

**E-learning in a university interdisciplinary and bilingual context: analysis of students' participation, motivation and performance**

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**Abstract**

**Purpose** – The purpose of this paper is to discuss the use of virtual learning environments in multicultural higher education of two different subjects: foreign language and marketing.

**Design/methodology/approach** – The paper describes the aims, development and results of an interdisciplinary collaboration project was held between two European universities through a webCT system, where students had to work on linguistic aspects and economic and management topics.

**Findings** – Univariate analysis shows students to have a great interest in the project. Different multivariate techniques determine a strong positive relationship between students' participation, implication and motivation in the project and their individual final grades in the course. Regression also proved that the more exciting and challenging the class activities, and the higher the student's active participation, the better the results obtained by the student.

**Research limitations/implications** – Even if it is an exploratory research that should be replicated in other contexts, both the qualitative and quantitative results seem to confirm the positive contribution of this interdisciplinary e-learning activity to the multicultural teaching-learning process.

**Originality/value** – Results support the positive influence of interdisciplinary activities in the students' performance and the use of learning methods that facilitate active and cooperative learning through audiovisual pedagogical resources in multicultural contexts.

**Keywords.** E-learning, interdisciplinary cooperation, motivation, participation, performance.

**Article Type:** Research paper

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## 1. Introduction

Internet is a powerful new tool people can use for leisure, work and study [URL: [Internetworldstats](#)]. Within this context, E-learning is a current possibility for students all over the world. Not only the implication with new technologies by young people but also the European university system has intensely changed. Universities in the European context have been collaborating for the last decades through different programs. Continuous efforts have been made to strengthen links between education institutions throughout the European Union and also the world. These agreements have facilitated the exchange of thousands of students and many lecturers.

The best known and more implemented international mobility program is the Socrates-Erasmus. This scheme basically helps students complete their studies in different universities of the European context. This programme promotes language skills, open and distance education, and the exchange of information and experiences. One step beyond is the European Higher Education Area. This process has yielded the homogeneity of university studies in our continent. In this sense, a specific credit system, the ECTS system, was designed to describe educational programmes [URL: [European Commission](#)].

In the present paper we describe a collaboration e-learning project between two European universities in the scope of the agreements between institutions of the European Union. Through this project we have tried to create a classroom environment that stimulates the development of self-regulated learning through social interaction. In this way, we expect to increase the student intrinsic motivation to take part in the activities proposed, to encourage the autonomous work of the student and, thus, to observe high participation rates and good final results.

The paper starts reviewing different insights on teaching and learning in university contexts as a way to frame our online teaching project, that is explained next. Later, we describe the methodology of the

research undertaken to measure students' participation, motivation and performance results. Finally, main results and conclusions will be presented.

## **2. E-learning as a pedagogical resource**

Following Brown and Atkins (1988), learning and teaching are two interrelated processes, being learning the main and basic aim of teaching (Novack, 1982). In this process, didactic methods and resources that allow to develop satisfactorily the teaching-learning process are necessary.

In particular, specific teaching methods and resources have been proposed for practical lectures. These methods should allow the student to acquire the necessary skills for his/her professional career, through the development of analytical, reasoning, problem resolution and communication competences, among others. Thus, these practical lectures must be developed through the interaction and active participation of the students. In this context, it has been considered as convenient to use independent research with a supervisor and discussion (work in groups and discussion in groups). The aims of this kind of practical teaching are (Pujol and Fons, 1981): teaching individualization, active participation of all students and work in teams, developing the skills of the team members and leadership. These authors also classified the techniques to be developed in these groups into the following three types: *more structured techniques*, such as symposium, round table, panel, and public debate; *less structured or more informal*, such as preliminary meetings in small groups and simultaneous dialogues; and *other techniques*, such as case study, role-playing and business games. Considering the less structured or more informal techniques, active and cooperative learning can be as a collection of teaching strategies that use students to help each other learn (Slavin, 1990).

