A LEARNING EXPERIENCE IN THE FIELDS OF ECONOMICS AND BUSINESS: CREATION OF STUDENT-MANAGED INTER-UNIVERSITY VIRTUAL NETWORKS

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ABSTRACT
With this article we shall describe the learning experience carried out by our students in the fields of Economics and Business at the Universities of Huelva and University of Seville within an active- and cooperative-learning framework involving creation of virtual networks between our students and others who were attending diverse universities in Spain and abroad, thus allowing us to strengthen interactions and information exchanges among students, also allowing them to apprehend on their own the characteristics of economic and business and entrepreneuring realities in which they are immersed and, very specially, the use of virtual communities in the Internet.

KEY WORDS: Student networking, cooperative and collaborative learning, virtual communities.

1. INTRODUCTION

University teaching cannot fall behind nor remain on the sidelines in the face of innovations involving nearly everything around us. It needs to delve into the constant string of changes we find ourselves subjected to, insofar as the student is required to come to grips with an economic surround where practically nothing remains unmoved. It is thus that one of our priorities is to make students of Economics and of Business Management witness the accelerated dynamics driving the economy, and to train them to cope with life in such a scenario.

We have tried to blend theoretical elements with the practical ones, and to introduce new actors into the teaching-learning system of new technologies and economic globalization, where the parameters within which we have been coursing (countries or economic sectors, among others) are slowly becoming diluted in favor of new frames of reference in both economics and university education.

Therefore, when the boundaries of the economic environment have already gone beyond the local and national scene and are now globalized, we cannot constrain the educational model to a classroom milieu. If, under the new economy, networks devoid of geographic limitations will be underpinning businesses and work systems, students must acquire knowledge in scenarios that are spatially, socially or linguistically dispersed, a matter that brings us to the use of technical tools under other criteria, among which we must also assay those that are sociological and cultural in nature.

On the other hand, in the classroom we are now facing a new generation of students, better educated and more concerned about the use of new Information and Communications Technologies (ICT), but with an

individualistic mien. In fact, we still encounter difficulties in obtaining cooperation among students in a manner that will enable them to work and learn together, acknowledging the fact that classroom integration is a crucial issue in education, being that circumstances emerge thereat where students can perceive a need to reconcile different conflict-resolution perspectives in matters such as, for example, issues of interpretation. It is thus that in our case we have not only incorporated ICT into learning as contents to be studied or skills to be mastered, but are also using them as education-bound communications tools, meaning that they are systems through which the teaching/learning processes course. Owing to ICT, mainly Internet, we have resources focused on interaction and orientation between teachers and students and amidst the students themselves. We regard as peremptory the need for introducing the computer into the classroom as a learning tool. It is necessary to teach students to think about thinking, and to avoid confusing thoughts with programs.

All of the foregoing brought us to a teaching experiment within the cooperative learning framework, such as creation of interuniversity working groups mirroring the dominant economic system, wherein students may engage in individual learning, but immersed in groups having shared aims. The said virtual-community networks are a means for students to rapidly exchange information regarding a specific subject, and in so doing creating relationships among themselves and becoming true virtual communities or groups of individuals sharing an interest and using computer networks as communication channel.

In the quest to enhance the diversity and heterogeneity characteristic of our era, we have strived for those groups not to be based at single learning venue, but rather that they must be within different component parts, in other countries, with distant economic and cultural motivations, as that is what present business and economics are all about.

2. LITERATURE REVIEW

One of the characteristics in this new economy is its network structure and its dependence on information technologies. We agree with Castells (1997) in that networks are the fundamental element from which new organizations are and will be made up, taking into account that these new technologies, and particularly Internet in its predominant role, allow greater flexibility and in-network workability.

Admittedly, in manufacturing industries the strong interaction and processing costs lead to high levels of vertical integration, in the sense that it is easier and more cost-effective for companies to maintain a handhold on all supplier-client links in the value-added chain, where the computerized economy and the low interaction and cooperation costs, coupled with the potentials inherent to ICT, prompt creation of a virtual organization – a value network – where better quality, flexibility and cost-control levels are achieved by way of top-of-the-line and innovative partners specialized in specific value-added chain links.

