

**E-learning and blended approaches for
cartographic courses at the Surveying
Engineering Department of Technological
Educational Institution (TEI) of Athens:
Challenges and Problems**

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**(Society for Organisations, Cartography,
Remote sensing and Applications using
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A blended educational approach

For two courses



“General and Mathematic Cartography”

“Digital Cartography and Spatial Databases”

For four kinds of users



- undergraduates
- undergraduate ERASMUS students
- graduates or other interested parties (Life-Long Learning)
- postgraduate students of Geoinformatics- Telegeomatics

What is a “blended approach”?

By the term
“blended approach”

we mean a combination of long distance *“support modules”*

(e.g. interactive e-Learning modules, putting teaching materials on the web)

+

“process”

(e.g. computerized exams, send the homework by email)

and

face –to –face traditional learning.

Why blended and non traditional ?

Our final goal is to create a blended approach which will be more motivating compared to a traditional lecture.

Blended educational approaches started to be developed and implemented in our department since 2007 within a research framework program called “Archimedes”, partly funded by the EU.

Now, besides the termination of the research program, such approaches continue for the cartographic courses aiming to:

- The development of a blended educational approach **(60% traditional- 40% e-Learning)** for the full-time students.
- The development of a blended educational approach **(30% traditional- 70% e-Learning)** for the ERASMUS students.
- The development of an e-Learning basis for an international Master of Science (MSc) degree in the Geoinformatics – Telegeomatics field with the collaboration of other universities.
- The development of an E-learning basis for a Life – Long Learning system for past graduates of the department in the field of Geoinformatics.

E-LEARNING AND BLENDED APPROACHES IN GEOMATICS FIELD

A research with any browser combining the words Geoinformation plus

- **(+) e-learning gives about 30.000 references**
- **a number of important e-Learning projects**
 - http://www.gitta.info/website/en/html/unit_about.html
 - <http://www.geo.unizh.ch/virtualcampus/gitta>
 - <http://edina.ac.uk/projects/mapscholar/about.shtm>
 - www.eduGI.net/eduGI.LA/
 - <http://ocw.mit.edu/index.htm>

THE STRUCTURE OF THE COURSES

General & Mathematical Cartography

15-week mandatory course of the 3rd semester

- theory lectures (3 hours per week)
- laboratory sessions (3 hours per week)

Digital Cartography and Spatial data bases

15-week mandatory course of the 7th semester

- theory lectures (3 hours per week)
- laboratory sessions (3 hours per week)

THEORY LECTURES

- theory chapters

Presentation, Discussions and further analysis

- invited speakers, experts of the public and private sector

Presentations of various topics in the field of cartography – geoinformatics

- the laboratory exercises as well as the semestrial project are often distributed and discussed during lectures.

LABORATORY WORK

Groups of two on weekly assignments & on individual research projects which comprise of:

- **Demonstrations** designed to display particular skills, given by the instructors.
- **Controlled assignments**, wholly devised by the instructors that yield known results.
- **Structured questions**, where students might be given an objective but they are free to choose a data set and they have to develop their own procedures and provide their own interpretations of the results.
- **Open questions**. These require students to identify a problem, formulate it clearly, develop appropriate procedures, interpret results and consider their implications. Students are requested to develop the ability to research different types of information and have a critical point of view.
- **Research projects**. Project topics might be selected by the students or instructors.

The theoretical content of “*Digital Cartography*”

- *Introduction, basic concepts and principles*
- *Digital cartographic data types*
- *Sources of digital geospatial data*
- *Software and equipment*
- *Geographical digital data characteristics*
- *Spatial Database management. Planning levels*
- *Conceptual modelling of spatial databases and CASE – tools*
- *Spatial Database structures*
- *Interrelation between digital maps and databases*
- *Georeference*
- *Digital terrain models*
- *Cartographic generalization in digital maps*
- *Metadata and data dictionaries*
- *Quality and compatibility of geographic digital data*
- *Exchange standards*
- *Data compression*
- *Cartography with satellite images*
- *Automated vehicle systems and digital cartography*
- *Digital maps on the internet*
- *Geographic digital data for Greece*

The laboratory content of “*Digital Cartography*”

- **The understanding and practical implementation of the concepts of digital cartography and spatial databases as reported in theory lectures**
 - **Familiarization** with basic software and hardware used in digital cartography
 - **Development of cartographic databases**, conceptual models of alphanumeric and spatial databases, data dictionaries, topological relationships of cartographic data, digital maps' quality control
 - **Raster and vector digitization**
 - **Generation, update and digital map control**
 - **Special issues** (i.e. use of satellite imagery and aerial photography)
- Special attention has been given to:**
- the updating of the content of the course according to similar courses
 - taking into account the everyday use of digital cartography in many of people's activities (GPS for car/boat navigation, maps in mobile phones, maps on the internet, etc)

