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Network of educational investigation: Teaching innovation

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Abstract

The new educational reality, with the introduction of the European Higher Education Area (EHEA; and new requirements for education require a rethinking of the teaching process, which will use new technologies as key instruments. However, the concept of educational innovation goes beyond the widespread use of Information Technologies (IT). Structural changes are needed in educational institutions, which must be reorganized according to a new paradigm.This paper presents the strategic transformation developed by the National University of Distance Education (UNED); which involves the introduction of new instruments, new methodologies for current and prospective students and a new network organizational structure that facilitates global access to content and new methodologies. We emphasize Teaching Innovation Network, with special attention to the Educational Innovation in Finance. It shows a real example of combination of institutional change and educational initiatives. It combines efforts towards a better service and attention to students and the rest of the university community. And last, but not least, this new paradigm it is not only feasible but efficient because improvements outweigh organizational implications and economic costs.

Keywords: Educational Innovation; ICT Distance Education, New Technologies Applied to Education

1. INTRODUCTION

This study pretends to be a practical presentation of usefulness and visibility of the teaching innovation process and in particular, at National Distance Education University (UNED; the second largest university in Europe by number of students. The traditional approach has undergone an intense transformation due to the commissioning of the European Higher Education Area (EHEA).

However, before analyzing models of educational innovation in UNED, it is necessary to present some basic ideas to clarify the procedure in change, and that somehow define its conceptual scope and application of consistent, on the premise of sustainable advantage in the educational process.

The Web, educational platforms, communication tools, both asynchronous and synchronous, computer applications developed ad hoc and multiple teaching models proposed by the combination of the above, form a new educational scenario in which imagination is the only limit. However, at this point, there might be some questions: Is it reasonable to implement any combination of the above

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items in the teaching process? Which criteria should prevail in the implementation of new ways of teaching? and when can they be considered innovative teaching?.

Before answering these questions, let´s focus on some of the main concepts of innovation teaching. Paraphrasing Zabalza (2004) "Innovation is not just doing different things but to make things better. And keep the changes until it has been able to consolidate a new culture that changes […] necessarily entail". Therefore, only changes which represent a substantial improvement make sense. This requires a preliminary feasibility analysis, which justifies requirements, and evaluation, using techniques that do not bias the benefits of the system (Mauri et. al., 2007).

On the other hand, relation between teaching innovation and Information and Communications Technologies (ICTs) has been overestimated. ICTs have become the backbone of the innovation process (Zabalza, 2004), not only by their advantages and new features, as already mentioned, but by the influence on teachers´ motivation. But we must remember that the innovation process in education is much broader, encompassing other types of procedures and mechanisms are not necessarily based on technological development and its possibilities (Villa, 2004; Elmore,1990).

The role of ICT in the process of change must be properly weighted. As stated by Celestino et al. (2003), technology is not the center of teaching revolution, but rather a tool kit, it should never be confused with the ultimate goal: student learning, avoiding a "culture of technological work" that become a cluster of separate processes and would not represent progress in educational process.

This leads us necessarily to answer the last of the previous issues. Not every teaching model that integrates ICT can be considered an innovative education and do not necessarily contribute to the process of change in an educational institution. Several reasons support this assertion. On one hand, university today shows an increasingly intensive use of such mechanisms, although often in the form of applications, tasks or particular uses of subjects and teachers, an issue not widespread and that in no case results in a change of model. On the other hand, the usual resistance to change in universities sometimes show reluctance to the adoption of certain changes. However, to get the process of educational innovation effective, a relaxation, not only of the teaching task, but the entire university structure with involvement of all stakeholders -teachers, students, managers, etc.- is needed (Salinas (2004). Many authors have pointed out several sources of pressure that stimulate educational innovation processes, and the progress in the culture of technology as a trigger for significant change must be highlighted (Bates, 2000; Edwards and O'Mahony, 2000; Bates and Poole, 2003; Le Grez, 1995; Toffler, 1985).

ICT are, more than any other tool, a central stone of the change process, and therefore eventually draws all universities in the same direction. As stated by Fernández et al. (2007), the first universities able to encompass in its structure a model of educational innovation present a significant competitive advantage, which will be easily neutralized once the model is generalized, but would lead to disadvantage for those who do not fit it. Obviously, this is a motivating argument to every educational institution to undertake the implementation of new processes based on ICT.