ICT resources make entities go to new organizational forms which, owing to their nimbleness, are better adapted to market uncertainty, using cross-organization links to that end. Organizations can go beyond their borders through ICT-based interorganizational information systems. Traditionally, such extensions have been overly expensive in terms of ICT investment, but this situation has changed radically, allowing, especially in the case of sme's, for design and implementation of cross-organizational systems aimed at transcending the borders or boundaries of the organization and connecting their processes with those of their clients, suppliers, partners, etc., which interconnections lead to the extended enterprise (Bloch & Pigneur, 1995) and of cross-organizational networks (D´Aveni, 1994) or entrepreneur networks (Biggiero, 2001).

In fact, in the age of information in which business enterprises are immersed, the sort of organization that becomes the key is the interchanges network, since such networks provide the global economy with a suitable performance environment based on flexibility and continuous adaptation. In this manner, more and more network organizations made up of specialized units coordinated by way of electronic networks are replacing the hierarchical organizations (Benjamin & Wigand, 1995). In this context, numerous research efforts have taken place regarding the design of cross-organizational information flows as supports for cooperative relationships between the firm and its business partners, as highlighted in the work by Van der Aalst (2002).

From the organizational viewpoint, Miles and Snow (1984, 1986, 2002) were first in discussing the emergence of the network model within a logic of organizational design blueprints, the aim being to simplify intraorganizational issues, discharging upon other companies activities previously accomplished internally and maintaining operational ties (strategic alliances) with the said companies, as well as with others, thereby achieving better access to new markets and technologies. In addition to its flexibility and response capability, the networks also stood out by the efficiency with which tasks were performed: this is due to specialization relationships accruing within them.

The said cooperative strategies are issuing forth interorganizational relationships that become a handle for organizational blueprinting that lowers transaction costs and allows for obtainment of synergies through interlocking of enterprises having complementary capabilities (Powell, 1990). Cooperative strategies then lead to networks that can link businesses along stable courses and with strategic consequences, thus opening up the way for virtual communities (Jarillo, 1993).

Authors such as Williamson (1985), Benjamin and Wigand (1995) and Steinfield et al. (1997) have analyzed how networks can reduce transaction costs and their influence in creating electronic markets (Benjamin & Wigand, 1995; Reagle, 1996), and have identified the following Internet effects on client-supplier relationships: a) reduction in distances between both parties, even to the point of eliminating the middleman when allowing for direct contacts, although such a situation does not occur in a generalized fashion inasmuch as in the majority of cases what ensues is a return to middlemen, resulting, on the one hand, from the large volume of buyers and sellers participating in such a global milieu and, on the other, the amount of data that need be processed towards decision-making; b) reduction of supplier profit margins: supplier profit transfers to middlemen can occur in relation to Internet-based e-business, or cyber-intermediaries (Sarkar, Butler & Steinfield, 1995); c) increase in currency exchange loss. If approximation between client and supplier occurs owing to use of an interorganizational information system, based o Internet for example, there is a noticeable increase in exchange loss for the supplier. Likewise, to the extent that both parties gather information jointly, their exchange costs become higher, creating entry barriers for new competitors.

More recently, Subramaniam and Shaw (2002), commented that if it is true that new interorgnizational information systems were lineal links between organizations, Web-based interorganization information systems allowed for in-network creation of business systems.

On another side of the issue, and in connection to teaching-associated network building, there is much research done on networking among professors (e.g.: Clark, 1988; Day, 1999; Lieberman & Grolnick, 1996; Moonen & Voogt, 1998; Ponzio, 1987; Rhodes & Beneicke, 2002; Thompson, 2001; West Burnham & O´Sullivan, 1998) and interdepartmental university networks, as is, for example, the Finnish one on psychology, Psykonet (Niemi & Hämäläinen, 1999). The Law and Glover study (1996) established that open networking wherein mutual

assistance and thought processing among educators is provided, becomes an important component in effective professorial management development.

