DIGITHUM
Les humanitats en l'era digital

www.uoc.edu/digithum

The use of new technology in teaching geography in the EHEA. The subjects of Social and Economic Geography, Cartography and Photointerpretation, and GIS

Anna Badia i Perpinyà
Full Professor in the Geography Department at the Autonomous University of Barcelona (UAB)
anna.badia@uab.es

Montserrat Pallarès Barberà
Full Professor in the Geography Department at the Autonomous University of Barcelona (UAB)
Vice-Rector for Research at the Autonomous University of Barcelona (UAB)
montserrat.pallares@uab.es

Joan Carles Llurdés i Coit
Full Professor in the Geography Department at the Autonomous University of Barcelona (UAB)
joancarles.llurdes@uab.es

Submission date: January 2006
Published in: May 2006

Recommended citation:

BADIA, A. ; PALLARÈS, M. ; LLURDÉS, J.C. (2006). "The use of new technology in teaching geography in the EHEA. The subjects of Social and Economic Geography, Cartography and Photointerpretation, and GIS". *Digithum*, issue 8 [article online]. DOI: http://dx.doi.org/10.7238/d.v0i8.526

Abstract

Over the last five years, the Autonomous University of Barcelona's Geography Department studies have undergone a series of structural changes. Adaptation to an online system has led to a structural change in the way in which knowledge is disseminated and materials produced, and the application of the so-called Bologna Process (adaptation to the European Higher Education Area, EHEA) has brought with it the need to change certain habits in the way knowledge is disseminated, a new credit transfer system (ECTS) and skills-based training. The Department has taken part in a pilot test project initiated by the Autonomous University of Barcelona (UAB). In this period of change, we are simultaneously offering three teaching systems: the traditional system, in line with the study plan from 2002; the Bologna Process system, started in 2005-2006, and the online system, which was started in the academic year 2001-2002 and which does not form part of the Bologna Process. Two or three years from now, there will be two systems, face-to-face and online, both of which are to be adapted to the Bologna Process. This article looks to show what these changes have meant, in terms of the experience in subjects we teach (Cartography and Photointerpretation, Social and Economic Geography and Geographic Information Systems), which provides the basis for a discussion of the pros and cons of adaptation of Geogr@phy Online and to the Bologna Process.

Keywords

geography online, ICT, e-learning, face-to-face learning, EHEA, ECTS, skills

Resum

En els darrers cinc anys, el Departament de Geografia de la Universitat Autònoma de Barcelona (UAB) s'ha vist immers en un seguit de canvis en l'estructura dels estudis. D'una banda, l'adaptació a la modalitat xarxa ha representat un canvi estructural en la forma de transmetre coneixements i en l'elaboració dels materials, i de l'altra, l'aplicació de l'anomenat Pla Bolonya (l'adaptació a l'espai europeu d'ensenyament superior, EEES) comporta canviar d'hàbits en la forma de transmetre els coneixements, amb un nou còmput de crèdits (ECTS) i una formació basada en competències. El Departament s'hi ha integrat com a prova pilot d'un projecte iniciat per la UAB. En aquest moment de traspàs oferim simultàniament tres sistemes d'ensenyament: el tradicional, seguint el pla d'estudis del 2002; el Pla Bolonya, començat el 2005-2006, i el de modalitat xarxa, que es va iniciar el curs 2001-2002 i que no ha entrat en el Pla Bolonya. D'aquí a dos o tres anys hi haurà dues modalitats, la presencial i la virtual, totes dues adaptades al Pla Bolonya. En aquest article volem mostrar què han significat aquests canvis prenent com a fil conductor l'experiència en assignatures que impartim (Cartografia i fotointerpretació, Geografia econòmica i social, i Sistemes d'informació geogràfica), a partir de les quals tractem els pros i els contres de l'adaptació de la geografia en xarxa i al Pla Bolonya.

Paraules clau

geografia en xarxa, TIC, docència virtual, docència presencial, EEES, ECTS, competències

"Where are your books? that light bequeath'd
To beings else forlorn and blind!"