European universities are facing a whole change process that necessarily involves the introduction of measures to boost innovation in the educational process, supported by new technologies. The EHEA, whose bases were established with the Sorbonne Declaration in 1998, and later with the Bologna Declaration in 1999, and ending with membership of 31 signatory countries, with the necessary legislative reforms in 2010, based on the following principles (cited on Gonzalez et al., 2008):

- A system of academic degrees, easy to recognize and compare.
- A system based essentially on two cycles: a first cycle geared to the labour market and lasting at least three years, and a second cycle (Master) conditional on the completion of the first cycle.
- A system of accumulation and transfer of credits of the ECTS type used in the Erasmus exchange scheme.
- Mobility of students, teachers and researchers: elimination of all obstacles to freedom of movement.
- Cooperation with regard to quality assurance.
- The European dimension in higher education: increase the number of modules and teaching and study areas where the content, guidance or organization has a European dimension.

Also, new needs must be considered, as lifelong learning for European. Intensive use of ICT is proposed, especially in the teaching and continuous assessment, classroom relocation, students' autonomy and the skills development. This way, students will get a better and more practical education, and will face introduction to working life and progress on it in a better position. This means a revolution which, undoubtedly, represents a break with the pre-established scenario, new premises, more ambitious, new instruments and mechanisms, in short, constitute the best framework for educational innovation.

1.1. TRADITIONAL UNIVERSITY VS. DISTANCE UNIVERSITY: UNED

Although the ultimate goal of any university is student learning, the differences between traditional universities and distance universities (open universities) are well known, not only in the organizational structure, but also in developing materials, channels and lines of communication and relationship between different actors. So, it is worthwhile pointing out some different between the two models (Arguedas, 2003).

Undoubtedly, the physical coincidence of teachers and students facilitates and simplifies the interaction among them. Interaction has a direct and personal channel on which doubts that may arise pupils, teachers´ reinforcements, especially the assessment of knowledge can flow according to the dynamic set previously. This system is commonly used in the stage of compulsory education and it could be argued also that it is the most common for college students who do not simultaneous their studies with other work or family obligations.

However, the times in which a citizen completed college or vocational training, and incorporated into the working world subsist during their active life with the education acquired at an earlier stage of study are over. Nowadays, it is required constant retraining and upgrading of knowledge and mastery of skills and performance capabilities, failing to pay the high price of trying to compete in the market with a deciduous knowledge. We live in an era of continuing education throughout life.

The term *distance education* refers to various forms of study at all levels of education (primary, secondary, universitary, refresher courses and training, etc.) in which there is no need of systematic spatial or temporal confluence of teachers and students, so need not be time synchronization between teaching and learning time. Students are not under constant and immediate teacher´s supervision in a classroom, but may benefit from support and guidance of an educational organization 'ad hoc'.

The key factor in the distance education university model is the ability to design and produce, at a central location (physical or virtual; high-quality educational offerings, which can, then, be distributed locally. Thus obtained, first, the benefits of *economies of scale*, while, on the other hand, allows a more flexible and suited needs education, receiving, even, support from (local) tutors. In

most cases, it also provides communication mechanisms to join students with the offering organization.

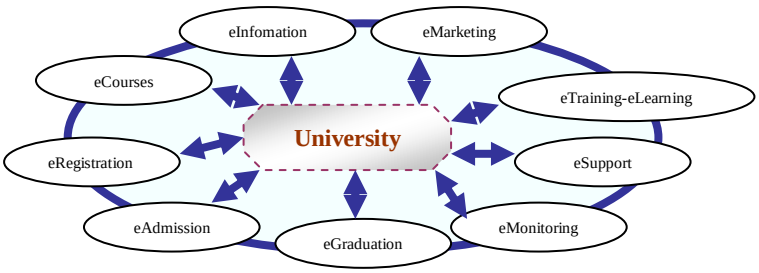
In addition to all the above factors, the type of students at distance universities is also a distinguishing feature, characterized by diversity. Bujan Fernandez (2001) describes a student according to a social-statistic point of view: "The current profile might be: middle-aged, college-educated media, stable occupation pictures intermediate, married with concerns for personal and/or professional growth". This sketch of student moves the preparation and background study on the scale of responsibilities, behind family, work, and sometimes, their social life. In spite of this, the last two years, students´ average age has decreased and this must be a variable under study for years to come, to check for consistency and causality analysis.

UNED is a reference university in Spain and in Europe, and even Latin America, due to its structure, operation, number of students and the continued application of new technologies to improve teaching and management process. It has more than 200,000 students, 11 faculties, 62 *Associated Centers* and with operations in 130 other major cities, through their *University Classrooms*. Covers the entire Spanish territory and is present in 12 centers abroad, across Europe, America and Africa. Pay special attention to more than 6,000 students with disabilities, through a specialized care center (UNIDIS). Its program of Prisons, which plays an important role in rehabilitation, manages more than 1,500 students.