Besides, pedagogical resources constitute an important part in every educational program as they determine the other elements (objectives, contents, methodologies) and are oriented, designed and produced depending on these elements (Cebrián, 1994). In this sense, pedagogical resources provide

students and teachers with *information and data*; allow to *simulate experiences* difficult to carry out; offer the possibility of *developing cognitive and affective skills and competences*; enable the creation of *specific communication models* for the agents of the teaching-learning process; also enable the *transmission, representation and reconstruction* of academic contents and provide with new study elements; and can generate *self-assessment processes* of students and teachers, upon analysis, study and discussion of the data collected and stored by these agents. Thus, even if educational resources are relevant, they should not play a leading role in class. Human relationships should be the main axis of education and the role of the lecturer should not be replaced by the pedagogical resources, even if sometimes they are becoming more efficient. The conjoint use of all the available material is specially convenient, as the simultaneous use of more than one channel facilitates the perception in the communication process and reinforces the teaching-learning process (Fernández, Sarramora and Tarín, 1984).

Among the different formats of resources, audiovisual resources have shown a higher impact in class because of their notable communication conditions. These resources include the use of computer programs and resources available on line through the *Internet*, the so called e-learning. In this sense, the important advances in multimedia programs and the development of telecommunications, allow to develop new pedagogical alternatives oriented towards facilitating the teaching-learning process (García, 2002; Mir, Reparaz and Sobrino, 2003). Web-based peer-to-peer learning activities have proved to be more efficient, effective and satisfactory for students than other activities and/or alternative scenarios (Rada, 1998). In particular, intrinsic value and interactional fairness play important roles in satisfaction with the usage of the e-learning resource and, thus, in learners' intention to continue using Web-based learning (Chiu, Sun and Ju, 2007).

All in all, traditional learning models, where the teacher prescribes and students perform, do not support self-regulated learning and, in fact, can deter it (Boekaerts, 1997). Alternatively, creating

classroom environments that actively engage students both experimentally and cognitively have the potential of stimulating the development of self-regulated learning (Young, 2005). Taking responsibility for learning requires active participation by the learners to initiate and control their learning process along with supportive learning strategies (Loranger, 1994). Students' increased involvement in their own learning process is thought to better prepare them for rapidly changing technologies and careers that demand long-life learning skills (Young, 2005). Marketing literature provides several examples of instructor-created classroom environments to actively engage students with activities such as student management groups (Lilly and Tippins, 2002), documented course participation (Peterson, 2001), experiential learning exercises (Gremier, Hoffman, Keaveney and Wright, 2000), student-operated Internet businesses (Daly, 2001) and Web-based projects (Siegel, 2000). Furthermore, creating an active learning environment, as compared to the traditional classroom, has been linked to higher student motivation (Garcia and Pontrich, 1996; Stipek, Salmon and Givven, 1998).

In this sense, there are different approaches about student motivation. On one side, the cognitive theory states that student performance is influenced by the will to reach specific academic objectives, that can be learning-oriented or goal-oriented (Ames and Archer, 1988; Elliott and Dweck, 1988; Ames, 1992; Dupeyrat and Mariné, 2005). On the other hand, student social motivations have been also proposed as antecedents of academic goal achievement (Wentzel, 1989, 1993; Urdan and Maehr, 1995; Covington, 2000; Humphrey, 2004). Thus, social acceptance, academic self-esteem, classmates and teacher personal assessment can play important roles in the students' involvement in their learning process (Cuestas, Fenollar and Roma, 2006).

Student motivation is closely related with participation, literature has widely reported (Martin, 2007). However, Davies and Graff (2005) conclude that the reported beneficial effects of online participation and interaction do not necessarily translate into higher grades at the end of the year, with students who

participated more frequently not being significantly awarded with higher grades. However, students who failed in one or more modules did interact less frequently than students who achieved passing grades.

### **3. The online teaching project**

As a consequence of the collaboration agreement signed between two universities of different European countries, the London School of Economics and Political Sciences (United Kingdom) and the University of Valencia (Spain), an interdisciplinary online project was designed for e-learning of their students. The project, carried out through a webCT system, was going to take place in Spanish and in English. But, this collaboration was based not only on linguistic aspects but also on different economic and management topics.