William Wordsworth (1770-1850).
"Expostulation and Reply". *Lyrical Ballads* **(1798)**

Introduction

The fundamental changes to geography resulting from the tensions between the different types of space in the 21st century have brought with them changes to the way geography is taught, produced as a result of the introduction of ICT and the EHEA. With respect to this, we need to clarify certain concepts which we are to make reference to more widely in this article. In geography, by "different types of space", we mean the distinction between "places" and "spaces"; by "ICT", a more well known case, we mean the so-called new information and communication technology and, finally, the acronym EHEA stands for the European Higher Education Area. Obviously, all of these factors are interlinked, producing a very dynamic and complex process: a multitude of new concepts and elements, innumerable agents executing and receiving the product.

The Autonomous University of Barcelona's Geography Department has also offered, since the academic year 2001-2002, its Geography degree as an e-learning course. It was the first of its kind at the Autonomous University of Barcelona (UAB) and the first online Geography degree in Spain. Adapting this degree to e-learning took place in a context in which a series of online tools were already available to support face-to-face teaching. The platform that has made it possible is the Virtual Campus, one of the fundamental tools, which allows for interaction between the professor and the student.[www1]

In this article, we wish to look at these aspects in a specific case, the Geography degree offered at the Autonomous University of Barcelona (UAB), and three first and second-level subjects: Social and Economic Geography, Cartography and Photointerpretation, and Geographic Information Systems (GIS); though there are collateral results from the participation of the article's authors in other courses and programmes, and other subjects or specialisations relating to geography, offered as part of courses from the Universitat Oberta de Catalunya (UOC), the UAB itself or the UAB's College of Tourism. These different experiences offer us a wider perspective on e-learning with respect to face-to-face teaching, which we believe could constitute a starting point for subsequent work in this area.

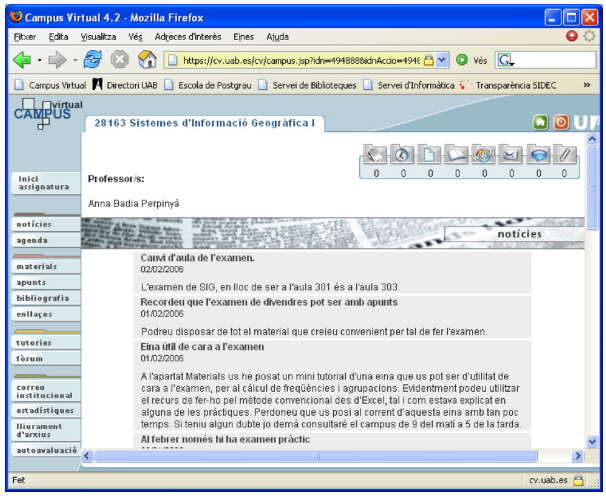
This article has been organised in the following way: Firstly, it looks to offer a more theoretical reflection on the two processes of change affecting the Geography Department; on the one hand, the contrast between e-learning and face-to-face teaching or the use of virtual tools to support face-to-face teaching; and on the other, the bases of the EHEA. There is a section explaining the two processes, which incorporates our teaching experience in a range of subjects. In conclusion, there are some final thoughts that look to show the pros and cons of these experiences.

[www1]: https://cv.uab.es/cv/entrada.jsp

Reflections on the use of the Virtual Campus and the implementation of Geogr@phy online

The UAB first decided to offer complementary online studies in 1996. At the time, a series of tools were on offer, providing online support for face-to-face teaching, and there was the chance to study some subjects online. The number of subjects increased gradually, but not until the academic year 2001-2002 did the Geography Department start rolling out a 100% e-learning degree, using the platform offered by the Virtual Campus. The Virtual Campus is a platform created to offer virtual teaching support. The teaching staff, alongside their 'traditional' teaching, have the chance to upload complementary material to the internet, to communicate with students, to post news items and notices, to open forums for discussion, etc. (Badia, Durà, 2005). Figure 1 shows what the Virtual Campus generally looks like, with a screenshot from a page offering news.