Although UNED has distance education in its birth name, its teaching process could certainly be qualified as blended or mixed education. The size and magnitude of the institution have required a student support structure organized around the figure of the tutor who, from the Associated Centers and University Classrooms, support and are responsible for continuous assessment, linking students and Faculty Central Headquarters. Therefore, tutors are one of the keys in UNED model, having been trained in new technologies as they also have access, within their functions, to virtual platforms that the University provides for every member of UNED community.

The new scenario that presents the EHEA has several points in common with the methodology of UNED and its statutes. Moreover, it has been at the forefront thanks to a technological culture that reaches all levels and provides flexibility to an organization of over 1,400 teachers in the headquarters and the 6,900 tutors. Teaching innovation, therefore, be understood as an ongoing process at this University and covers the entire education community, as well as all the organizational level. In short, it fulfills all the parameters to become what many authors call the *Virtual Campus*.

Figure 1. elements of the virtual campus



Source: Compiled from Aggarwal (2003) and Fernandez et al. (2007)

UNED has a Vice-Rector of Quality and Innovation which develops multiple projects involving teaching figures but also the rest of stakeholder groups (service and administration staff, managers and representative bodies; Associated Centers, libraries, Foundation, Student Information and Orientation Centre (SIOC; etc.-, paper and audiovisual materials, educational virtual platforms, etc.). Currently, teaching innovation actions are focused on adapting the University to the EHEA and conducted in collaboration with the Institute of Distance Education (IUED; with the Vice-Rector of Academic Organization and the rest of Vice-Rectors. It is an integral part of the commitment of UNED for quality education. Thus, some of the most notable efforts, using ICT and organizational development adapted to the new reality are already underway. Some of the most important initiatives are: ATECA Plan[†], functional structure of the Associated Centres, AVIP Platform (AudioVisual Tool under IP technology); Hospitality Courses[‡]; Courses Zero[§]; and Teaching Innovation Networks.

1.2. TEACHING INNOVATION NETWORK

The new European scene in higher education, proposes a series of challenges from the educational point of view, that so far as to attack more efficiently, will determine the competitive position of each university. For this reason, UNED has promoted working together and sharing in this area, within the framework of "Research Network for Teaching Innovation: Development of Pilot Adaptation of Teaching to the European". This initiative aims to highlight those aspects that makes the most significant European directive and, in some cases, means a greater effort to adapt the current model:

- Competency-based curriculum design.
- Implementation of active learning methodologies.
- Continuous evaluation systems.
- New forms of tutoring adapted to the EHEA.

Each group of researchers develops their work on those lines considered strategic for teaching, the characteristics of each subject and the objectives. These works are shared, so can be helpful teaching protocols applied in a particular area to different ones. An example is the "Teaching Innovation Finance Network".

1.3. EDUCATIONAL VIRTUAL MODEL

Educational Innovation in Finance aims to develop a distance learning model, rooted in the application of new tools adapted for this purpose, with clear objectives[**].

First, reduce the differences between teaching and distance learning. No doubt each of the above teaching methods has advantages and disadvantages of its own idiosyncrasies. However, some differences can be saved or at least significantly mitigated through virtual teaching techniques. Of all the issues that the reader can immediately recognize as characteristics of either type of teaching, the

[†] INTECCA (Innovación y Desarrollo Tecnológico de los Centros Asociados) designs and develops a Platform for Telecommunications for Schools and Classrooms of the UNED that under a National Network of Education Services, Information and Communication, is a teaching tool for adaptation to European Higher Education (EHEA). This platform supports the educational activities developed in the UNED and allows monitoring via the Internet live and deferred. INTECCA provides training and technical support to users of the Platform AVIP. To get more information, visit the web www.intecca.uned.es)

[‡] To get more information, visit: http://portal.uned.es/portal/page?_pageid=93,489745,93_20540779&_dad=portal&_schema=PORTAL, and Gonzalez (2008).

