E-LEARNING IN ROMANIAN HIGHER EDUCATION:
A study case

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ABSTRACT

The accelerated development of the information and communication technologies determined universities, companies and educational institutions to implement alternatives to the traditional teaching methods, thereby leading to the development of e-courses. New Information and Communication Technologies mediating learning represent an important component of education and training systems. In Romania, issues connected to eLearning are comparatively little known, as there are no relevant studies regarding the present situation of eLearning use or of the ways of increasing the level of use of Information and Communication Technologies along with an increase in the efficiency of higher education. The purpose of the study is to explore the level of dissemination of eLearning in the Romanian higher education, regarding both awareness about eLearning as a model and actual participation in such courses, to assess the respondents' opinion on eLearning, to analyze the perspectives of using e-learning, and the students' opinions concerning e-learning in comparison with traditional educational model. The paper reports the results of a research that was conducted in Iasi, at the "Alexandru Ioan Cuza" University. Through the application of appropriate statistical methods, the research' aim was to describe and assess to what extent computers are used for learning of the students in order to highlight any important differences in terms of gender, specialty, and the preferred form of learning for postgraduate courses.

Keywords: information and communication technologies, higher education, eLearning.

INTRODUCTION

There are many definitions about e-learning, but the one proposed by the scientists from Learning and Teaching Support Network (LTSN) Generic Centre (2002) seems to be large enough to cover the complexity of the concept: e-learning is "learning facilitated and supported through the use of information and communication technologies(ICT)" (Jenkins, Hanson,2003). From this definition, one may understand that e-learning concept is based on the utilization of ICT, in order to support teaching-learning activities. The growth of information and communication technologies requires a broader view of academic literacy and how this growth now informs situations of learning. It is argued that educational practice must recognize new demands on learning these new forms as well as new divides and disillusionments associated with them.

The exponential development of increasingly sophisticated communication technologies has prompted universities, companies and educational institutions to experiment with alternatives to the traditional teaching methods, thereby leading to the development of online courses (Favretto, Caramia & Guardini, 2005).

However, there are also new opportunities to be seized for learner participation in the creative process (Crook, 2005). At present, new Information and Communication Technologies mediating learning represent an important component of education and training systems.

The European Commission started pioneering actions for the use of new technologies in education some time ago, while the general objectives of European co-operation in this field have been reflected in the 1983 Council Resolutions on measures necessary for the implementation of the new ITC in education (**Commission of the European Communities, 2002**, p. 3). Later, European **Councils from Lisbon (2000), Stockholm (2001) and Barcelona (2002) have required sustained action at Member State and Community levels in order to integrate ITC in education and training systems (Commission of the European Communities, 2002**, p.2**). ÆEurope2002 and eEurope2005 Action Plans adopted by these Councils identified eLearning[1] as a top priority (Commission of the European Communities, 2002**, p.2**). Moreover, recent policies at EU level have emphasized the role of eLearning in improving innovation in education and training (Anon, 2001). The Commission of the EU has adopted the "eLearning" Programme (Decision No 2318/2003/EC, 2003) (2004 to 2006) to adapt the EU's education and training systems to the knowledge economy and digital culture, for the effective integration of information and communication technologies in education and training systems in Europe. By 2010, Europe should be the world leader in terms of the quality of its education and training systems. E-learning has the potential of helping the Union respond to the challenges of the knowledge society, to improve the quality of learning, to facilitate access to learning resources, to address special needs, and to bring about more effective and efficient learning and training at the workplace. This process of fundamental transformation of education and training throughout Europe is carried out in each country according to national contexts and traditions and will be driven forward by cooperation between Member States at European level.**

The purpose of the study is to explore the level of dissemination of eLearning, to assess the respondents' opinion on eLearning, to analyze the perspectives of using e-learning in the Romanian higher education, the students' opinions concerning e-learning compared with other educational forms. The research was conducted at "Alexandru Ioan Cuza" University level.