The project aimed to explore the appropriateness of Virtual Learning Environments for learners across disciplines, institutions and countries to improve their learning in both the foreign language and the subject area. It was considered that student experience would be enhanced through authentic exchanges with their counterparts in the other country. The collaborative project would also allow students from two different disciplines and different universities to meet other students with different backgrounds through the VLE, to debate and acquire knowledge on other realities and to improve their foreign language skills. Specifically, the objectives of the project (Byrne, Coca and Cuadrado, 2007) were manifold:

- To promote, through the use of new technologies, cooperation and exchange of ideas between students.
- To engage learners in activities that develop their linguistic skills in the target language and raise awareness of the attitudes, values and beliefs of the target cultures.

- To provide a unique and fruitful environment for debating topics related to social sciences (ie, politics, history, economics, management or marketing topics).
- To encourage independent learning in the subject area.
- To promote critical thinking and analytical skills in comparing cultural, social, business and managerial practices by means of specially set tasks.
- To develop transferable skills such as negotiation skills and time management.

The project involved collaborative work between a group of undergraduate students learning Spanish and Society as an Outside Option to their Social Sciences degrees at the LSE and a group of students of Marketing as a core course in the Business degree at the UV. All exchanges had to take place using the LSE webCT. All participants from the UV were given access. There were also training sessions for the teachers taking part in the Project.

The students participated in a set of oral and written activities and debates assigned by the teachers leading the project. All exchanges were monitored by responsible teachers and students were expected to produce assessed related tasks (short essays, reports, oral presentations or personal research project). For the first two tasks, students were grouped in fours to facilitate the exchange of information. During those stages students had to complete guided tasks, although they were able to decide independently the topics, the length and frequency of the exchanges at the final stage of the project. The working language for all topics proposed by LSE were in Spanish whereas for those programmed by UV, English was the communication vehicle. Participants had to demonstrate a higher intermediate / advanced level in the foreign language (level B2 Council of Europe Framework for Languages).

The results of the pilot were thought to inform the future development of a model for the effective implementation of interdisciplinary collaborative partnership in a foreign language environment for



non language specialists. At the same time, presentations of that experience in international conferences were considered as well as other research and study activities.

#### **4. Hypotheses**

Considering the evidence reported by the literature, we assume that students' final performance will be determined by intrinsic motivation and involvement. Thus, as the participation in our collaborative on line activity is not extrinsically rewarded, we expect that the higher the intrinsic motivation of the student, the higher his/her active participation (measured by number of messages posted) and the better his/her final results in the course.

In particular, we first expect that the higher the participation, the better the student's performance. In this sense, positive and significantly high correlation between participation measures and students' marks are expected. Therefore, we expect the existence of significant differences in participation in the online activity between the "best" and the "worst" students, ie, those students with higher grades are expected to have participated to a greater extent in the on line activity.

On the other hand, we expect high levels of intrinsic motivation with higher levels of participation in the online activity. Furthermore, we expect the existence of significant differences in intrinsic motivation levels between students according to their participation in the activity and their final results. Finally, we expect that the final performance in the course depends positively on the student's implication and intrinsic motivation.

#### **5. Methodology**

The project described in the present paper, which will only consider the University of Valencia from now on due to data availability reasons, has been carried out in the core course "Marketing Management II" of the Business Administration studies. In spite of the existence of 11 groups, the

project has only been implemented in the so called international group, the only one in which the language of instruction is English. We decided to test the activity in a reduced group in which all students have a good command of English, as communications with LSE students are both in English and in Spanish. The project has been carried out in two consecutive academic years (2005-06, 2006-07).

The number of students of UV that took part in this project in the first and the second edition was 32 and 77, respectively. This difference in size is consequence of the large number of students in this group who are granted by the Socrates-Erasmus program. Demand of this course in English can then vary every year. Both in the first and second editions, the project lasted six weeks. Results of the students' participation, together with their reports were analysed at the end of the projects by the responsible teachers. In doing so, we collected information about access to the VLE and participation (date of the first and last connections to the LSE WebCT, duration of the connection period, hits, messages read and posted), and assessment (final grade in the course, ranging from 0 –minimum- to 10 -maximum).