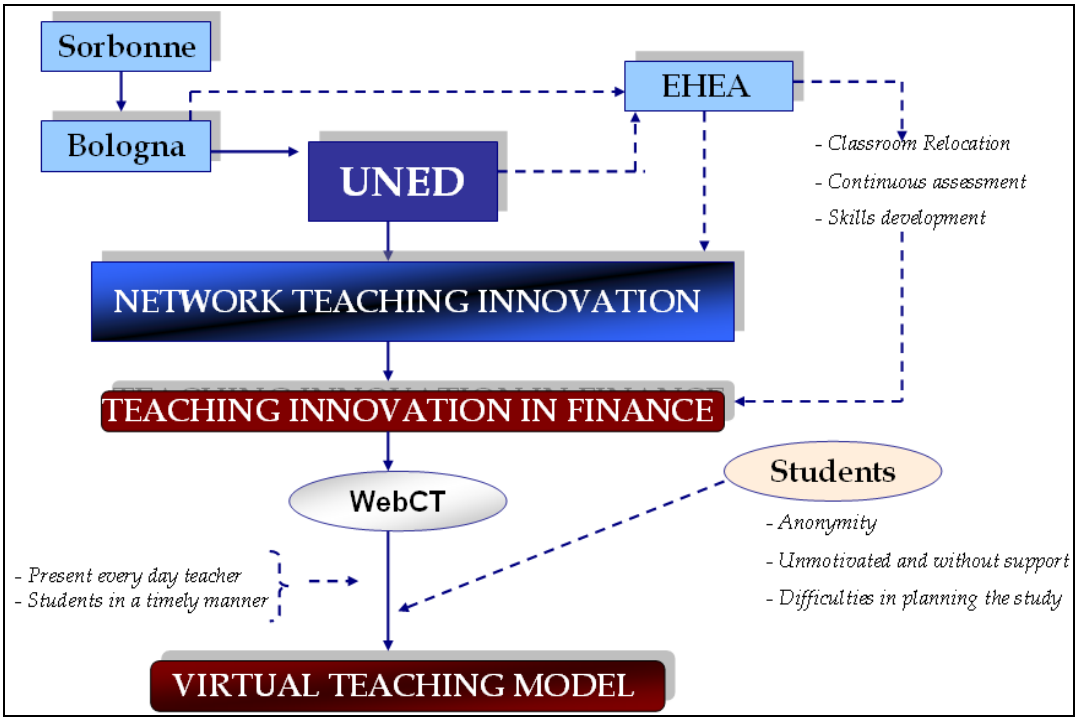
[§] Supporting courses for prospective students of the UNED and refresher for those just arriving at the UNED and have trouble catching up with the materials.

[**] González et al. (2008)

authors emphasize, uniquely because of its importance, the possibility existing of classroom instruction to follow students, know their possibilities, limitations and difficulties and, therefore, propose a system of continuous learning. In distance education, classroom relocation, the absence of templates, schedules and timetables and the anonymity that often leads to physical distance, made, in practice, difficult to following the continued evolution, student motivation and effort, limiting thereby the evaluation process to a series of tests, more or less objective, which may be biased by the personal circumstances of the day they are made.

Obviously, the possibilities that are opened in the field of computerized teaching have been many, and developed applications to adjust to the needs of the teaching-learning process in the most convenient and efficient for each of the parts involved. In this sense, educational platforms, specifically the WebCT- which is used by UNED along with other platforms-, allow to avoid more or less definitely the problem that we explained above on the following, investigating and evaluating of the efforts and abilities of students.

Figure 2. educational virtual model



Source: Authors

This is one of the pillars that support the intention of the model that arises in the project: the optimal use of the tools of virtual teaching platform in order to follow properly not only the learning process and student training, equivalent to the defining of classroom instruction, but it is reflected in the evaluation process, according to their skills and efforts in addition to knowledge so far, as a rule, was the only measurable fact.

On the other hand, the second factor behind the essence of the proposed model, which is related to the above, is the search for the use of all the possibilities in a more consistent and regular way

that offer to teachers and students not only educational platforms and patented modeled, but also of those developments, applications and software which affect to specific parts of the teaching process.

The monitoring reports of the application show different data on the use, both in number of users and frequency of the platform, having a significant disparity in the comparison between studies, years and even levels. However, what is no doubt is that the platform used is a very powerful tool that offers huge range of possibilities, most generally, are not being exploited to its full potential range, so we can extract that the platform is underutilized many applications such as tracking students, the use of chat-in frequency and purpose-, the working groups, and so on. Being this, as we warned, the second of the reasons that justified the project.

1.4. MODEL OBJETIVES

For the development of the above goals, the project affects the achievement of collateral objectives, each with partial information, ensure better teaching practice and paves the way preparing a scenario in which the student optimize his/her efforts and results based on more efficient teaching procedures.