On the contrary, there are not many concluded and published learning experiments relating to student networks (Baldwin, Bedell & Johnson, 1997) in particular concerning university students, such as we are presenting here. This sort of activity takes place in the cooperative and collaborative framework, where the professor organizes activities such as those, so that they can be developed within a faculty-supervised student team. Among the advantages of this of this type of learning, characterized by student interactions, we can highlight, as is done by (García, Traver & Candela, 2001) the following: a) Enhancement of student motivation; b) allows more interdependence and communication among group members, c) in their interrelation with other students the subjects can directly learn attitudes, values and skills; d) interaction between peers provides opportunities for practicing social-positive behavior (sharing, helping, etc.); e) students learn to apprehend situations and problems with perspectives different from their own; f) student self-reliance is promoted through interactions with other students; g) positive attitudes towards different fellow students develop; h) makes possible a more fair distribution of the power of information, which is not centralized by the teacher. Many are the empirical evidences regarding the positive effects of cooperative learning (e.g. Faye, Jones & Wakai, 2003; Palincsar & Brown, 1984; Ploetzner, Dillenbourg, Preier & Traum, 1999; Schwartz, 1995).

More specifically, the foresaid learning activity of student network creation falls under the teaching techniques for collaborative learning sustained by the interactive capability of computer-supported communication (Computer-Supported Collaborative Learning, CSCL). For a review of CSCL, see (Lehtinen, Hakkarainen, Lipponen, Rahikainen & Muukkonen, 1999; Lipponen, 2002).

To be considered is the work by Lipponen et al. (2002) stemming from their own outcomes (Lipponen, 1999; Lipponen, Rahikainen, Lallimo & Hakkarainen, 2001) and from other preceding research (Haythornthwaite, 1999, 2001; Nurmela, Lehtinen & Palonen, 1999; Palonen & Hakkarainen, 2000; Scardamalia & Bereiter, 1994; Van Zee, 2000) regarding participation and quality of communication in discussions about the CSCL environment. The said authors put forth in the first place that interaction among players must be compact, inasmuch as with a compact network more favorable learning use can be made of distributed experience and diversity of students knowledge. In the second place, participation and interactions must no be centered on some of the participants, which makes it necessary to monitor the participation levels of group members. In the third place, the discourse should be very reflective, meaning that it should not turn out to be a mere exchange of information as new contributions but rather that all arguments should be challenged, making it essential to demand elucidations of new concepts as they arise if indeed the object is to expand whatever knowledge is shared. In the fourth place, the communication itself should be constructive, issuing forth positive feedback flows and precluding personal and negative feedback, so that critiques are conveyed in a well-founded manner.

There are some learning experiences made in Spain's education environment that resemble the ones presented herein, as is the one undertaken through e-mail for students and teachers of New Technologies and Educational Technology at different Spanish universities with the object of introducing students to the world of computer networking through e-mail (Perez i Garcias, 1996). In this classroom experience the conclusions drawn were, among others, that students valued, in the first instance, the sharing of information with others and, in second place, that they could exchange ideas on the subject discussed that paralleled their own, and thirdly, that they valued the time availability.

Other educational experiences along these lines have been the creation of on-line communities between doctoral students (Solloway, Harris & Mayer, 2000) and the work by Ruth (1997) describing the procedure and process required for converting one traditional university course into a course based on new technologies on-line.

3. STUDENT NETWORK CREATION: A NEW COLLABORATIVE LEARNING EXPERIENCE

Owing to the foregoing circumstances we normally resort to ICT applications (Internet above all) to attempt adaptations of teaching to the new context of the Information and Knowledge Society, which carries with it the quest for educational coordination between students of different courses, degrees, universities, and countries, all of it in a virtual-class climate, and with innovative strategies and models.
Because of that, networks built among our students have operated as authentic virtual organizations, with extremely variegated objectives: Four groups compared the particularities, structuring and workings of the universities and their components, others have done the same in regards to use and import of ICT, and yet another has done theirs on a subject dear to students, in this case on the importance of association football in the respective countries making up the network (for this exercise, they were Italy, Holland and Japan and additionally Spain).

OBJECTIVES
The objectives of this educational experience were:

- Improving student skills in the new networked economy
- Opening the classroom system from the local environment to a globalized one.
- Fomenting Internet use as a means of getting work done.