NATIONAL POLICIES AND PROGRAMS

Romania, as a member of the EU, should take into account and implement the decisions at European level on eLearning. In this context, in Romania, within the general strategy referring to ICT, the Ministry of Education and Research, by its ongoing programs, is trying to implement the on-line assessment, as well as the e-lessons for the various subjects, by means of the AeL[2] application. The AeL lessons are used in high schools throughout Romania within the framework of the CES (Computerized Educational System). By means of the CES, Romania has taken major steps in the development of didactic content in electronic format. Other several attempts have been

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[1] In the eLearning Action Plan, e-learning was defined as "the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration" (Commission of the European Communities, 2002, p. 2).
[2] Romanian educational soft developed by Siveco.

made to introduce eLearning in the educational system, taking the form of several projects: „Introducing electronic textbooks in general education"; "The implementation of a new open - source system for eLearning in higher education with the aim of accelerating Romania's evolution to the informational society through innovative educational methods"; "The Creation of an experimental centre for the pedagogical training of tutors for distance learning"; the Pyxis Project, developed between 2001 and 2003 completed with the creation of a distance learning site.

In Romania, issues connected to eLearning are comparatively little known, as there are no relevant studies regarding the current situation of eLearning use or of the ways of increasing the level of use of ICT along with an increase in efficiency of higher education. Within this framework, eLearning research is necessary in order to assess how real is its use within Romanian higher education, which are the ways by which it can be improved, the ways by which the present situation can be assessed and what proposals for the future can be made. Moreover, it is necessary to identify the position the eLearning has among the current form of higher education. In Romania, there were 107 tertiary education institutions, 770 faculties, and 716464 students enrolled in the 2005/2006 academic year. Bucharest, Iasi, Cluj and Timisoara together held 46.10 % of tertiary education institutions and 59.37% of the students enrolled in 2005/2006 academic year.

METHODOLOGY

Study Area
In Iasi, an important higher education region, there were 11 tertiary education institutions (10.28%) (Figure: 1), 65 faculties (8.44%) (Figure: 2), and 60686 students enrolled in 2005/2006 academic year (8.47%) (Figure: 3).
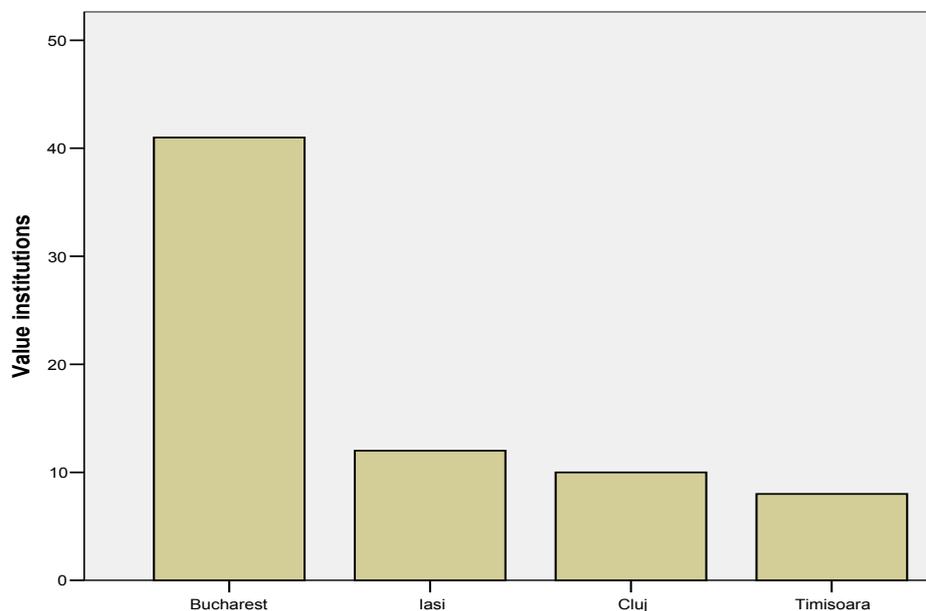

Figure: 1
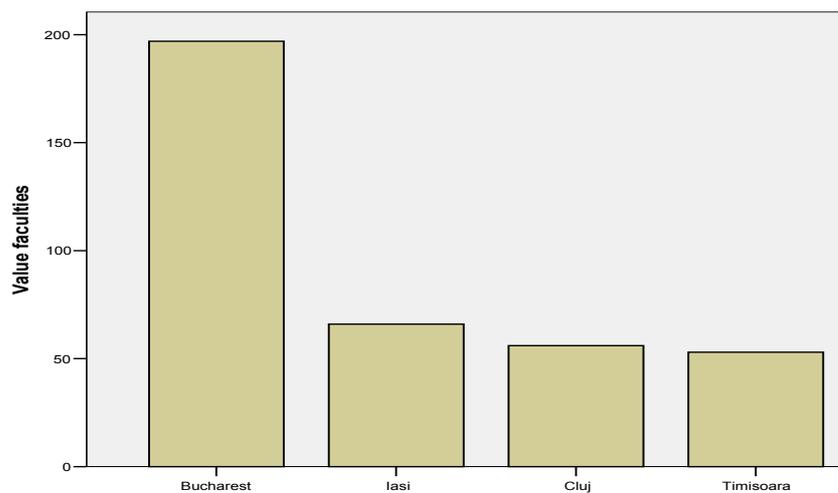**Tertiary education institutions in 2005/2006 academic year**