Educational Innovation in Finance aims to develop a distance learning model, rooted in the application of new tools adapted for this purpose, with clear objectives:

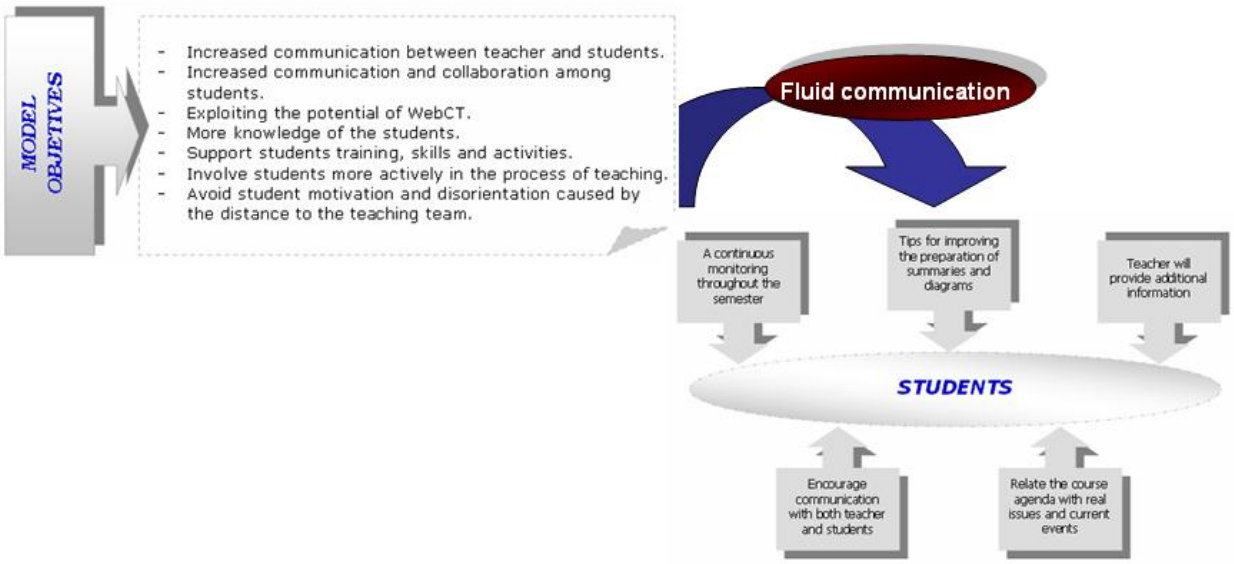
- Strengthen communication between all those involved in the learning process. So the model aims to encourage communication between students and teaching team, making it more regular and fluid which will stimulate the former to go more regularly to the teacher with any questions or problems. Enhance communication more actively among students, which can benefit not only the face of the special preparation of the subject, but also in social and sociological component carries a career.

- To remove the anonymity of the students, as we indicated earlier, involves more closely know them and may influence on their mood, avoiding the lack of motivation and the confusion that sometimes have, and involving them more actively in their learning process so they take it on a more active and less mechanical way.

- In so far as to achieve the previous goals, we will be able to create a feedback with the students that will offer information of great importance in improving as teachers, not only in the procedures of the Model but also when preparing materials or intrinsic to the agenda issues and development.

- The last phase of the teaching-learning process should be the evaluation, and in this we need to echo the above process. In this way, it would be appropriate to carry on the implication, tracking and proceedings of students to the evaluation process, and these were included in the final score. This idea, in itself, responds to the essence of planning a continuous-time teaching model with the lowest degree of anonymity possible.