INVESTIGATION PLAN
The plan followed in executing this educational experiment has consisted of:
Proposing to the students that they search for potential "partners" (among student bodies at other universities in Spain and abroad) through the Internet network in order to share information concerning their subject matters. The six groups put together were made up as reflected in Table 1.

	HUELVA AND SEVILLE COLLEGE STUDENTS	STUDENTS ABROAD
GROUP 1	3	2
GROUP 2	2	3
GROUP 3	1	3
GROUP 4	2	4
GROUP 5	2	4
GROUP 6	3	11
TOTAL	13	27

Table 1. Composition of student networks

Selection of search methodology: The majority did so by using as first contact method the university forums, in addition to chats, searches for student e-mail addresses or informal contacts (see Table 3).
Proposing a working theme as a function of interests evinced in the group formed. In this sense, in spite of our considering more appropriate the centralization of themes on stereotypes about the disciplines we impart, (Information systems/Information Technology) as recommended by Guzdial and Turns (2000), we opted for giving students more freedom in the matter of choosing the network theme. These are as reflected in Table 2.

	NETWORK THEME
GROUP 1	Comparison of university systems in the different countries
GROUP 2	Analysis of study method evaluations, for Economics, and Business Management and Administration
GROUP 3	Importance of football
GROUP 4	Study of the importance of Information and Communication Technologies
GROUP 5	Comparison of university systems in the different countries
GROUP 6	Development of a comparison for programs of main classroom subjects in Economics-Business Management and Administration

Table 2. Subjects for discussion in student networks

Establish a work methodology using synchronous and asynchronous communications tools. Generally speaking the most used resource was e-mail although complemented by use of distribution or mailing lists, electronic bulletins, electronic forums and Web pages, all of them constructed ex-professo, together with use of a questionnaire as system for ordering group tasks (see Table 3).

	SEARCH METHOD	WORKING METHOD
GROUP 1	CHAT E-MAIL E-FORUM	E-MAIL WEB PAGE MAIL LIST E-BULLETIN E-FORUM
GROUP 2	CHAT E-MAIL INFORMAL CONTACTS	E-MAIL E-FORUM MAIL LIST QUESTIONNAIRE
GROUP 3	E-MAIL INFORMAL CONTACTS E-FORUM	E-MAIL MAIL LIST WEB PAGE E-BULLETIN E-FORUM
GROUP 4	ELECTRONIC FORUM CHAT E-MAIL	E-MAIL MAIL LIST E-BULLETIN
GROUP 5	E-FORUM CHAT E-MAIL	E-MAIL MAILING LIST E- BULLETIN QUESTIONNAIRE
GROUP 6	E-FORUM CHAT E-MAIL	E-MAIL MAIL LIST E-BULLETIN E-FORUM QUESTIONNAIRE

Table 3. Student search and work methodology

In the creation of mailing or distribution lists, use was made, fundamentally, of charge-free services available in Domeus.es, Yahoo! Groups and Coollist.com; the same as was done in creation of internet forums with Melodysoft.com, Groups.msn.com and Foros.terra.com; for creation of electronic bulletins the Domeus.es and Freetechmail.org sites were used, and for creation of Web pages they used Tripod.Lycos.es, Geocities.Yahoo.com, Red-es.com and Galeon.Hispavista.com

Submission of closing report, specifying how partners were found, how networks were established, what results were obtained. One aspect differentiating this system from other similar ones is that students freely choose their partners, without any previous relationship between them normally existing, nor even agreements between universities where networking students belonged to. Creation of these networks is totally free willed, just as students would be doing in the economic world they are going to find themselves living in.

Evaluation. Students participating in this project have been evaluated using traditional methods, computer-based written practical and theoretical examination, and their grade is stepped up as a function of the work accomplished in their networks.

RECIPIENTS (STUDENTS, ACADEMIC SUBJECTS)

Many have been the students that showed interest in this proposal, actually several hundred of them (mostly foreign students), although we only reflect those really participating in the process until completion of their final reports. Thus, 40 students have collaborated actively, distributed into six groups, of whom 13 are from the Universities of Huelva and Seville and 27 from the same number of universities from other countries (see Table 4).