Figure: 2
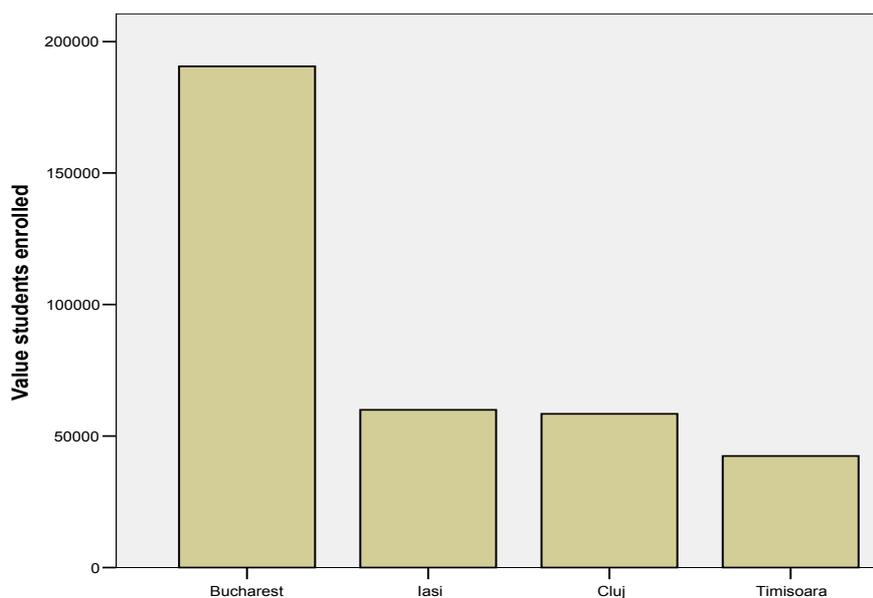**Tertiary education faculties in 2005/2006 academic year**

Figure: 3
Students enrolled in 2005/2006 academic year

"Alexandru Ioan Cuza" University is the oldest higher education institution in Romania, with a continuing tradition –starting in 1860- of excellence and innovation in education and research. With over 36.000 students and 900 educational staff, the university is highly prestigious on a national and international level. There are 13 faculties, 31385 students (graduate students) enrolled in the 2006/2007 academic year and it holds the first place in the Association of Romanian Researchers (Ad-Astra) classification.

In the previous years, important steps have been taken towards the implementation of services related to eLearning at the"Al. I. Cuza" University. Within the university there is the Cisco Networking Academy Centre, a stronghold of Distance learning. E-VIS – a step forward to virtual education in an informational society within the framework of research and of Virtual Education for an Informational Society is a project initiated in the autumn of 2002 by a group of students at the Faculty of Economics and Business Administration within the "Al. I. Cuza" University. The aim of the project is to create a virtual research network for communication and cooperation among students and firms, between theory and practice, as an innovative element in higher education research and development. The E-VIS project facilitates the development of students; team directly involved in the development and promotion of innovative activities in ITC and in business. Also, within the"Al. I. Cuza" University at the Faculty of Psychology and Education Sciences is operative, starting with 2007/2008 academic year, the *E*Faculty for Adult Education, which is unique in Romania.

Data and measures

For the analysis, we used data collected within the project "The Quantitative and Qualitative Analysis on E-learning in the Framework of Romanian Higher Education". The study assesses a sample of a prestigious higher education institution in Romania: "Al.I.Cuza" University of Iaşi. A questionnaire survey has been conducted in October 2005. Respondents were students in second, third, and fourth year of study. A stratified sampling in two stages was implemented. The non-response rate was 10%.

