

Teaching in an inter-university virtual environment. ECTS experiment supported by ICT

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Abstract

In today's environment of technological development and the construction of the European Higher Education Area, new needs are emerging to adapt to the new demands of teaching using strategies being promoted by the credit system (ECTS). That is, there is an imperative to experiment with methodologies related to the imminent implementation of the European credit system.

In this study, which was conducted on the virtualisation of certain courses in within the curriculum of the Pedagogy degree programme, several individual projects are presented that together aim to incorporate information and communication technologies (ITCs) into teaching as one of the key elements to improving the teaching-learning process, as well as experimenting with the new European credits.

This article presents the most noteworthy results of the experiment carried out in academic year 2005-06 based on the assessments of the main stakeholders (professors and students).

General area of interest of this innovation

This innovation might be of interest to any professor or group of university professors who are interested in implementing the European credit system. In this experience, they will discover the possibilities and challenges that ICTs pose in this process of change. The results from the experimentation process in the Pedagogy degree programme at the Universitat Autònoma de Barcelona can be transferred to other situations when ICTs are the key element in the process of university change.

1. Objectives

The main goals are:

1. To experiment with the European credits in teaching the different courses.
2. To promote the use of ICTs as a tool for improving university teaching.
3. To analyse the use of technology in re-structuring teaching processes in higher education, that is, to reflect on the role of the student and the teacher, the design of the teaching-learning processes in both virtual classrooms and in developing multimedia materials.
4. To define a virtual educational environment for holding courses within the Pedagogy and Social Education curricula.
5. To develop proposals for including and planning telematic tools into the teaching and learning process.

2. Description of the study

The goal of the study is to experiment with the European credits while stressing their didactic-methodological implications, especially those related to the use of ICTs. This entails an entire process of innovation with multiple and varied activities, which give an idea of the complexity of this proposal, in addition to the creation of an entire virtual educational environment. The involvement of the different stakeholders (professors, students, research team) in turn necessitates a monitoring and evaluation mechanism that is capable of shedding light on the innovation process itself.

We chose the innovation strategy of collaborative action research, which in turn became the main referent and guide when designing the study, its phases and the working plan. With regard to the design of the study, it was organised into three main phases: A) planning, in which we addressed the first two general goals of the study, focusing on three specific actions: design of the intervention, design of the virtual environment and design of the methodological framework. B) Action-implementation, where the experiment itself was conducted. C) Evaluation/reflection, where the work conducted in the previous phase was systematised and evaluated.

The study was conducted within a context of cooperative inter-university learning in which two groups of professors were involved: teachers from the Universitat Rovira i Virgili and from the Universitat Autònoma de Barcelona, who experimented with the proposal in the Pedagogy degree programme in courses related to teaching.

3. Methodology

3.1. Design of the study

This study is methodologically founded upon cooperative action research in terms of its underpinnings, structure and dynamics. It falls within a qualitative methodological

approach as it took place within a specific context from an internal perspective, as the researchers and actors in the innovative action are one and the same.

Somehow, too, it can be regarded as a study of multiple cases, as we shall validate the effectiveness of the resources and strategy by involving them in different courses. Each of them becomes a particular case on which an exhaustive study of the process of developing the experiment is conducted.

3.2. Population and sample

In this type of case study, for reasons of provenance, the sample is preset and defined beforehand, as it is an intentional sample, thus ensuring the qualitative significance.

The sample of the professors involved is made up of the research team (six professors from the Universitat Autònoma de Barcelona and three from the Universitat Rovira i Virgili in Tarragona), with their corresponding courses. In this way, they become the individual case studies in our project.

In terms of the students, we took into account all the students registered in each of the courses affected as those involved in the study (299).

3.3. Instruments

As a result of the above, the research project meant the involvement of different, varied and complementary instruments for gathering information (questionnaires, interviews, in situ observations, group discussions, documentary analyses, etc.), which due to their very quantitative-qualitative nature and using the principle of triangulation enabled us to gather and have at our disposal the relevant, valid, proven information on the objects of study. The sources of information to be used were varied and complementary as well, also as result of the principle of triangulation. They involved professors, students and the academic administration (especially the coordinator of the degree programme).