Figure 3. Model objetives



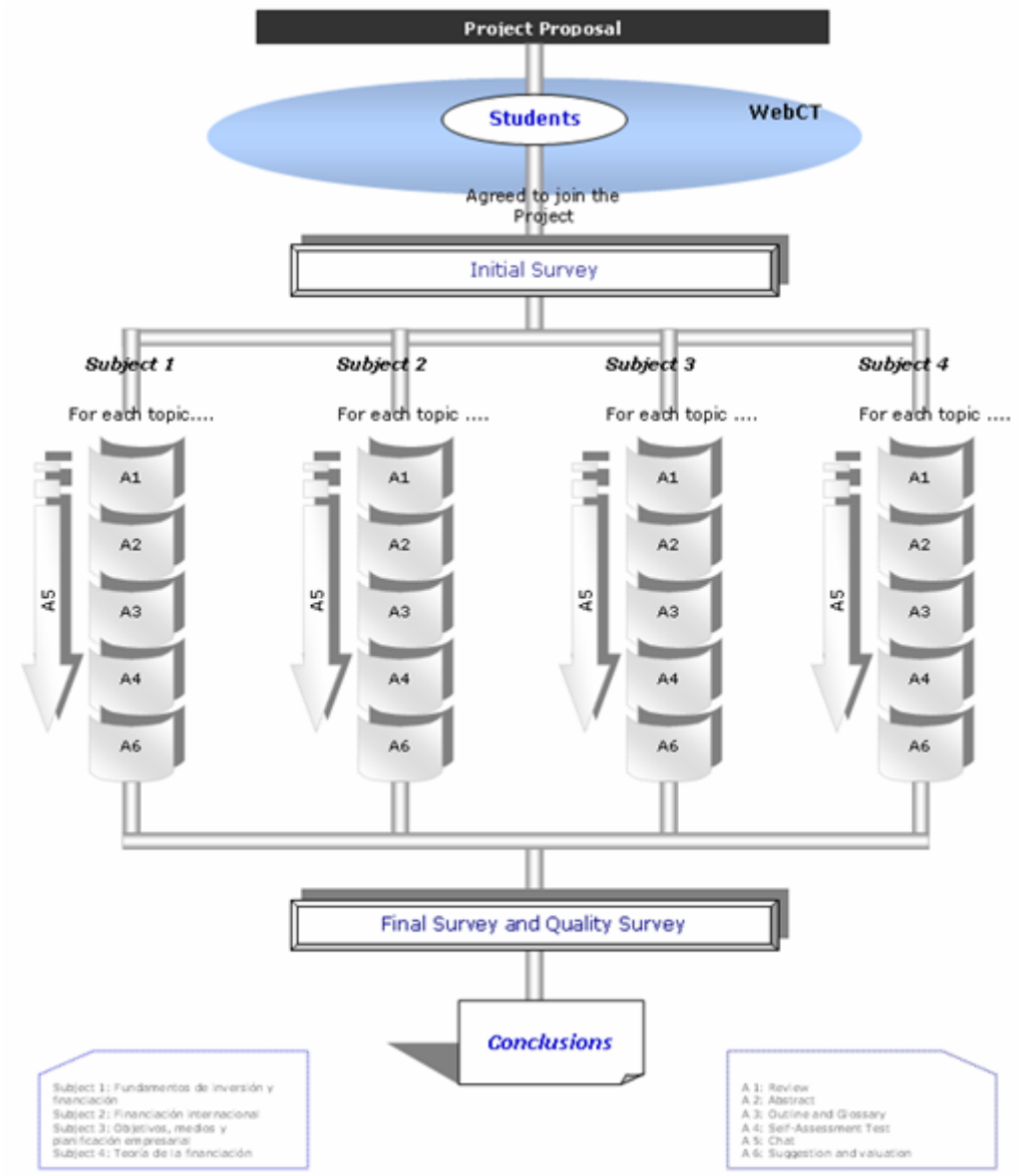
Source: Authors

1.5. THE MODEL

First of all and before starting the project, we announce to students through the virtual forum (WebCT; the possibility of carrying out the project and their conditions.

Then at the beginning of each subject, we create a specific forum and a working group for those students who have signed to the project, so they have a reference, meeting-point and a sense of belonging to a specific and special group.

Figure 4. The model



Source: Authors

At the beginning of the project and for all the subjects we performed a survey to students who decide to form part of the project. Its objective is to obtain information about each of them, not only in teaching (hours of study, subjects passed, and so on) but also in the professional and student staff.

Through a schedule or Gantt chart, there will be a planning time available in each subject, making an assignment for each topic, consistently and weighted to the difficulty and requirements of each chapter.

Figure 5. The model

Denomination	Description	Implementation
Project Proposal	Announce to students through the virtual forum (WebCT), the possibility of carrying out the project and their conditions.	Before starting the project
Creating a specific forum for the project	It will be created a specific forum and a working group for those students who have signed to the project, so they have a reference, meeting-point and a sense of belonging to a specific and special group.	At the beginning of each subject
Initial Survey	We performed a survey to students who decide to form part of the project. Its objective is to obtain information about each of them, not only in teaching (hours of study, subjects passed, enrolled, etc.,) but also in the professional and student staff (potential synergies with their work, limitations the study, etc.).	At the beginning of the project
Time planning	Through a schedule or Gantt chart, there will be a planning time available in each subject, making an assignment for each topic, consistently and weighted to the difficulty and requirements of each chapter.	At the beginning of each subject
Activity 1 (A1) Review	Before preparing a particular topic, may be advisable to review, or remember, another previous topic or another subject already past. This is proposed by the teacher to student.	In each topic. Recurrently in all of them
Activity 2 (A2) Summary	The student must make a summary of the chapter or topic, will serve significantly for the preparation of the subject, and, furthermore, must be delivered to the teacher for prior review.	In each topic. Recurrently in all of them
Activity 3 (A3) Outline and Glossary	The teacher will prepare a graphic outline of the topic, as well as a glossary or form, depending on the characteristics of the subject, which will be offered students to facilitate the study and training of them	In each topic. Recurrently in all of them
Activity 4 (A4) Self-Assessment Test	Before the end of time devoted to each topic, the teacher developed self-assessment questions to give to students who must perform them, and give them to the teacher to see how well the item is.	In each topic. Recurrently in all of them
Activity 5 (A5) Daily chat sessions	Every day we will schedule a time to chat, where students can come to talk to other students on the item related or just general aspects. Once a week is obligatory the presence of a teacher, and is a good time not only to ask questions, but also for students to carry news related to the appropriate item, and discussed them.	In each topic. Recurrently in all of them
Activity 6 (A6) Suggestions and valuation	At the end of the topic the student will submit a tip sheet, will make an assessment of the issue passed, will examine the most complicated and easier, so teachers will take this into account in future academic activities	In each topic. Recurrently in all of them
Final survey	At the end the student will answer a few questions, as a quality survey, on specific aspects of the project, in order to improve it and correct errors.	By project end

Source: Authors

As we can see on the slide, the *Activity 1 (A1) is* Review. It may be advisable to review, or remember, another previous topic or another subject already past. This is proposed by the teacher to student.

Activity 2 (A2) is Summary. The student must make a summary of the chapter or topic, will serve significantly for the preparation of the subject, and, furthermore, must be delivered to the teacher for prior review.

For Activity 3 (A3) the teacher will prepare a graphic outline of the topic, as well as a glossary or form, depending on the characteristics of the subject, which will be offered students to facilitate the study and training of them.

Before the end of time devoted to each topic, in forr the *Activity 4* the teacher developed self-assessment questions to give to students who must perform them, and give them to the teacher to see how well the item is.

Every day we will schedule a time to chat, for *Activity 5*, where students can come to talk to other students on the item related or just general aspects. Once a week is obligatory the presence of a teacher, and is a good time not only to ask questions, but also for students to carry news related to the appropriate item, and discussed them.

Finally and for *Activity 6*, the student will submit a tip sheet with suggestions and valuation, so teachers will take this into account in future academic activities.

After all the proposed activities, the six of them, the student will have to answer a few questions, as a quality survey (final survey; on specific aspects of the project, in order to improve it and correct errors.

1.6. MOST SIGNIFICANT DATA & RESULTS

After several academic years of implementation, the model has been more than fulfilled the expectations set, not only quantitatively in relation to the grade obtained by students who have voluntarily involved and the application of a continuous evaluation model, but also in the achievement of qualitative goals marked, getting the assimilation and involvement of students, not only with specific activities, but with the essence of the Model††.

In this point, we are going to analyze the most relevant results of our Educational Innovation in Finance Network.

First of all we think it is interesting to note that we have tested our virtual teaching model in different subjects in the area of financial economics. These subjects are covering both first and second cycle degree in Business Administration.

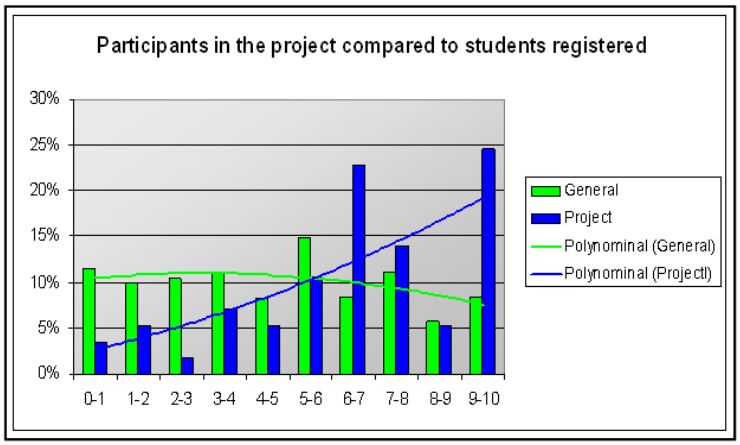
In general, as we can see in the next slide, most participants are in the 26-35 years segment, although the age groups that are around it are also important.

It is also important to know the composition of the sample of participants. Thus according to the sex of the participants we observe a strong female participation, which is two thirds of the students who have completed the project activities and have performed the test.