We also examined the motivations of students to take part in the second edition of this e-learning activity since the first edition was just a pilot experience. In this sense, we adapted the scale of Young (2005) for assessing intrinsic motivation. The students filled in the motivation survey during the last session of the course, ie, the day before the final examination. Univariate and multivariate analysis were undertaken with data using the statistical package SPSS 14.0 for Windows.

In order to test our hypothesis, we estimated several descriptive statistics and ANOVA analysis and we also performed a linear regression.

## **6. Results**

### ***6.1. Participation***

The participation rate at both universities was higher than expected in both years. Interaction between students at LSE and UV was then a reality apparently showing students' great interest in the project. Furthermore, the assessment of the different essays handed in showed that students were able to use and structure the information provided by partners after posing guided questions. Again, due to data availability reasons, the following results will be exclusively referred to the students of the Universitat de Valencia.

In order to assess the correlation between the students' participation in the e-learning project and their performance in this course, the Spearman's rank correlation coefficient was calculated. The results obtained are shown in Table 1. All the rank correlation coefficients (except the coefficient referred to first connection for the course 2006/07) show positive and significant values at 1%. There is a strong positive relationship between involvement and participation of students in the activities of this e-learning project and their final results in the course. In particular, the more messages posted and the longer the duration of the connection period, the better the results obtained by the student. These two indicators are those that involve the biggest effort for the student, ie, his/her active participation and the continuity of this effort along time.

The positive results, observed in the two subsequent years, seem to support the positive influence of this interdisciplinary activity in the UV students' performance in this course.

Take in Table 1

## ***6.2. Differences among groups***

In order to test the significance of the differences in participation between groups of students, we used a variance analysis (ANOVA). Students were splitted in two groups: those whose final mark was below the median value of the group (ie, 2.30 for the course 2005/06 and 6.00 for the course 2006/07), and

those whose grade was above the median value. Table 2 shows the results obtained for the mean values in each group of students (ie, below and above the median grade) and the  $F$  test.

Take in Table 2

As a general result we obtained higher values for all the indicators of participation in the project for students whose grades in these courses were above the median value in comparison to those whose final results were below. The only exception was the first connection results, as most of students logged in for the first time in the first practical session of the course. Besides, there were no statistically significant differences for this variable between these two groups.

Furthermore, the differences in number of messages posted between both groups were statistically significant at 5% in both academic years. Thus, students who obtained a grade above the median of the group adopted a more active attitude towards the project since they posted a higher number of messages. Additionally, for the year 2006/07 we also obtained significant differences in the number of messages hit and read and in the duration of the connection period.

Taking into consideration some students joined the course later, we examined the existence of differences in participation and performance between those attending all the sessions (full attendance) and those who took part in only some sessions (partial attendance). Results are shown in table 3.

Take in Table 3

Full attendance students showed better results than those who joined later. Even though those students that joined the course several sessions later were encouraged to take part in this project and to catch up with the rest of the group, they showed significantly lower levels of participation (number of hits,

messages read and posted, first connection and duration of the connection period) and significantly worse grades. The differences between both groups of students are particularly relevant regarding final grades and duration of the connection period (statistically significant at 1%).

### **6.3. Motivation**

Intrinsic motivation of students taking part in this e-learning activity was measured using a four-item scale. The descriptive statistics of the results obtained only in the second year are shown in Table 4.

Take in Table 4

In a scale from 1 to 10, all items showed mean and median values above the middle point of the scale.

Thus, the on-line activity is successful at motivating students intrinsically.

Again, we examined the existence of differences in the motivation of the students who attended all the sessions and those who only attended some sessions (table 5).

Take in Table 5

The students that participated in all the on-line activities showed higher levels of intrinsic motivation (excepting for the item “I enjoy learning about an interesting subject”) than those students with partial participation. Nevertheless, the differences between both groups of students are not statistically significant.

Furthermore, we examined the existence of significant differences for hits, number of messages read and posted between the students below and above the median of these variables (median values for hits, messages read and messages posted are 54, 25 and 4, respectively). Results are shown in Table 6.

Take in Table 6

As it can be appreciated from Table 6, the students that participated to a greater extent in this activity showed higher values for intrinsic motivation items. In particular, the differences between the students that participate below and above the median values are significant regarding the items referred to the satisfaction of improving their personal knowledge and skills, and to the joy of learning.