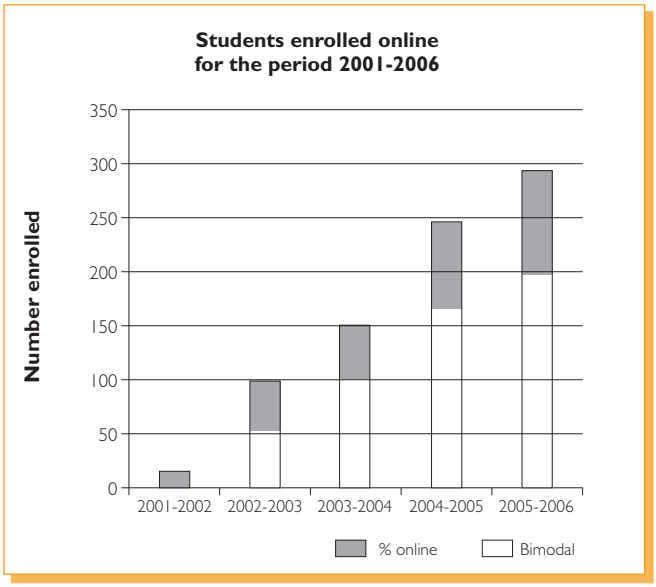
Figure 1. What the Virtual Campus looks like



The roll-out of the e-learning degree has allowed students the chance to use a bimodal system: they can enroll for both online and face-to-face subjects. This offers greater levels of flexibility when it comes to studying the Geography degree at the UAB and allows students to combine their studies with other professional tasks, without losing out on the face-to-face option.

Figure 2 shows the number of students enrolled on the online subjects, differentiating between those who are 100% online and those whose studies are bimodal, for the period 2001-2006. It is worth pointing out that the experience gained over these four years has shown that, in general, those who matriculate for 100%

Figure 2. Students enrolled online



of the course online keep more effectively to the course than those whose studies are bimodal, though we have been unable to check this finding statistically as yet.

From the point of view of the results, the different learning options mentioned in this article should have led to similar levels of grades and quality. When graduating in Geography, the student has to respond in the same way before society in their professional tasks, with a level of technical and intellectual preparation that allows them to resolve the geographic problems arising from the discipline.

In terms of teaching practice, the introduction of ICT in geography has led to different results in class work, which we would like to highlight below:

a) Thanks to the shared platform, the teaching staff can design the 'virtual' part of subjects in terms of different aims and characteristics than those that would have been employed in a 'traditional' or face-to-face teaching system.
b) This platform is easy to use, which aids people's habitual use of it.
c) Students can access the system from anywhere and at any time (ie, outside the classroom and class timetable).

Nonetheless, according to our experience, in order to be able to make good use of it, then an 'extra' effort is required from the teaching staff, who have to be aware of the following aspects:

a) Preparation of the best materials, taking into account the characteristics of this partial virtualisation (for example, they should not simply upload the subject schedule).
b) Periodical updating and reviewing of material (for example, the notes, practical solutions, notices and news, etc.).

c) A regular monitoring of the level of acceptance in the group (checking the number and frequency of students' connections).
d) Opening of forums for discussion on certain questions considered important for the proper understanding of part of the subject matter (for example, for an exercise or doubt).
e) The need to encourage other teaching staff on the course to also introduce this tool into their subjects and thus avoid excessive overbalancing in terms of uploaded material for certain subjects.

The EHEA in the Geography degree. The experience at the UAB

The degree in Geography, along with other courses in Catalonia, forms part of a pilot test at Catalan universities to adapt to the European Higher Education Area.[www2] This currently affects the first two years of our degree course, and a total of 88 students.

The Bologna Declaration sets the bases for the construction of a European Higher Education Area, organised in accordance with the principles of quality, mobility, diversity and competitiveness, and aimed at achieving certain objectives which, generally speaking, can be summed up as follows (Ministry of Education and Science, Spain, accessed January 2006):

a) Adoption of an easily understandable and comparable system of qualifications, by introducing, amongst other things, a diploma supplement.
b) Adoption of a system based, fundamentally, on two main levels.
c) Establishing a credit system such as the ECTS.
d) Promotion of Europe-wide cooperation to ensure levels of quality in the development of comparable criteria and methodologies.
e) Promotion of a necessary European perspective in higher education, with particular emphasis on the development of the curriculum.
f) Promotion of mobility and removal of obstacles to ensure free movement for students, and teaching and administrative staff at universities and other European higher education institutions.

With regard to the teaching, we need to stress above all else the effects that it has on the way knowledge is disseminated, in terms of the new calculation of credits, the ECTS, and skills-based training. This system requires the quantification of the work needed from the student to study a subject. Likewise, and as important if not more so, is the need to look carefully at the methodology to be used in applying a teaching that meets the directives of the Bologna Process, which is based on a more dynamic teaching, where the theory and practice are combined.

Based on this, the Geography degree at the UAB has been set two new challenges: adaptation of the degree to the EHEA and adoption of ICT in the teaching of geography. Having overcome a series of obstacles, and thanks to the dedication and know-how of the Department's professors, we have witnessed a number of experiences, some of which we shall present and discuss in this article.

The subject of Social and Economic Geography: face-to-face and online teaching

Social and Economic Geography (SEG) is an optional subject worth six credits offered in the second level of the degree; it is seen to be fundamental in understanding the distribution of economic activities throughout the land. We should point out that it is currently only available in the Geogr@phy Online option, which has replaced the previous face-to-face teaching.

Students initially have some objections, given that they have often studied another subject, Economy, that they feel not to form part of the discipline. Thus, there is a somewhat negative predisposition towards Social and Economic Geography, given that, generally speaking, students consider it relatively quantitative and not overly useful, due to the fact that the Geography degree is conceived as pre-eminently 'arts'. With regard to this point, we could discuss the level of acceptance, but that does not correspond to the aims of this article.

In the *face-to-face classroom*, the dynamic actions of the professor are vital and, obviously, as in any other subject, non-verbal language is essential and has to invite students to take interest in the contents. In terms of written language, tools are used to introduce text from the day's news articles or web pages, or, in exceptional cases, students have to read a brief article. The professor leads the class and disseminates knowledge through reasoned verbal explanation, which the students take down in the form of notes. Generally speaking, it is unlikely that students take part in the form of questions and answers, though, on some occasions, a constructive discussion may be initiated and encouraged by the professor amongst those attending the class. This last element is common in face-to-face scenarios and often attributed to students' lack of motivation in terms of the subject, as their youth may not let them gain a sense of what they are doing and how that which they are studying can be of use to them in the future in the professional world. Despite linking the more

[www2]: http://www10.gencat.net/dursi/ca/un/eees_titulacions_pla_pilot.htm

theoretical subjects of SEG to the daily news, very few students read the papers, which means that the task of the teacher often involves having to encourage interest in the social and cultural links that surround them. The subject is assessed with an exam and a short assignment that consists of a closer look at a practical subject from the point of view of the more theoretical elements of the course.

In the *e-learning classroom* (Geogr@phy Online), there are many differences with respect to the face-to-face scenario. Firstly, non-verbal language, defined as those gestures, postures and mannerisms that teachers may use to communicate with their students, does not exist. Likewise, there is no reasoned verbal explanation or physical leadership from the teacher. Replacing these elements, which seem to be essential in the face-to-face classroom, are other key factors that come into play. The basic knowledge for the subject is disseminated in written materials, a form of textbook, that the students download from the internet. They no longer need, then, to take notes. This is the first accumulation of knowledge capital that the student makes of that which, supposedly, they are to learn. Whether they understand what the professor explains, or not, they have come into contact for the first time with the contents; they may not be fully aware of the fact, but it is still valid, and indeed, this is not the case with students in a face-to-face scenario. News items, articles that have to be read and the so-called *internetography* are addenda to the text material that can be downloaded from the internet. The way in which they can express themselves and communicate is through the forums, in which students can take part and invite others to do likewise. It seems that the role of the teacher in this case is more passive – the tool that replaces non-verbal language, in the case of geography online, is written communication, in the form of explanations, messages of encouragement, leadership and implication, via the institutional mailbox.

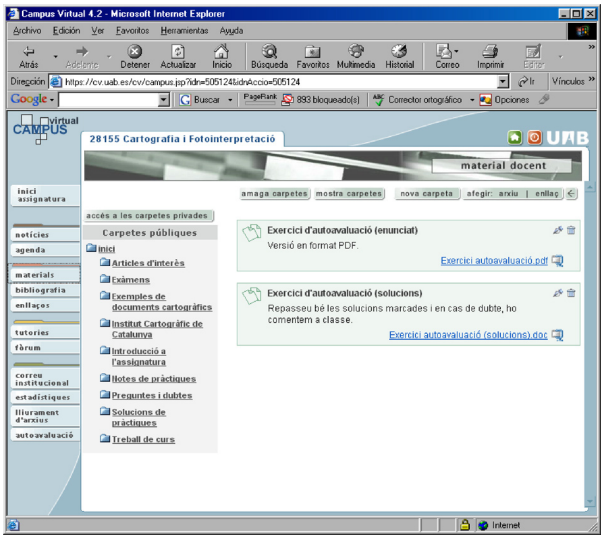
On the other hand, the profile of the online student is also different. A great percentage are adults, who show their levels of interest by working hard on the materials and relating them to the news and the real world situations that the teacher offers as examples. A small percentage of online students follow the same guidelines that we would normally see in what we could call the face-to-face student: they choose the subject online because of the timetable or for other reasons.

If we grouped the students, both face-to-face and online, together, each of them receiving knowledge via their chosen tool, we would no doubt have a normal curve where the average knowledge would increase in line with the average knowledge of face-to-face students. The two tails of the statistical curve would be similar to those seen in the analysis of knowledge acquired in traditional teaching.

The subject of Cartography and Photointerpretation: use of the Virtual Campus to support face-to-face teaching

Cartography and Photointerpretation is an obligatory first-level subject, worth nine credits, which looks to instil the most essential foundations of this discipline so as to allow students to subsequently explore some of these basic points in greater depth. Its profile responds to the idea that, without leaving aside the necessary theoretical components, the most practical questions have to dominate the subject's usual activities. For this reason, the assessment places special emphasis on carrying out a great number of practicals (almost one per session) and that the usual development should not require great amounts of time or effort in taking notes (in the more traditional sense of the expression), given that these notes can be obtained from the practicals carried out by the students, which are quickly returned corrected. Moreover, so as to aid understanding, there is a specific folder with the answers on the subject's Virtual Campus, which allows students to compare their results and see what they have done right and wrong.

Figure 3. An example of the roll-out of subject matter on the Virtual Campus for the Cartography and Photointerpretation subject



However, the experience in this case has shown us a biased use of the Virtual Campus. Some students think that with the answers to the practicals at hand, they do not need anything else to subsequently pass the subject, despite the fact that the

answers are merely complementary to the explanations of the subject matter given in the face-to-face classroom. This leads to relatively low numbers turning up to class and somewhat disappointing final results. Similarly, we have also seen a clear difference between those students who regularly turn up to class and those who, though they do not drop out (relying overly on the Virtual Campus), turn up only sporadically or hardly ever at all.

All that mentioned may lead us to think that the students are not sufficiently prepared to take full advantage of these virtual tools and that they only see certain purely practical benefits, whilst failing to realise that studying the subject requires much more. Thus, though teachers are coming under increasing pressure to introduce these types of tools into face-to-face teaching, we have also seen that these tools are not taken advantage of or simply ignored by students. Indeed, this would seem to be a paradox, as we would assume, quite rightly, that the latest generations have grown up surrounded by these new virtual environments and, in theory, should be more familiar with them.

The Geographic Information Systems subject in Geogr@phy Online and its adaptation to the Bologna Process

Geographic Information System (GIS) is an obligatory first-level subject, worth nine credits, which is predominantly practical-based. Recently, GIS have become a vital tool in many disciplines relating to the analysis, management and planning of land, though it is a subject that inspires reticence from a number of sectors driven by the fear of the teaching becoming excessively technical. Far from being teaching that is based on or exclusive to the technicalities, the aim of this subject is to highlight the need to use it subsequently to resolve spatial content problems. With this aim in mind, a methodology has been designed for the development of the subject's programme, but bearing in mind its adaptation to e-learning and the Bologna Process. In setting the objectives, there was no difference between face-to-face teaching, teaching in terms of the Bologna Process and e-learning, but reflection was required on the mechanisms that had to be employed so that students could acquire the knowledge and skills, according to one method or another, and according to one plan or another.

The specific nature of teaching GIS can be seen in the fact that it requires the combination of practice and teaching in the same environment. Thus, a platform for student/teacher interaction (which the UAB provides over the Virtual Campus environment) and a specific program to help learn the concepts by using GIS are required. This takes on special significance when we are dealing with a subject as instrumental as this one. Thus, choosing the MiraMon[www3] program was by no means haphazard, as it offers good value for money, whilst incorporating all the tools for handling and analysis required for the subject. Furthermore, it is the same program used in the face-to-face teaching.

There are three key points to take into account when designing the structure of the e-learning classes, given that it is a predominantly practical subject:

a) The usefulness of the learning has to be made clear: it is well known that if the practicals allow for the solving of practical cases that can be applied to the immediate surroundings, then they take on greater meaning.
b) The difficulties have to be foreseen and resolved: online students generally study at times when the professor is not connected. Thus, the hot spots of a practical have to be identified and clues offered to the students.
c) The practicals have to be scheduled: if at the start of the course, the student knows the scheduling for practicals, this helps their planning. Thus, when the course starts, a schedule is provided detailing all the activities that the student has to complete in the subject (the period for carrying out practicals, deadlines, dates of exams, commentaries on readings, etc.).

The application of GIS to the Bologna Process has not required significant changes to the subject contents or the way in which it has been taught until now. Though, it has brought with it the need to reflect on the series of specific skills affecting the subject and the need to rethink the tasks to be set in order to assess the attaining of these skills. One of the new key points introduced in the Bologna Process is continuous assessment, which requires having more effective control over the load represented by the activities students are set. This kind of assessment forces students to study on a daily basis.

Final thoughts

The experience gained by the Geography Department in adapting to e-learning and applying the Bologna Process has allowed for the rethinking and assessment of the way knowledge is disseminated and whether the teaching is effective and to what degree. When new proposals are made that require changes in the teaching, a series of mechanisms are started up that lead to meetings between the different professionals involved in these changes, which allow for highly enriching exchanges of experience.

The results from the five years of the Geography e-learning degree are very positive, both from the point of view of the supply

[www3]: http://www.miramon.uab.es/

and the demand. We would highlight the improved ability to connect with the important levels of demand from the high-level continuing education segment, thanks to the overcoming of the limits of time and space. With regard to the application of the Bologna Process, though it is still too early to make definitive appraisals (this is only the first year that it has been applied), an initial positive trait is the fact that it has allowed for reflection on the type of skills that have to be assessed in the different subjects and on the load that a student's keeping to the subject represents.

In short, a collective effort for renewal and adaptation was required in order to carry out these experiences, both from the teaching staff and the students. We need to pay attention to the development of new technology, which is increasingly forming part of our daily life, and, likewise, the advances arising in the field of the standardisation of studies within the framework of the EHEA.

These optimistic reflections do not exclude others that highlight, in turn, a certain lack of vision from students when it comes to how they have to see the virtual tools, whether as part of a face-to-face or online teaching environment. We are referring to the fact that, unfortunately, a prototype student dominates that does not value the culture of effort sufficiently, a student who, when they have to branch out beyond that which they are told, explained or given to download, often do not know where to turn. Indeed, students seem to prefer the 'convenience' of the work done by others (the teachers) for them (despite the fact that this is only a tiny part of what they have to learn from the subject), whilst they forget, voluntarily or involuntarily, that learning requires a corresponding effort from both teacher and student. At heart, the former tends to think that the latter, the student (or a good number of the students), still has the old mentality that believes that what really matters in life is gaining a university qualification, without any real idea of the fact that society and the job market increasingly value other aspects, which are still compatible with having a degree (the ability to learn, self-teaching, work, sacrifice, adaptation to new situations, etc.).

References

BADIA, A.; DURÀ, A. (February 2005). "La llicenciatura de Geografia en xarxa. L'aposta de la Universitat Autònoma de Barcelona pels estudis a distància". *Cibereduca 2005*.
MINISTERIO DE EDUCACIÓN Y CIENCIA. "Espacio Europeo de Educación Superior" [online]. Ministerio de Educación y Ciencia. [Date of consultation: January 2006].
<http://wwwn.mec.es/univ/jsp/plantilla.jsp?id=3501>
UNIVERSITAT AUTÒNOMA DE BARCELONA. "Presentació del Campus Virtual" [online]. Universitat Autònoma de Barcelona. [Date of consultation: January 2006].
<https://cv.uab.es/cv/info/index.jsp?plana=presentacio.htm>

Anna Badia i Perpinyà
Full Professor in the Geography Department at the Autonomous University of Barcelona (UAB)
anna.badia@uab.es

Professor in the UAB's Geography Department. She teaches the Geographic Information Systems subject for the degree, both online and face-to-face, and the Geographic Information Analysis and Modelling subject for the Environmental Sciences degree. Her research focuses on the field of geographic information systems and their application to environmental and territorial planning studies. She has published in a range of journals in Spain and abroad, including Documents d'Anàlisi Geogràfica, Treballs de la Societat Catalana de Geografia, Environmental Hazards and the International Journal of Wildland Fire. Since 2002, she has been the coordinator of the Geography Online course and, since 2004, the assistant coordinator of the Geography degree.

Montserrat Pallarès Barberà

Full Professor in the Geography Department at the Autonomous University of Barcelona (UAB)
Vice-Rector for Research at the Autonomous University of Barcelona (UAB)
montserrat.pallares@uab.es

A graduate in Arts and Philosophy, Geography section, from the UAB (1978), she gained a master's and PhD in Geography from Boston University (USA) in 1993. She has been the Faculty Secretary and Vice-Dean of Economy, Infrastructures and Telematics at the UAB's Faculty of Arts and Philosophy. She is currently Associate Professor in the Geography Department and Vice-Rector for Research at the UAB.
Her research focuses on economic geography. She leads the Ministry of Science and Technology's RDI project *Geografía del nuevo espacio económico. Un análisis a partir de sistemas de información geográfica* (Geography for the new economic space. An analysis based on geographic information systems). She forms part of the Applied Geography quality research group, funded by the Autonomous Government of Catalonia's 4th Research Plan. She has taken part in European projects such as *Restructuring remote urban areas. The role of social capital in rural development (RESTRIM)*, led by the Arkleton Centre for Rural Development, University of Aberdeen (UK).

Joan Carles Llurdés i Coit

Full Professor in the Geography Department at the Autonomous University of Barcelona (UAB)
joancarles.llurdes@uab.es

Professor in the UAB's Geography Department, where he teaches the subjects Cartography and Photointerpretation and the Geography of Tourism. He also teaches at the Hotel Management and Tourism University College (UAB), on the Humanities degree at the UAB and the UOC's Tourism Studies course. His fields of research are tourist planning, industrial tourist heritage, environmental hazards and, recently, the effects of climate change on tourism. He has published articles in a wide range of local, national and international journals; highlights include *Estudios turísticos*, *Documents d'anàlisi feogràfica*, *Treballs de la Societat Catalana de Geografia*, *Anales de geografía de la UCM*, *Boletín de la AGE*, *Annals of tourism research*, *Journal of environmental planning and management*, *Environmental hazards* and l*and use policy*. He has also collaborated in a number of books, including *Geografía mundial del turismo*, *Canvis socioambientals a l'Alt Empordà (1950-2000), Aquí no! Els conflictes territorials a Catalunya, Nous usos per a antics espais industrials* and *Informe sobre el canvi climàtic a Catalunya*.

UOC www.uoc.edu

Iss. 8 | May 2006 ISSN 1575-2275