A pilot survey was conducted to determine the validity of the questions and corrections were made. The questionnaire included a set of questions regarding the span of time each of the respondents spends working on the computer, previous participation in e-courses, their view of the e-learning model compared with other/traditional educational models, the students' desire to continue their studies after graduation; gender; the preference for certain forms of post university studies. Multiple-choice questions were chosen since their answers could be managed more effectively.

The response scale for the respondents' opinion on the criterion of comparison the on-line courses and the traditional courses ranged from 1 = *much better* to 5 = *not at all good*. The *time spent on the computer* is grouped in four categories: 0-4 hours, 4-10 hours, 10-20 hours, and over 20 hours. The analysis contains several descriptive measures involving the variables taken into account. The relationships between the *faculty* and *the participation of the students in the e-learning courses*, and between *the preferred form of learning for postgraduate courses* and *gender* were investigated. *Time spent on the computer* compared by faculties, gender, and *e-learners* was analyzed too.

RESULTS AND DISCUSSIONS

The analysis performed allows us to point out some relevant educational options of the students in "Al. I. Cuza" University. One of the items of special importance is the participation of the students in eLearning courses. The data indicates that only 31 % of the respondents previously took an eLearning course. The low participation rate on an e-course can be explained, at least by the difficult access to computers and/or the Internet.

In 2005, in Romania there were only 22 Internet users/100 inhabitants, which is a low value if we compare it with the Czech Republic (50 Internet users/100 inhabitants) or Hungary (30 Internet users/100 inhabitants).

Table 1 summarizes data on the students' previous participation to on-line courses. 50 % of the students on Computer Science Faculty and over 30 % of the students of the Faculties of Economics, or Law, or Mathematics previously took at least one on-line course (Ceobanu et al, 2006, p. 530).

Table: 1
The participation of the students in e-courses at the „Al.I.Cuza" University Iasi

Rank	Faculty	Participation of the students in e-courses (%)
1	Informatics	50
2	Law	33
3	Physics	33
4	Faculty of Economics and Business Administration	31
5	Mathematics	31
6	Geography	27
7	Psychology	25
8	History	22
9	Public Administration[*]	20
10	Biology	18
11	Philosophy	12
12	Letters	11
13	Chemistry	8

* Specialization on the Faculty of Economics and Business Administration

The independence between two variables can be tested using the chi-square test (Jaba and Grama, 2004, p. 124). The chi-square measures indicate that there can be a relationship between *Faculty* and *Participation in e-learning courses*. A low significance value $(sig = 0,033$) indicates that there may be some relationship between the two variables, with a significance level of 95%. The contingency coefficient (0.237) points out that there is a positive but weak relationship between the two variables (the faculty and the participation in e-learning courses).

Concerning the time spent in front of the computer, we can observe that there is a difference among faculties/specializations (Kruskal-Wallis Test). The data indicate that 36% in the Faculty of Economics' students spent between 4 and 10 hours/week, 23% between 10 and 20 hours/week and 26% more than 20 hours/week.

Of the students in Computer Science, 86% spent 20 hours/week on the average. This is obviated through the very nature of the subject. 46% of students in Mathematics spent more than 20 hours/week on the average and 38% student spend between 10 and 20 hours/week.

The students who spent the smallest amount of time (0-4 hours/week) in front of the computer are students in Chemistry (77 %), Law (50 %), Philosophy (58 %), Physics (44 %), Geography (42 %), History (73 %), Letters (43 %) and Psychology (60 %) (Figure: 4).

By ANOVA, can be tested the hypothesis that three or more means are equal, in order to verify whether there are any significant differences among th populations from which the samples were extracted (Jaba, 2002, p. 353).

In other words, ANOVA is used to determine whether the differences among the means are greater than would be expected from sampling error alone (Glass and Hopkins, 1996, p. 377).
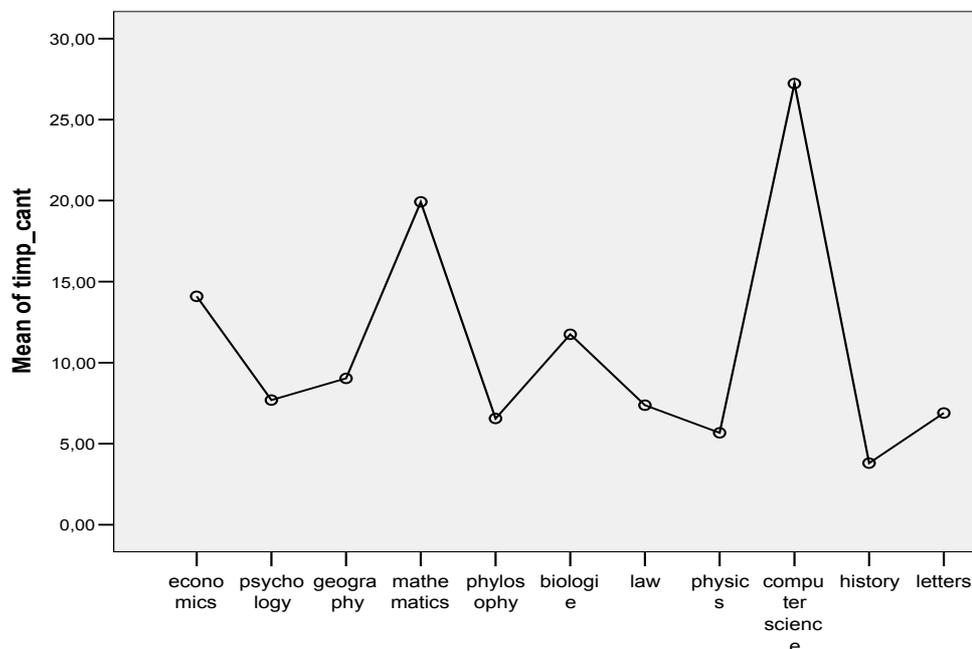

Figure: 4
Means plot

Because the variances of dependent variable are not equal across groups, the results of the ANOVA are questionable, and the Welch and Brown-Forsythe statistics are alternatives to the F test.

Small significance values (sig. < .05) indicate group differences among specializations regarding the time spent in front of the computer (Table: 2).

Table: 2
The Welch and Brown-Forsythe statistics

Robust Tests of Equality of Means

timp_cant

	Statistic[a]	df1	df2	Sig.
Welch	19,116	10	62,879	,000
Brown-Forsythe	15,561	10	122,383	,000

a. Asymptotically F distributed.

We used the Tukey test to test the largest pair wise difference in the set of 11 faculties studied (Table 3). In this research, four homogeneous groups are defined:

> ➤ **History, Physics, Philosophy, Letters, Law, Psychology, Geography, and Biology;**
> ➤ **Physics, Philosophy, Letters, Law, Psychology, Geography, Biology, and Economics;**
> ➤ **Biology, Economics and Mathematics;**
> ➤ **Mathematics and Computer Science.**

The following Faculties: History, Physics, Philosophy, Letters, Law, Psychology, Geography, and Biology differ from Faculty of Economics and from the Faculties of Mathematics and of Computer Science concerning the time spent in front of the computer.

Table: 3
Homogeneous groups

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	faculty	N	Subset for alpha = .05			
			1	2	3	4
Tukey HSD[a,b]	history	10	3,8000			
	physics	9	5,6667	5,6667		
	phylosophy	67	6,5522	6,5522		
	letters	38	6,8947	6,8947		
	law	8	7,3750	7,3750		
	psychology	26	7,6923	7,6923		
	geography	36	9,0278	9,0278		
	biologie	12	11,7500	11,7500	11,7500	
	economics	145		14,0897	14,0897	
	mathematics	13			19,9231	19,9231
	computer science	22				27,2273
	Sig.		,303	,223	,263	,433

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 16,763.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

The Faculties of Mathematics and of Computer Science do not differ from each other on the above perspective.

According to the statistical analysis, it follows that students spend 10 hours/week on the average working on the computer, while half the students work less than 7 hours/week. It has been found that 75% of students spend up to 15 hours/week working on the computer. The lowest value of the variable *time spent on the computer* is 2 hours/week, and the highest is 25 hours/week.

The time spent working on the computer is differentiated by gender: male students spend more time on the computer compared to female students; male students spend an average of 18 hours/week in front of the computer, while female students spend an average of only 9 hours/week. The t test for equality of means (t=5.855, d.f.=91.026, sig.=0.000) indicates that there is a significant difference between the two groups (male-female). However, this should be corroborated with gender distribution by faculty, which can be widely different. Thus, 70% of the students in Computer Sciences are male, while at Faculty of Economics and Business Administration, 72 % of the students are female.

The t test for two independent samples reveals that the number of hours spent in front of the computer does not differ by the two groups of respondents: those who had taken an e-course and those who had not. Also, 41 % of those who had already taken an eLearning course have assessed the experience as very interesting, and 58 % of the respondents assessed it as interesting.

We also investigated the students' responses on the comparison of the e-learning model with traditional teaching methods from the following points of view: efficiency, intelligibility, amount of knowledge acquired, and updating content. The answers are summarized in tables 4, 5, 6 and 7. As regards the efficiency criterion, 51 % of the responses were for *better* and *much better* levels (Table: 4). Also a high percent of the responses for these two levels (56%) were for the criterion the amount of knowledge acquired (Table 6). In contrast with these two criteria, by the intelligibility criterion eLearning model is better is much better than the traditional model for only 26% of the respondents (Table: 5). The updating content criterion is very well appreciated (88%) (Table: 7). Thus, we can summarize that the eLearning model compared with the traditional one is best rated for its possibility of being updated, and it is rated lowest from the point of view of the the intelligibility criterion. We can say that the students apreciate the explanations of the teacher and also they can ask questions on issues that they haven't understood in class and get answer to them.

Table: 4
The responses for the efficiency criterion

Answers	Percent	Cumulative percent
Much better	13.2	13.2
Better	38.1	51.3
Equally good	26.4	77.7
Worse	19.9	97.7
Not at all good	1.3	99
Missing values	1.0	100

Table: 5
The responses for the intelligibility criterion

Answers	Percent	Cumulative percent
Much better	7.5	7.5
Better	18.6	26.1
Equally good	35.9	62
Worse	35.1	97.2
Not at all good	1.8	99
Missing values	1.0	100

Table: 6
The responses for the criterion on the amount of knowledge acquired

Answers	Percent	Cumulative percent
Much better	16.4	16.4
Better	38.9	56.4
Equally good	28.0	85.1
Worse	12.5	97.9
Not at all good	1.0	99.0
Missing values	1.0	100

Table: 7
The responses for the criterion regarding the updating content

Answers	Percent	Cumulative percent
Much better	50.7	50.7
Better	37.6	88.3
Equally good	7.6	95.8
Worse	2.6	98.4
Not at all good	0.5	99.0
Missing values	1.0	100

Another question referred to the students' desire to continue their studies after graduation and if in the affirmative, which would be the preferred form of learning. The answers indicate that a large number of young people (over 90%) intend to continue their studies after their graduation.

Students have chosen post graduate studies, something which is natural if we take into consideration the present conditions of study in Romania. The way in which the students prefer these studies to take place is interesting to analyze (Figure: 5).

Therefore, most of the students (66%) prefer blended learning, while e-learning is the option of 10% of the respondents. From among the students who have already taken an eLearning course, 58% prefer the mixed model for post-graduate courses.
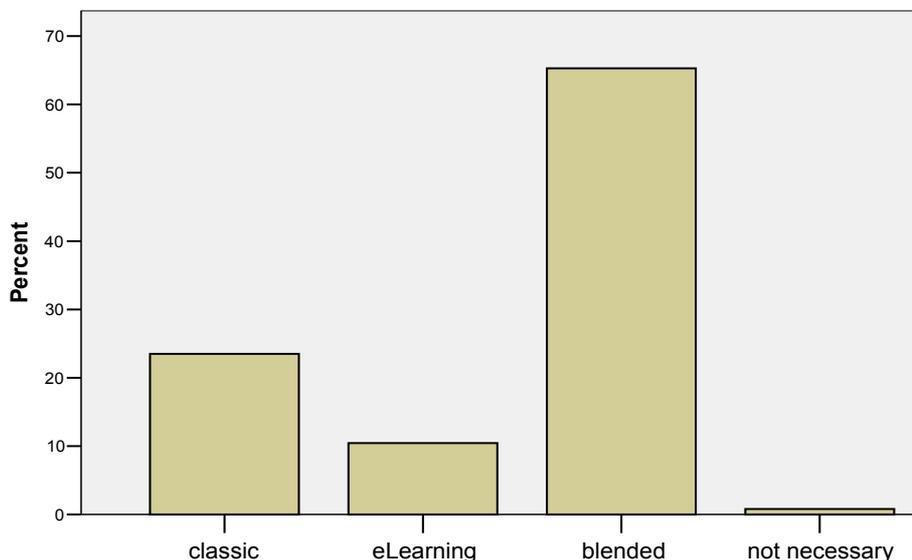
Figure:5
Preferred form of learning for postgraduate courses

The low significance value (sig. = 0.000) for the contingency coefficient indicates that there is a relationship between *the preferred form of learning for postgraduate courses* and *gender*, but the low value (0.216) for the test statistics indicates that the relationship between the two variables is a fairly weak one.

From among male students, 51% prefer blended learning and only 12.5 % made an option for eLearning for postgraduate courses. Comparatively, from among female students, 69 % have chosen blended learning. 78 % from among the respondents who prefer eLearning and 85 % from among the students who prefer blended learning are female.

Table: 8
The students' preferred form of learning for postgraduate courses for the intelligibility criterion

Intelligibility	Postgraduate courses			Total
	traditional	eLearning	blended	
Much better	25.0 %	14.3%	60.7%	100.0%
	7.8%	10.3%	6.9%	7.5%
Better	18.3%	12.7%	69.0%	100.0%
	14.4%	23.1%	19.8%	18.7%
...	...	...	...	...
Total	100.0%	100.0%	100.0%	100.0%

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From among the respondents that prefer eLearning for postgraduate courses, 10.3% responded that the eLearning model is much better than the traditional one in terms of intelligibility, and 23.1% say that it is better. From among the students who assessed the eLearning model as much better than the traditional one with respect to intelligibility, 25% would choose the traditional model for postgraduate courses, 60.7% would choose blended learning and only 14.3% would choose eLearning (Table: 8).

CONCLUSIONS

Higher education is becoming increasingly globalised because of the economic developments worldwide require it to evolve in this direction (Denman, 2001). In this framework, networks were set up for the participation in the European Higher Education Area.

The analysis of data from the sample reveals that there is a difference among faculties in terms of time spent in front of the computer. The time spent working on the computer is differentiated by gender: male students spend more time on the computer compared to female students. We also investigated the students' responses on the comparison of the e-learning model with traditional teaching methods from the following points of view: efficiency, intelligibility, amount of knowledge acquired, and updating content.

The updating content, efficiency, and the amount of knowledge acquired criteria were very well appreciated while by the intelligibility criterion the eLearning model is lower rated.

Another question was on the students' desire to continue their studies after graduation and if in the affirmative, which would be the preferred form of learning. Even that the data indicates that only 31 % of the respondents previously took an e-learning course, a large number of young people intend to continue their studies after their graduation. The answers indicate that, most of the students (66%) prefer blended learning, while e-learning is the option of 10% of the respondents. We can note that e-learning and classroom-based methods of training ar not necessarily alternatives to each other and may instead be complementary. Students could expand their educational experience by taking e-courses.

The students wish to have a more substantial offer concerning such courses and, consequently, the participation could be greater. The increase of the technology will contribute to the technological competence of the student. Thus, students may demand implementation of more sophisticated technological equipment in the educational environment (Hijazi et al., 2003, p. 41).

In these circumstances, the management of the University has to take into account that the students will become more technically oriented. The result of this orientation will affect educational institutions that have to understand the potential applications of technology and include it in their strategic plans.

In the present condition of higher education in Romania, further research in this area is imperative, and this study provides the basis for further research in this field.

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REFERENCES

Anon, (2001). *Report on the European eLearning Summit 2001*, 10-11 May, IBM International Education Centre.

Ceobanu, C., Asandului, L. & Gagea, M. (2006). "The Study of Educational Options in Economic Higher Education in an E - Learning Context, Using Statistical Methods" *3rd International Conference Regional Economic Cooperation in South Eastern Europe,* Bankya, Bulgaria, pp. 527-536, ISBN-10:954-23-0327-0, ISBN-13:978-954-23-0327-5.

Crook, C. (2005). "Addressing research at the intersection of academic literacies and new technology", *International Journal of Educational Research*, vol. 43, issues 7-8, 2005, http://www.sciencedirect.com/.

Denman, B. (2001). *Higher education in Europe*, Issue XXVI, no. 1.

Favretto, G., Caramia, G. & Guardini, M. (2005). "E-learning measurement of the learning differences between traditional lessons and online lessons", *European Journal of Open, Distance and E-learning*, Issue 2005/II, www.eurodl.com

Glass, G. V. & Hopkins, K. D. (1996). *Statistical methods in education and Psychology*, