts, types of paleography, and elements of the Greek paleography for the specific system. Already the scholars of the Theology department of the Athens University are showing great enthusiasm for the coming of such a tool in their hands. But should Greek paleography be aimed at scholars only?

"In the time that there is a great need for confronting the lexical poverty that appears especially in the young people, the return to the Greek linguistic inheritance is the answer to this problem", as the President of the Greek Philologist Union remarks.

Hence, we plan to use the know-how and the infrastructure of this e-learning system that was used for this content, for a new system concerning Greek paleography and Greek manuscripts that will be attractive and popularized and will aim at bringing every user close to the lexical and cultural wealth of the Greek language.

References:

[1] National Learning Network, "Paving the way to excellence in e-earning", (http://www.nln.ac.uk/materials/tutors/Paving_the_way.asp?menuitem=paving).

[2] Djamshid Tavangarian, Markus E. Leypold, Kristin Nölting, Marc Röser, Denny Voigt, "Is e-Learning the Solution for Individual Learning?" Djamshid Tavangarian, Markus E. Leypold, Kristin Nölting, Marc Röser, Denny Voigt, University of Rostock, Germany, Electronic journal of e-learning, Vol.2,Issue 2, December 2004.

[3] Dr. Marc J. Rosenberg, "E-learning".

[4] Lewis, M. "Interactive multimedia pedagogy: How interactivity supports learning", 2003, (http://www.thelearningcurve.com/lessons/resources/media/TLC_interactive%20pedagogy.pdf).

[5] Tate Gallery, e-learning content (http://www.tate.org.uk/learning/).

[6] Magda Vasillov, "E-Learning Art History: An Asynchronous Online Art History Course for Community College Students", Education Technology 2001 Conference.

[7] ABC's Winged Sandals website, e-learning interactive project for Ancient Greek History.

[8] University of Hong Kong, French at HKU e Learning
(www.hku.hk/french/resources.htm#online).

[9] The CUNY Online Distributed Learning Network, Introduction to Literature
(http://www.dln.cuny.edu/courseinfo.php?CourseID
=973).

[10] California University State, Stanislaus, Online Courses Art, History, Psychology and Literature

[11] The National Archives, "Paleography: reading old handwriting 1500 – 1800-A practical online tutorial"
(http://www.nationalarchives.gov.uk/palaeography/).

[12] A. Cartelli, M. Palma: The Open Catalogue of Manuscripts Between Paleographic Research and Didactic Application , IRMA 2003 International Conference "Information Technology and Organizations: Trends, Issues, Challenges and Solutions", 18-21/05/2003, Philadelphia PA, USA.

[13] The Schoyen Collection, e-learning content for paleography
(http://ce.byu.edu/courses/univ/734141400105/public/start.htm).

[14] The University of Melbourne, Ductus –an online course in Paleography
(http://www.medieval.unimelb.edu.au/ductus/).

[15] Brigham Young University, "English Language Paleography", online courses
(http://ce.byu.edu/courses/univ/734141400105/public/start.htm).

[16] A.S. Drigas, A. Tagoulis, P.Kyragianni, P. Nikolopoylos, D. Kalomoirakis, D.Koyremenos, CH. Emmanoyilidis, J. Vretaros, "A self learning e-system for Greek paleography", WSEAS TRANS on Information Science, 2 Applic, Issue 8, Vol.2, August 2005, P. 1096-1099.

[17] Laurie K. Benson, "The Power of eCommunication".

[18] Apostolos Andreoulakis,Greek Deputy Minister of Interior Public Administration and Decentralization,"e-Government:Focusing on the citizen",WCIT 2004 - XIV World Congress on Information Technology in Athens, 19-21 May 2004, Session Theme: ''The State - of- the Art''.

[19] Paul Waller, Peter Livesey,Karin Edin, "e-Government in the service of democracy", ICA International Council for Information Technology in Government Administration, ICA Information No. 74: General Issue, June 2001.

[20] United Nations Educational, "Scientific and Cultural Organization, Institute for Information Technologies in Education, "Information and communications Technologies is Distance Education", 2002.