We also tested the existence of significant differences between the students whose marks were above the median value (ie, 6.00) and those with grades below this reference level. Results are shown in table 7.

Take in Table 7

In general, students with better grades showed higher levels of intrinsic motivation. However, only the differences regarding the item “I have completed exciting and challenging class activities” were statistically significant at 10%. This result emphasizes the important contribution of attractive resources and an exciting environment for the teaching/learning process.

#### ***6.4. Relationship between performance, participation and intrinsic motivation***

Finally, in order to test if the final performance in the course depends positively on the implication and intrinsic motivation of the student, we estimated a linear regression. The dependent variable was the students’ final grades (as a measure of performance) and the independent variables were, on one side, the number of messages posted (as it has proved to be the explicative variable of the differences in the

results obtained by the students with low and high grades) and on the other side, the four items of the intrinsic motivation scale of Young (2005). Results are shown in Table 8.

Take in Table 8

As it can be observed in Table 8, the model is statistically significant at 10%. The coefficients show the signs predicted by the theory, ie, positive relationships between performance and both intrinsic motivation and number of messages posted, excepting the coefficient associated to the last item of the intrinsic motivation scale (“I enjoy learning about an interesting topic”). In particular, the coefficients associated to number of messages posted and the third item of the intrinsic motivation scale (“I have completed exciting and challenging class activities”) are positive and statistically significant at 5% level.

Thus, intrinsic motivation and active participation of the students in the online activity play an important role in their final performance. In particular, students seem to be motivated by exciting and challenging class activities, and not by the course in itself.

## **7. Conclusions**

Following the evidence obtained, we consider that the interdisciplinary collaboration between UV and LSE through this e-learning project has involved positive effects on students’ motivation, involvement and performance. In particular, we have proved that even if there is no extrinsic reward for the student because of his/her participation, he/she becomes actively implicated in the activities proposed if he/she considers them as exciting and challenging, even if the course in general does not seem interesting. This result has important implications on the design of attractive teaching-learning activities that may stimulate student’s participation therefore contributing to improve his/her final results. This evidence is

in the line of Deci and Ryan (1985), who assumed that the activation of intrinsic motivation is determined to a great extent by characteristics of the task. In this sense, we agree with Bergin (1992) regarding the existence of a relationship between intrinsic motivation, academic activities and leisure that the lecturer must take advantage of in favour of the teaching-learning process. In the line of Amory, Naicker, Vincent and Adams (1999), we consider that the use of ludic activities provide sufficient stimulation to engage students in knowledge discovery, while at the same time developing new skills.

All in all, the collaboration project allowed students from two different disciplines and different universities not only to meet others with different backgrounds through an online system but also to debate and get more information on other realities and improve their foreign language skills. The results obtained for the students of both institutions - ie, University of Valencia and London School of Economics - in this innovative project are positive.

Both the qualitative and quantitative results seem to confirm the positive contribution of this interdisciplinary e-learning activity to the teaching-learning process and, according to García (2002), Mir *et al* (2003) and Davies and Graff (2005), the convenience of the use of Internet tools in class. Nevertheless, the evidence is not conclusive, as it has been an exploratory research and the activity should be replicated in further years and for different courses. Regarding the quantitative data, the results obtained could be biased because of students' work in groups using only one password. On the other hand, causality between participation indicators and student's final grade has not been explored. In this sense, do students have better results because of their participation in this e-learning activity? Or do the "best" students tend to participate in this activity more than others? "Best" students might be more intrinsically motivated by these class activities and vice versa, and in this sense, considering the performance of students in other subjects could improve the explanatory power of our model.



Thus, the results obtained for the students of University of Valencia seem to support the positive influence of this interdisciplinary activity in the students' performance and the use of learning methods that facilitate active and cooperative learning through audiovisual pedagogical resources, in accordance to Pujol and Fons (1981) and Cebrián (1994).

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Table 1: Spearman's rank correlation between participation indicators and final grades

Participation indicators	Rank correlation coefficient	
	Course 2005/06	Course 2006/07
Hits	0.637***	0.550***
Messages read	0.576***	0.448***
Messages posted	0.728***	0.407***
First connection	0.691***	0.140
Duration of the connection period	0.741***	0.504***

\* Statistically significant at 10%, \*\*5%, \*\*\*1%

Table 2: Mean values and ANOVA of participation indicators depending on final grades

Variables	Course 2005/06			Course 2006/07		
	Grade below median	Grade above median	F	Grade below median	Grade above median	F
Hits	56.38	90.69	2.54	36.00	103.82	6.87**
Messages read	33.44	50.15	1.62	24.65	59.32	3.77*
Messages posted	5.06	12.77	6.74**	3.10	6.68	4.31**
First connection	3.90	3.54	0.12	3.54	3.57	0.01
Duration of the connection period	50.80	51.46	0.01	4.30	9.68	6.28**

\* Statistically significant at 10%, \*\*5%, \*\*\*1%

Table 3: Participation and performance depending on full and partial attendance

Variable	Attendance		<i>F</i>
	Full	Partial	
Hits	100.05	40.15	5.16**
Messages read	61.36	22.40	4.89**
Messages posted	6.45	3.35	3.15*
First connection	3.00	4.46	3.58*
Duration of the connection period	9.91	3.50	10.05***
Mark	6.87	5.26	9.17***

\* Statistically significant at 10%, \*\*5%, \*\*\*1%

Table 4: Descriptive statistics of intrinsic motivation

Item	Mean	Median	Std Dev
1. I have the satisfaction of improving my personal knowledge and skills.	6.26	7.00	1.77
2. I have a sense of personal accomplishment.	5.89	6.00	1.85
3. I have completed exciting and challenging class activities.	6.18	6.00	1.89
4. I enjoy learning about an interesting subject.	7.32	8.00	2.21

Table 5: Intrinsic motivation depending on students' full and partial attendance

Item	Attendance		<i>F</i>
	Full	Partial	
1. I have the satisfaction of improving my personal knowledge and skills.	6.61	5.73	2.31
2. I have a sense of personal accomplishment.	6.22	5.36	1.92
3. I have completed exciting and challenging class activities.	6.30	6.00	0.23
4. I enjoy learning about an interesting subject.	7.26	7.40	0.03

Table 6: Intrinsic motivation depending on participation

Item	Hits			Messages read			Messages posted		
	Below median	Above median	<i>F</i>	Below median	Above median	<i>F</i>	Below median	Above median	<i>F</i>
1. I have the satisfaction of improving my personal knowledge and skills.	5.83	6.56	1.49	5.67	6.72	3.36*	5.53	6.79	4.97**
2. I have a sense of personal accomplishment.	5.41	6.17	1.46	5.33	6.29	2.43	5.47	6.11	1.04
3. I have completed exciting and challenging class activities.	5.89	6.22	0.29	5.72	6.39	1.17	5.53	6.53	2.73
4. I enjoy learning about an interesting subject.	6.61	7.72	2.45	6.44	7.89	4.37**	6.47	7.79	3.55*

\* Statistically significant at 10%, \*\*5%, \*\*\*1%



Table 7: Intrinsic motivation depending on final grades

Item	Mark below median	Mark above median	<i>F</i>
1. I have the satisfaction of improving my personal knowledge and skills.	6.11	6.39	0.23
2. I have a sense of personal accomplishment.	5.39	6.33	2.39
3. I have completed exciting and challenging class activities.	5.63	6.67	2.92*
4. I enjoy learning about an interesting subject.	6.87	7.67	1.32

\* Statistically significant at 10%, \*\*5%, \*\*\*1%

Table 8: Linear regression of performance depending on intrinsic motivation and active participation

Independent variables	Unstandardized coeff.	Standardized coeff.	Sig.
Constant	4.190	-	0.002
Number of messages posted	0.112	0.368	0.034
1. I have the satisfaction of improving my personal knowledge and skills	0.002	0.002	0.994
2. I have a sense of personal accomplishment	0.036	0.037	0.898
3. I have completed exciting and challenging class activities	0.560	0.577	0.030
4. I enjoy learning about an interesting subject	-0.257	-0.308	0.240

R = 0.537, R<sup>2</sup> = 0.288, F = 2.351, Sig. = 0.066