The content of “General and Mathematical Cartography”

- *Introduction, basic concepts and principles, history of cartography Cartographic data*
- *Plane coordinates systems, transformations (Helmert, affine)*
- *Physical earth surface, sphere and ellipsoid, geographical and geodetic coordinates systems*
- *Cartographic distortions*
- *Cartographic projections*
- *Use, selection, change of projections, change of ellipsoid*
- *Greek maps cartographic projections, coordinate systems and ellipsoids*
- *Topographical maps presentation, symbols, colour, relief*
- *Place-names*
- *Topographical maps*
- *Generalization*
- *Maps composition, publication, updating, revision*
- *Cartometry*
- *Maps production*
- *Cartographic data publications and organizations*
- *Special topics (maps and decision-making, propaganda, GIS, remote-sensing, photogrammetry)*
- *Maps use*
- *Research topics*

EXAMINATIONS AND TESTS

"Digital Cartography"

- **Theory exams** consist of a set of multiple choice questions covering all the issues discussed during the course lectures.
- **Laboratory test** involve questions that requires the use of the previously mentioned software.
- **The assessment** takes place in the laboratory and consists of an oral examination with questions on the methodology followed in using the software in order to get the results.

The final grade is weighted by 40% for the weekly assignments, by 30% for the individual project and 30% by the laboratory examinations.

"General and Mathematical Cartography"

- **Theory exams** consist of a set of multiple choice questions covering all the issues discussed during the course lectures.
- **laboratory grade** results from the weekly assignments (30%), an individual project (10%) and final written exam (60%).

THE USE OF E-LEARNING AND BLENDED APPROACH

E- class software

TOOL USED

our e-Learning platform is available via the web for both synchronous and asynchronous education process

synchronous tools:

- a "chat" facility

asynchronous tools:

- a forum to discuss ideas, exchange opinions, and see questions and difficulties answered
- e-mail to ask for indications from the instructors and work out problems and difficulties in the learning process
- online tests to observe the progression of the students
- the option to store and organize various types of files (e.g. Word, Excel, and PDF)

The core objective and aims of our blended approach

Our core objective is to motivate the students to endeavour in using the educational resources we have gathered, having the following **aims:**

- The increase of the students' participation in the educational process.
- The increase of students' initiative.
- The continuous self-assessment of the students.
- The application of new multimedia technologies in the educational process.
- The total computerization of the students' exams.

A BLENDED EDUCATIONAL APPROACH **(60% TRADITIONAL - 40% E-LEARNING)**

FOR FULL-TIME STUDENTS

Why to introduce a Blended Approach in a traditional University? 1/3

A blended approach increases the students' participation in the educational process.

Although the students do not participate in the theoretical courses via mandatory E-learning exercises and essays students are obliged in a more substantial participation.

- **A blended approach increases the students' initiative.** The students are urged to search sources that we have already found and during the process to investigate further.

**A BLENDED EDUCATIONAL APPROACH
(60% TRADITIONAL - 40% E-LEARNING)
FOR FULL-TIME STUDENTS**

**Why to introduce a Blended
Approach in a traditional
University? 2/3**

- **A blended approach stimulates the continuous self-assessment of the students.**
 - Self-assessment tests according to the large number of students and the rigid interrelation between the professor and the students that dominates our university could not take place via traditional methods.

Why to introduce a Blended Approach in a traditional University? 3/3

- A blended approach **facilitates the application of new multimedia** technologies in the educational process.

Three-dimensional and two-dimensional graphics, videos, sounds etc. **and ancillary tools attract particularly younger generations and on the other hand distinctly assist** in teaching and in comprehending issues that specifically involve spatial – cartographic depiction.

- A blended approach incites **the total computerization of the students' exams**. The course exam -at least one part of them- takes place with a computerised way through various kinds of quizzes.