COUNTRY	Nº STUDENTS
Argentina	6
Mexico	6
Venezuela	4
Colombia	2
United Kingdom	2
Brazil	1
Italy	1
Holland	1
Japan	1
Poland	1
Guatemala	1
Dominican Republic	1

Table 4. Foreign students in networks

In this first experience we haven't wanted the number of networking participants to be too high, albeit aware that we were in danger of not having enough network participant density.

At the same time, subject matters included in the project are three, as reflected in Table 5.

SUBJECT	YEAR	DEGREE
Information Resources Management	4th	BA in Business Administration and Management from Universidad de Huelva
Computerized Business Management	3rd	BA in Business Administration and Management from Universidad de Sevilla
Information Resources Management	3rd	Associate in Business Administration

Table 5. Subject matters included

TIMETABLE

Project development coursed along two academic years, 2001.2002 and 2002-2003, following the timeframe reflected in Table 6.

PERIOD	ACTIVITY
January-March (2002)	Constitution of networks
April-July	Operation of networks and networking tasks
August-October	Analysis of networks
November	Evaluation
December-January (2003)	Preparation of final report

Table 6. Activity timetable

RESOURCES EMPLOYED (HUMAN, MATERIAL, INFRASTRUCTURAL)
In total, our group included three researchers with Ph.D. degrees, two from the Universidad de Huelva and one from the Universidad de Sevilla, plus 40 students (13 from Huelva and Seville and 27 from foreign institutions).

Concurrently, computers and telematic connections were used (in University computer rooms as well as in student's homes), additionally counting on those of the students abroad, in their respective universities as well as their own.

We also produced a set of posters to boost student participation and prepared diverse materials as orientation on the teaching systems and workings of established networks, posted on the Web site maintained by us as support during the experiment.

EVALUATION OF EDUCATIONAL ACTION
Evaluation of educational action was performed along two different paths, to wit:

Firstly, as stated before, each group had to prepare a final project brief (also valid for evaluation of students in our own classes, as they can be used to raise their grades over what they had obtained after examinations on theory and practice) and they had to report:

- Objectives of the network implemented (subject matter of the work done).
- Number of students participating, nationality and data identifying their academic
- institutions.
- Methodology followed in creation of the network (contact systems).
- Methdology in working (information exchange systems, such as e-mail, e-
- forums, e-bulletins, chats, instant messaging, Web pages, etc.).
- Work done jointly by way of the network.
- Annex containing all messages and files exchanged over the network since its inception.

In the second place, we met with the students in person (in discussion groups) and prompted some opinions and proposals, which we shall incorporate into future networks building.

From both evaluation experiences we learned that it has been quite difficult for them to build networks, although once constituted they proved capable of making them work effectively.

Some of the conclusions and experiences commented by our students were (verbatim):

Group 1:
"In spite of the difficulty in finding team members it was enriching"
"It was hard to seek contents for maintaining an enriching dialogue on the network" "It showed me the greatness of the extraordinary invention that Internet is"

Group 2:
"We would like to express our surprise at the response obtained and the eagerness to cooperate he/they displayed with us and the good impression left in us by doing a study together with people from other countries using e-mail, mailing list and e-forums and e-bulletins, and we were able to verify the enormous advantages of these tools".

Group 3:
"Although on principle it might seem simple, the task accomplished was not that simple."
"It took me over three weeks to build up the network."
"The experience was fairly rewarding, allowing me to practice English and see how language barriers or distances were overcome."
"But the hardest thing was to search and find valuable information for exchanging on the network."

Group 4:
"We have seen with this job that students in some countries and others are not so different"
"Through these new tools it's very easy to communicate with others worldwide, the planet is getting smaller."
"We've enjoyed the experience and would have liked more time for contacting more people"

Group 5:
"We got many responses, but few of them came near the network profile we intended to build).
"To those who didn't look like potential collaborators we expressed thanks for their cooperation as well as appreciation for the interest shown."
"In general, we are pleased with our network, although near the end we were a bit disappointed at the lack of interest shown by some net members at the last moment (we assumed they were immersed in exams just like us)".
"As a result, good friendships have developed with other network members and we think such will continue with the aim of helping us connect with jobs

Group 6
"In some of the search modes, results wee negative because the majority of college Web pages have no student addresses, just faculty."
"We've been able to ascertain computer price differences and Internet connection costs in participating countries, realizing that some countries have made bigger efforts in reaching towards the information society."
"At the end the network also became useful for exchanging tasks, experiences and notes"

To sum up, we think this has been a very positive experience inasmuch as students become aware of the existence of other individuals with whom to team up when studying (in the future they'll do it when working).