4. Results

4.1. General initial profile

We started with a group of students, the majority of whom were female (92%), in their second cycle of study (82%), who studied during the daytime (86%) and had unskilled paying jobs (70%) mainly to help fund their studies rather than for professional reasons. The courses on which the study was conducted were mainly core courses that lasted a year (2/3).

The students had previous experience with ICTs (2/3), mainly for writing documents, checking/browsing for research, email and chatting for communication, although there is also a pronounced use for leisure and as a pastime. They have sufficient infrastructure for working with ICTs both at home and in the faculty, and they use software

related to their activity (Word for word processing, Power Point, Internet Explorer, Mozilla, Messenger).

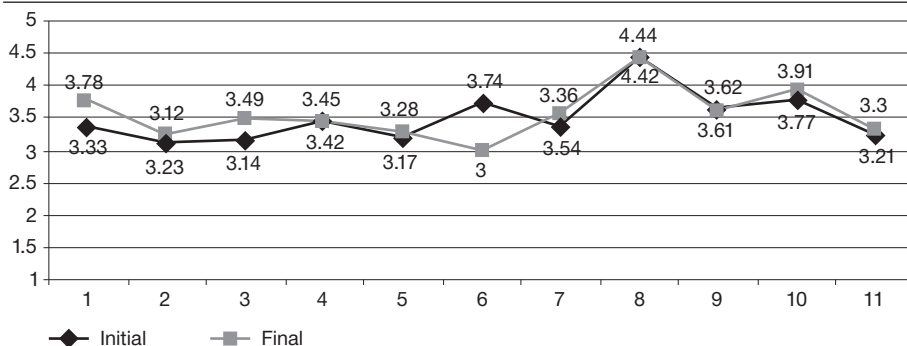
With all the data gathered, we deemed that they had a medium level of training and mastery in computers in order to use ICTs according to their own self-assessments. They acquired this training during their studies and through individual efforts (self-taught computer users).

4.2. Initial-final evaluation of teaching-learning with ICT

Table 1. Initial-final comparison of the use of ICT

	Initial (1)	Final (2)	Signif.	Dif.
1. Facilitates group work	3.33	3.78	.000	1 < 2
2. Motivates learning	3.12	3.23	-	
3. Helps students to remember information and reinforces contents	3.14	3.49	.000	1 < 2
4. Facilitates independent learning and individualises teaching	3.45	3.42	-	
5. Demonstrates and simulates experiences	3.17	3.28	-	
6. Clarifies abstract concepts	3.74	3	.008	1 > 2
7. Fosters a new kind of relationship between the professor and student	3.36	3.54		
8. Gives access to more information	4.44	4.42		
9. Facilitates the transfer of knowledge	3.62	3.61		
10. Presents the contents better	3.77	3.91		
11. Creates or modifies new activities	3.21	3.3		

Graph 1. Initial-final comparison of the use of ICT



4.2.1. Positive image of ICT in the teaching-learning process

ICTs improve teaching, enable each student to work at their own pace, improve collaborative work among students, give access to more information, present the contents better and facilitate independent learning and individualised teaching. In some cases, ICTs stimulate higher motivation due to the technological novelty and the variety of methods used, as well as because of the fact that the materials are presented in an innovative, user-friendly, attractive format that facilitates the integration of contents.

We should also consider that their potential lies in its complementariness with other resources, as opposed to using ICTs exclusively, meaning that instead of discarding textbooks they should be complemented with ICT.

4.2.2. Lack of preparation, scarce availability of resources and resistance to change as difficulties when including ICTs into everyday work

Even though the students claimed to have a mid-level of training and mastery in ICTs beforehand, they are aware of their own limitations when successfully completing an ICT-supported course, even though they are motivated to tackle it.

4.2.3. Professor preparation, student willingness-preparation, availability of resources and design of the online materials as factors of success for offering an ICT-supported course.

This is coherent with the previous conclusion, as the factors of success are nothing more than the counterpoint to the obstacles or difficulties of this project. However, we can glimpse a concern for the human factor, in terms of both professors (their preparation and the design of the materials) and the students (willingness-preparation) more than the material factor (availability of resources-infrastructure). In other words, the latter, while a necessary precondition, is not enough alone as a condition to ensure success.

4.3. Overall assessment of the training received

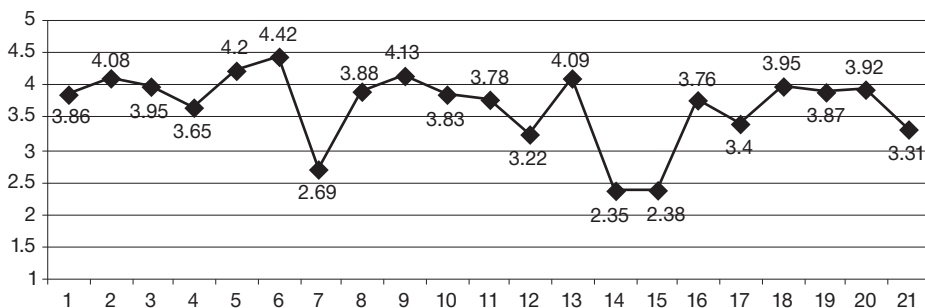
Below is a series of statements with regard to the **training received** via a sliding scale (1 = total disagreement and 5 = total agreement):

Table 2. Training received

	Ave	Dev.
1. The goals of the course were appropriate.	3.86	0.7
2. The contents covered were appropriate for my professional development.	4.08	0.7
3. The contents were presented in an orderly fashion.	3.95	0.8
4. The amount of knowledge covered was appropriate.	3.65	0.8
5. The knowledge presented was up-to-date.	4.20	0.7

	Ave	Dev.
6. Working in small groups is better than working in large groups.	4.42	0.7
7. Individualised teaching is better than group learning.	2.69	0.9
8. Practical aspects are better than theoretical aspects.	3.88	0.8
9. The working climate in the group was satisfactory.	4.13	0.8
10. I consider the presentation of the contents to be didactic.	3.83	0.7
11. The length of the course was appropriate.	3.78	0.8
12. There wasn't enough time to exchange experiences.	3.22	1
13. The professors skilfully led the work to be done.	4.09	0.8
14. Written exams are the best way to evaluate this type of course.	2.35	0.9
15. It would be preferable not to evaluate this type of course.	2.38	1
16. The evaluation used was in line with the criteria of the course.	3.76	0.7
17. It is necessary to start with an initial assessment.	3.40	0.9
18. During the course I learned skills and attitudes useful for my future work.	3.95	0.7
19. What I learned in this course corresponds to the workplace practice.	3.87	0.8
20. The course offers professional possibilities for the future.	3.92	0.8
21. This type of training made me interested in registering for other similar courses.	3.31	0.9

Graph 2. Training received



4.3.1. Appropriateness and relevance of the goals and contents

The positive assessment can be found in reference to the actual design of the course, the professional profile and the professional skills in the programming of ECTS as well as the working plan to be implemented.

In fact, not just the goals and the contents were quite positively rated (appropriateness and relevancy), but the learning acquired was viewed as being in line with the needs of workplace practice.

4.3.2. Methodological relevancy and sufficiency of the activities and resources used.

The multivariate approach of methodological strategies, as well as of resources and times for using them, were crucial to the success in this area. The students knew at all times what they had to do, with what, with whom, and their centrality and involvement in the activities was clear, as was the role of the professor. In fact, the virtual part of the course fostered this centrality, plus the professors themselves were capable of managing the work being done. The working climate was satisfactory and the students gave small group work much higher ratings compared to individualised work.

4.3.3. Multivariate strategies as the main principle for articulating a university course

The reflection on the practice, the appropriateness of the activities for the goals and the ease of having personal reinforcement during the process were the key elements in a university course, although other important factors include demonstrations, presentations of learning materials and presentations of the theories and concepts.

4.3.4. The need for new evaluation strategies

After this experience, it is clear that written exams are not the best way to evaluate this type of course, although there is no need to discard them outright. It is necessary to integrate a kind of continuous assessment that makes it possible to record information from the entire project and the process used in this kind of classroom, directed and independent learning, perhaps even starting with a good initial evaluation.

In any event, the evaluation criteria and plan must be clear, just as the students' working plan must be clear.

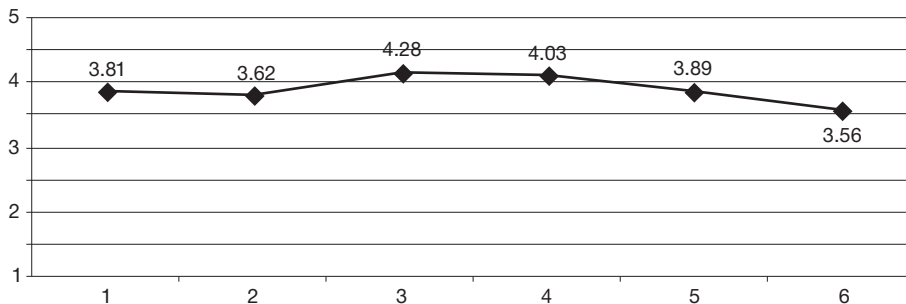
4.4. Development of the course

Table 3. Evaluation of the role of the participants in the development of the course (values from 1 = lowest to 5 = highest score).

	Ave.	Dev.
1. The participants have got involved in the course with interest.	3.81	0.7
2. The participants have known at all times what is expected of them.	3.62	0.8
3. The participants have been able to intervene when they wanted to.	4.28	0.7
4. An atmosphere of cooperation has been created in the group activities.	4.03	0.8

	Ave.	Dev.
5. The participants have perceived that the activities were productive.	3.89	0.8
6. New and innovative activities have been done in the course.	3.56	0.9

Graph 3. Role of the participants in the development of the course



4.4.1. The importance of student-centred learning

The involvement of the participants and their playing a leading role is fundamental for the success of this type of course, and this was demonstrated by the students themselves. They very positively rated the possibility of intervening when they wanted to, yet even more important was the atmosphere of cooperation in the group activities and their perception that the activities were productive. This once again reinforces the collaborative work that underlies the methodological approach of the course, in addition to also reinforcing the idea that these activities were new and innovative for the participants.

Somehow we are making a break with the traditional teacher-led university class, although this is nothing new given the fact that the design and development of the ECTS-style curricula means displacing the focus from teacher to student.

4.4.2. The professors' explanations and small group work: the backbone of methodological variety.

Through the assessment of the activities we can see the importance of the professor when explaining the contents, just as small group work comes to the fore as one of the most highly rated activities in this teaching-learning scenario.

Also important were the search for reinforcement documents (a possibility thanks to the use of ICTs), simulations or role plays and the debates proposed by the professor.

4.4.3. Participation, motivation, functionality and applicability and their interaction as methodological principles guiding the course

This rating should come as no surprise given everything we have explained until now about group work and the student-centred classroom. In fact, what this proves is that these principles, which were previously contained in the articulation-design of the course, are now positively rated by the participants after having done the experiment.

4.4.4. Importance of the course syllabus, the procedures handbook and conceptual schemas-maps

Even though all the materials used were rated quite highly (all above the theoretical average), what stand out in importance are the syllabus, the procedures handbooks and the conceptual schemas-maps as major resources from the start of the course. We believe that precisely prior knowledge and the interaction with these materials from day one were the keys to success in the course. In fact, the students rated the activities that had schemas, ideograms and illustrations very highly because they enabled them to better classify the difficult contents in the course and clarify confusing information.

4.5. Attitudes and skills developed in the course

4.5.1. New image of the role of the university student in the teaching-learning process

The students have taken on responsibilities in the learning process, they have shared ideas, responses and visions with their professors, and their level of involvement in the course has risen. The half-classroom half-independent learning method (virtualisation of the course) motivates work on the course, empowering students to find new information and resources using the computer tools. Somehow, it is assumed that there has been a change in students' attitudes when dealing with their studies.

4.5.2. Increase in independent learning capacities

The capacity for independent learning rose (students properly planned their time during the course without having time problems at any moment, they checked other materials to get further information on certain points), although it is assumed that it was difficult to learn the contents without the professors' help, reaffirming the benefits of attending class. Even though this might seem paradoxical, this once again demonstrates the importance of the strategy used founded on students' efforts through collaborative work. The students constantly claim that they learn more by sharing with both their professors and their classmates. The former are assigned a role more as a guide or facilitator of the learning process as opposed to a mere transmitter of information.

4.5.3. Satisfaction with the role of the professor

As a result of the previous point, the relationship developed with the professor and their role in the entire teaching-learning process was rated satisfactorily. The professor has given feedback properly, has made possible other alternatives for improving and developing the activities, has offered tutoring for those students who encountered difficulties, the communication was continuous and appropriate, and the professors have satisfactorily resolved questions.

This conclusion only complements what we have already mentioned on the change in role and new professional roles and functions that the professors have activated in order to ensure the success of this experience.

4.5.4. The way of doing the activities, interaction with others, the professor's work and the teaching methods are the most highly rated changes.

The methodological strategy designed and activated for developing a course following the ECTS guidelines and supported by ICT, founded additionally on collaborative work and the shift in the focal point from the teacher to the students, results in an overall positive assessment of the procedures and interaction as the most outstanding changes.

As a result, it is not surprising that there is more interaction with classmates, the relationship with the professor has improved, and especially students have gained more knowledge.

5. Conclusions

In summary, we can state that the students in the Pedagogy degree programmes believe that ICTs offer a wide range of technical possibilities that can facilitate teaching. They make possible rapid, easy access to information, thus encouraging students to manage themselves and creating the ideal forum for independent learning. The use of ICTs enables students to work in groups and in coordination as these technologies facilitate communication, the accessibility of information, materials to support the contents, and rapid exchanges of documents and quick dissemination of files and information. In some cases, ICTs arouse a higher level of motivation due to the fact that they are a technological novelty, as well as the methodological variety used and the presentation of an innovative, user-friendly and quick format, which makes it easier for students to retain knowledge.

In this scenario, the role of the teacher must shift so that they are capable of using and managing ICTs to design and put into practice varied methodological strategies that facilitate collaborative work. In this sense, the role and functions of teachers must adapt to this context. For this we need:

1. The continuous training of teachers in ICTs. A significant number of students think that teachers need to have knowledge and skills in ICT.

2. Changes in the teachers' job: they must develop new adapted materials, investing time and effort. Other jobs: daily management of email, virtual tutorials, regularly uploading information onto the virtual environment, developing and reviewing materials, updating information, exploring all the potential of the virtual environment.
3. The teacher must play the role of coach, exercising the functions of consultant and guide. The professor ceases to be the focal point of the classroom to give way to the students, so that their involvement, efforts and dedication can be demonstrated.
4. The teachers must improve the accessibility to and development of other methodological strategies adapted to the new technological context.

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Keywords

University teaching, ICT, ECTS, virtualisation.

Financing

This study was funded by AGAUR (Generalitat de Catalunya) (Identification number: MQD 2004 00058).

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Presentation of the working group

The CIFO research group, from the Department of Applied Pedagogy at the Universitat Autònoma de Barcelona, is a consolidated research group recognised by AGAUR (2005SGR01020). Its main avenues of research are related to training in and for the working world: training of trainers, professional skills, evaluation of training and innovation in training. In recent years it has participated in several different research

projects, especially European projects, related to the aforementioned avenues of research. The group recently-published book *Formación de Formadores* (two volumes published by Thomson) is a summary of its research in the realm of training the trainer.

Dr José Tejada is the head of the research group. For further information:
<http://dewey.uab.es/grupocifo/>

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