A BLENDED EDUCATIONAL APPROACH (60% TRADITIONAL - 40% E-LEARNING) FOR FULL-TIME STUDENTS

Χρήστης : Δήμος ΠΑΝΤΑΖΗΣ
e-κπαίδευση

Τα μαθήματα που υποστηρίζω (Καθηγητής)

[ΨΗΦΙΑΚΗ ΧΑΡΤΟΓΡΑΦΙΑ ΚΑΙ ΒΑΣΕΙΣ ΧΑΡΤΟΓΡΑΦΙΚΩΝ ΔΕΔΟΜΕΝΩΝ](#)
Δήμος ΠΑΝΤΑΖΗΣ Καθηγητής
DIGITALCARTO

[ΓΕΝΙΚΗ ΚΑΙ ΜΑΘΗΜΑΤΙΚΗ ΧΑΡΤΟΓΡΑΦΙΑ](#)
Δήμος ΠΑΝΤΑΖΗΣ Καθηγητής
GEMACARTO

[DIGITAL CARTOGRAPHY AND CARTOGRAPHIC DATABASES](#)
Δήμος ΠΑΝΤΑΖΗΣ Καθηγητής
DCARTOERASM

What have we achieved until now:

This is our E-learning platform on a central website and server of our University.

The links are all operational and correspond to both courses in Greek for the Greek full-time students.

The third link, corresponds to the course "Digital Cartography and Cartographic Databases" (in English) for the ERASMUS students.

A BLENDED EDUCATIONAL APPROACH

(60% TRADITIONAL - 40% E-LEARNING)











FOR FULL-TIME STUDENTS

- lecturers and professors may locate their lecture material (i.e. notes, diagrams, even videos etc.).
- students have access rights to these materials, submit assignments and communicate with the lecturers, conducting discussions or even tutorials.
- samples of local and international digital data of different kind, (satellite images, vector data, raster data, etc.), are also stored in the server.
- The rating of each exercise is announced to students through E-class together with a common list of corrections and warnings. That is a very advantageous method firstly, because the students may view everybody's mistakes. Secondly, it is helpful for the teachers because they avoid repeating corrections and warning on individual basis in the written examination.





A BLENDED EDUCATIONAL APPROACH (60% TRADITIONAL - 40% E-LEARNING) FOR FULL-TIME STUDENTS

Χρήστης : Δήμος ΠΑΝΤΑΖΗΣ
Μάθημα: ΨΗΦΙΑΚΗ ΧΑΡΤΟΓΡΑΦΙΑ ΚΑΙ ΒΑΣΕΙΣ ΧΑΡΤΟΓΡΑΦΙΚΩΝ ΔΕΔΟΜΕΝΩΝ
Κωδικός: DIGITALCARTO
Διδάσκων: Δήμος ΠΑΝΤΑΖΗΣ Καθηγητής
e-κπαίδευση > ΨΗΦΙΑΚΗ ΧΑΡΤΟΓΡΑΦΙΑ ΚΑΙ ΒΑΣΕΙΣ ΧΑΡΤΟΓΡΑΦΙΚΩΝ ΔΕΔΟΜΕΝΩΝ

[Προσθήκη εισαγωγικού κειμένου](#)

 Αναλυτική Περιγραφή Μαθήματος απενεργοποίηση	 Προτεινόμενη Βιβλιογραφία απενεργοποίηση
 Χρονοδιάγραμμα Διαλέξεων απενεργοποίηση	 Εκπαιδευτικό Υλικό απενεργοποίηση
 Ερωτήσεις-Ασκήσεις-Προβλήματα απενεργοποίηση	 Εργασίες φοιτητών απενεργοποίηση
 Ανακοινώσεις απενεργοποίηση	 Σύνδεσμοι απενεργοποίηση
 Χώρος Ανταλλαγής Αρχείων απενεργοποίηση	 Κουβέντα απενεργοποίηση

Μόνο για Διαχειριστές

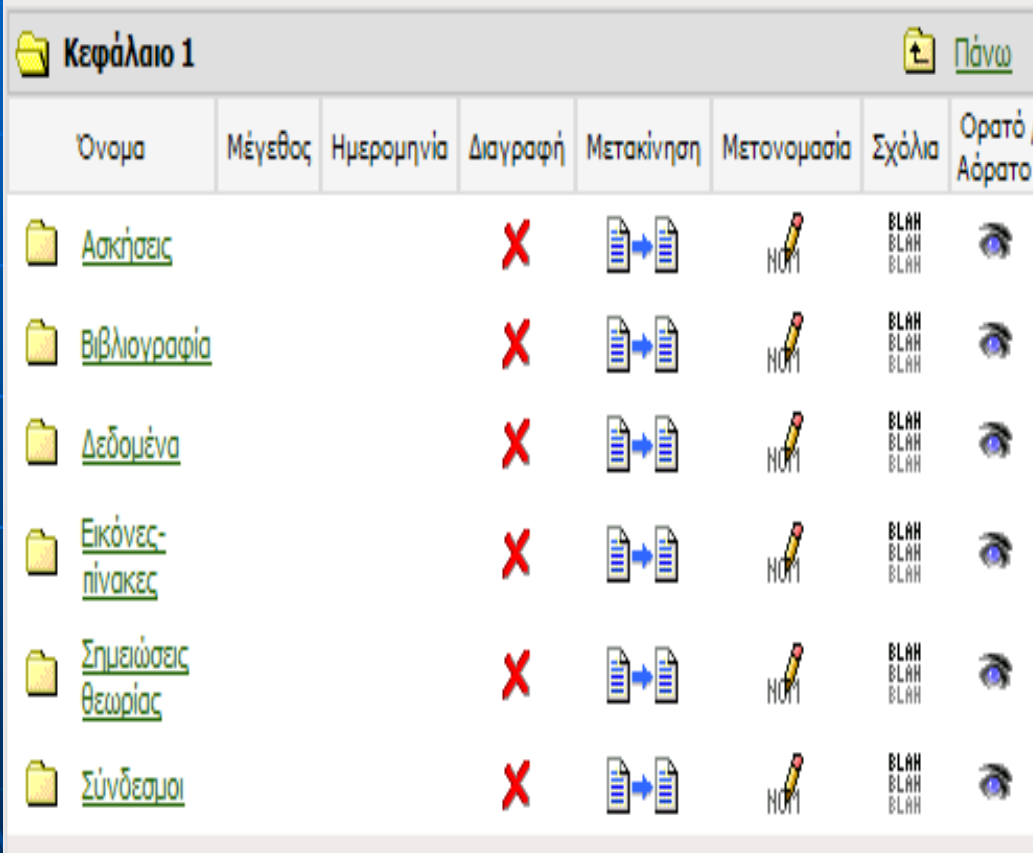
 Στατιστικά	 Αλλαγή πληροφοριών μαθήματος
 Ανέβασμα σελίδας και δημιουργία συνδέσμου στην αρχική σελίδα	 Προσθήκη συνδέσμου στην αρχική σελίδα

- The chat tool, is for live conversation between students and the professor in order to solve specific problems or to answer questions related to the course. Replies are visible to anyone registered in the course.

The forum for each course is also useful because it helps the professor to organize specific thematic sessions that are related to the course content.

Students are invited to post their opinion and receive replies from all the registered users (professors and students).

A BLENDED EDUCATIONAL APPROACH (60% TRADITIONAL - 40% E-LEARNING) FOR FULL-TIME STUDENTS



Κεφάλαιο 1 Πάνω

Όνομα	Μέγεθος	Ημερομηνία	Διαγραφή	Μετακίνηση	Μετονομασία	Σχόλια	Ορατό / Αόρατο
Άσκησης			X			BLAH BLAH BLAH	
Βιβλιογραφία			X			BLAH BLAH BLAH	
Δεδομένα			X			BLAH BLAH BLAH	
Εικόνες- πίνακες			X			BLAH BLAH BLAH	
Σημειώσεις θεωρίας			X			BLAH BLAH BLAH	
Σύνδεσμοι			X			BLAH BLAH BLAH	

Advantages & disadvantages, profits & problems: our experience (1/2)

The blended educational approach we are trying to adopt has several and crucial advantages, namely:

- - Students have access in the educational material and are able to prepare the lessons earlier before the lectures.
- - The collaboration of the teaching staff improves, (in our case there is one professor and three scientific assistants), which essentially helps to integrate the role of teachers.

Advantages & disadvantages, profits & problems: our experience (2/2)

- - In cases where a lecture **is missed, mainly due to strikes**, or to the student's absence, the E-learning platform provides the student with the opportunity to obtain the necessary material to get going.
- - Facilitates **the students' work at home because the** E-learning platform offers effortless distribution of the educational material, independent of space and time, with the potentialities of hypertext, multimedia, etc.

Difficulties and disadvantages of this method (1/2)

We should mention though the following difficulties and disadvantages of this method which we are nevertheless prepared to overcome:

- - Execution and use of E-learning and blended approach **requires new competencies** of faculty members and should take into account the capabilities and limitations of the teachers.
- - There **is lack of time from** the professors – academic staff (at list at the beginning of the semester) **to prepare and manage** the E-learning platform and **deal with both the technical and educational barriers**.

Difficulties and disadvantages of this method (2/2)

- - There are obstacles with students that **are less self-disciplined** in submitting their work and following up the specific dates of deadlines brought out in the e-learning platform.
- - There are **technical problems** (unreliability of networked services, problems in computing services, and so forth).

A BLENDED EDUCATIONAL APPROACH (30% TRADITIONAL - 70% E-LEARNING) FOR THE ERASMUS STUDENTS

- **Why to introduce a blended approach in a traditional University for the ERASMUS students? (1/2)**
- Definitely all the above pros and cons also apply for this category of students. The ERASMUS students are an important part of our Institution hence these students reflect directly on our educational standards, and other numerous university facilities which are very important for the well-being of a European student.
- We have often traced the phenomenon of marginalization and downgrading the provision of knowledge to a simple reading of a foreign book from the library.
- It is crucial therefore to develop such methods for the ERASMUS students in order to battle with the problem of poor knowledge which is far from the desired standards of educational assistance to these students.

Why to introduce a blended approach in a traditional University for the ERASMUS students? (2/2)

- Indeed, the development of a specific educational structure of the Cartographic courses in English for the ERASMUS students, which in its greater part is computerized, is substantial in facilitating the communication (through the system) between the students and the professor and also fully operational.
- Additionally, an important goal here is to manage these particular courses effectively in order to create a substantial, standardized and proper assistance to the ERASMUS students because so far their medium- low number in the Greek universities does not practically allow the creation of multilingual sessions.
- For the time being, it is a challenge and a message of appreciation from our current ERASMUS students, to achieve more in this field of mediating knowledge and satisfying proper educational standards

What have we achieved so far

- By the time of writing this article, we are at the stage of **translating the Greek educational material of our E-learning platform in English, French, Italian and Spanish.**

Advantages- disadvantages, profits and problems: our experience.

- So far, we have lack of feedback regarding this approach hence now the ERASMUS students follow the traditional method of lecturing.
- Although the English version is nearly completed, we are at a pilot stage of testing and final corrections so to become operational.

AN E-LEARNING BASIS FOR AN INTERNATIONAL MASTER OF SCIENCE DEGREE

- Further, we aim to the creation of a **postgraduate degree (MSc) on the Geoinformatics – Telegeomatics** field with the collaboration of other universities based on an E-learning approach.
- It is in fact a strategic target of our Department.
- The core idea is to create an **international degree** in this field oriented to an educational blended platform which will facilitate the contacts and **reduce the expenses of the students through the virtual visit of the student.** Apparently, this scheme may attract students from many EU countries and so forth.

AN E-LEARNING BASIS FOR A LIFE –LONG LEARNING SYSTEM FOR THE PAST-TIME GRADUATES OF THE DEPARTMENT

- Similar programmes of Life-Long Learning have already been developed in the Greek educational system (Koutsopoulos, 2005; Maniadhakis, 2004).
- However, we should acknowledge **a general weakness of the Greek Educational Institutions of Higher Education to offer qualitative Life-Long Learning programmes**, not only to the graduates but also to the wider public, without **bureaucratic procedures, time and spatial restrictions**.
- Progressively we aim to the creation of a parallel structure for a Life-Long Learning educational platform for the graduates of the Department **in the Cartographic field**. Yet, this may apply to every interested party involved in this field.
- Apparently, **we isolate the mediation of knowledge from granting degrees and diplomas**.

CONCLUSIONS – PERSPECTIVES 1/3

In this article we have briefly presented

- **the barriers of a blended educational approach** for both the courses of “General and Mathematic Cartography” and “Digital Cartography and Spatial Databases” of the Department of Surveying Engineering at the School of Technological Applications (TEI) in Athens.
- The undergraduate students of the Department, the undergraduate ERASMUS students of the Department, the graduates or other interested parties (Life-Long Learning) and the post-graduate students in the field of Geoinformatics- Telegeomatics, **are the four kinds of users involved in using a blended educational approach.**
- **A step-by-step incremental approach and the logic of “one step at the time” are in our case the best practice to implement with success our blended educational approach in the cartographic courses of our department.**

CONCLUSIONS – PERSPECTIVES (2/3)

- In the near future **we also plan to add other useful materials like** census data, satellite data, raster and vector data, cartographic data, environmental data etc. so that research or a dissertation with these data would become convenient.
- Via our blended educational approach **we are oriented to improve the self – study** with E-learning process, the **communication and exchanges between students and educational staff**, to facilitate the answering to questions (with creation of a-priori questions - answers catalogue which would be enriched continuously.

- In any case, we underline that :
 - the **technology should not drive** the pedagogic approach/model of the teachers but
 - help them **deliver the pedagogic model** that they are comfortable with.

Finally, let us mention Parihar's (2004) words: "teachers will, however, always be needed!".

THE END

THANK YOU FOR YOUR ATTENTION