4. CONCLUSIONS, PROJECTION, GENERALIZATION POTENTIALS AND LIMITATIONS

On our part, we do not forsake traditional university teaching methods, since notwithstanding the fact that our teaching is overly targeted at magisterial lecturing, it seems obvious that to a certain extent such is still required owing to its numerous advantages, with its disadvantages reduced by way of readapting educational methodology towards taking advantage of the ICT potential in teaching resources, above all when it comes to simulations of socioeconomic conditionants produced by the new information economy, wherein network links become the true workhorse of the economy. On final analysis and since the ways of the industrial economy persist and coexist with the knowledge society, in extrapolating this scenario to university education we must also complement traditional teaching – a product of the industrial revolution – with new methods.

Being that our objectives include preparing students to thrive in the economic environment which already is and will continue being globalized and information-bound, we should outfit them with skills that can be achieved only through practice and the simulation of situations which they shall be working under. For that reason the classroom must also become, as pointed out before, open, globalized and information-bound, and the ICTs must be yet one more tool, not only in the faculty's service but rather, above all, in that of the student body itself.

To accomplish that, we need to teach our students how to face up to situations and resolve them, integrating knowledge acquired from the totality of their curriculum package and finding practical solutions to them, inasmuch as if what we seek is future professionals in possession of initiative we must promote active participation in teaching processes, such as in the student networks. Education, as well as economics, can no longer be limited to an isolated place, advances in joint management of education being necessary, engaging in actions from the teaching side as well, coordinating actions and subject matters with other schools, and also by student creation of new networks.

We thus believe that, with this perspective in mind, university teaching activity should change, since traditional phases of goal selection, goal-oriented education methods and evaluation must be relativized and coordinated, inasmuch as the education plan is no longer up to a single institution but rather several ones, the same as making a product today, be it material or informative, requires involvement by several different organizations. It is thus that if industries have constituted systems for joint management of production, we must create "systems for joint educational management", and such will be one of the standards guiding educational planning over the next several years.

This has been the main motivation that led us to effect, as teaching experience, the creation of student networks, which are totally useable for any subject matter presently taught at Huelva and Seville universities and other university centers.

We are convinced that, as proven by experience, student-managed virtual networks enhance present learning, ICT skills and teamworking capability, and additionally constitute a computerized resource able to serve as future framework for lifelong learning needs.

With these networks, we have not only reached the three goals originally sought but have also achieved practical application of the theoretical contents on internet services that were gained in our discipline and have enhanced a more positive attitude towards teamwork among participating students, heightening their skills in active listening and group discussion.

At present we are building new networks with our students, trying to overcome difficulties encountered in previous ones.

In order to resolve one of the inconveniences expressed by students, concerning difficulties encountered in locating contents relating to the selected subject that were fit for exchanging on the net, as required for correct implementation of the methodology we used, we shall also provide our students innovative learning material adequate for Web use, because this will probably be the stimulus for strengthening student networks, because the idea is to share information, and such information need be well designed and presented.

Another inconvenience faced, even more important, was the difficulty our students encountered in constituting the networks, which gave way to their not being as dense as hoped for. As do Guzdial and Turns (2000), we also regard as positive the existence of more numerous network membership as a way of learning through computer-mediated forums. To alleviate in part this effect, although heterogeneity and territoriality are lost, we have started a new project whereby students making up the groups all belong to the Universidad de Huelva, but at different campuses, and must work on a joint task, without person-to-person contact for a set period of time (a whole day), with such an experience being very positive because it forces students to network whilst meeting tight deadlines, which makes them apply the knowledge and networking to the maximum level, as work to be reported is presented jointly by all participating networks.

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