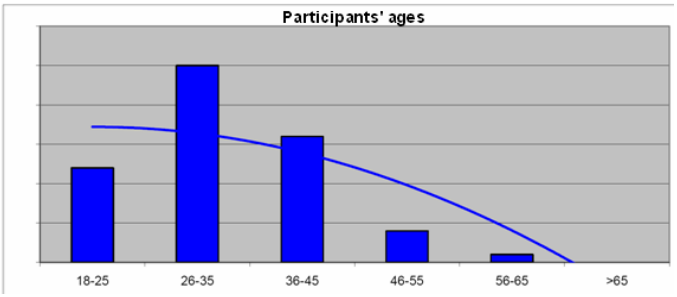
Of the students who have left the project (a total of 50; 38% are women and 62% were men. Seems to be more firm commitment assumed by women than men, regardless of the particular circumstances of a family nature, labor or otherwise.

†† Data, treatment, scenarios of continuous assessment and results are available in González et al. (2008).

Figure 6. Subjects, participants and results



Subject	Year	Credits
Aims, Means and Businessl Planning	1	6
Investment and Financing Principles	2	6
Theory of the Financing	4	4,5
International Finance Company	5	4,5
Business Planning	2	6



Source: Authors

We can finish saying that the results are better for students participating in the project, averaging nearly two points higher than the aggregate results of the subjects and the failure rate in the general group is twice that obtained by members of the project. Of all the students presented, have not exceeded the minimum level by 51.2%, while among the participants, only 22.8% obtained a score below 5.

Other benefits we have found in our model, besides the incentive to communicate with teachers (additional communication tools, eg. chats, asynchronous discussions,...; is the linking that is achieved with the students when making a constant periodic monitoring because there is a significant increase in the percentage of students who have presented to the tests, the sense of belonging to a group and greater identification with the institution and the students that set a commitment to work with themselves and with teachers rarely leave except by reasons of force majeure.

2. CONCLUSION & RECOMMENDATION

Technological culture that has developed in our society has significantly changed the ways to communicate, to relate and to interact, opening new channels unimaginable just a decade ago. How could it be otherwise, this transformation has come to education, especially higher education. It is belief that educational opportunities and apply teaching models are limited only by the imaginative capacity of the teacher. Based on the concept of educational innovation, whose center of gravity in

most cases turns around ICT, there are many models adjusted to the characteristics of the subjects or areas of reference materials. But this whole process, which we consider appropriate and timely given the social and cultural changes in the environment, can not distract attention from those issues that, indeed, involve teaching innovation:

- Firstly not all model or project that uses ICT in its development can be considered an innovation process, especially if this is punctual and the procedure is not acceptable in the global institution. In other words, it is reasonable to think that a course offered through the web with tutorial support through forums is an innovation.
- Innovation processes must cover the entire institution, in each and every one of its aspects and levels, providing the flexibility to adapt the model to adequately undertake the projects.
- Finally, once passed the above two points should be keep in mind that "no anything goes". Are acceptable only those projects that offer an added value or competitive advantage compared to the previous model.

Therefore, the implementation of changes requires a protocol necessary to take into account prior to the establishment or restructuring of current models:

- A preliminary analysis of the requirements and dissatisfactions of the different groups involved, along with a review of the possibilities offered by ICT to influence these aspects.
- A preliminary feasibility study on all possible alternatives, identifying those that generate a real benefit and prioritization criteria based on utility.
- Must be reconciled interests and motivations of all stakeholders. The dialogue is key to success in the implementation process and reduces the natural resistance to change.
- Decision-making should be firm and resolute, scheduled and defined in time, which will facilitate the systematic incorporation of those groups that are resistant to change.

UNED is a leader in educational innovation because reconciles institutional change and educational initiatives, combining the efforts towards better service and attention, both to students (such as basic piece of the puzzle; and the rest of the university community, because the continuous monitoring results show the proposed initiatives to be adapted to the final and the new educational reality and because the contributions of the proposed changes are outweigh to the economic and organizational costs involved.

In conclusion we point out some areas for improvement such as:

- It is appropriate a greater degree of communication among students, so we must seek mechanisms to enhance personal relationships.
- The high dedication that teachers are required to follow up students as we proposed, makes for extremely high enrollment courses, not viable. Therefore in subsequent calls we have collaborated with faculty tutors.
- Use the resources that the computer science offers us not only with their own virtual platform applications, for example, the automatic correction of questionnaires, but also to the development of new programs and tools designed ad hoc.
- These improvements have been planned and are being implemented in our project in subsequent years.

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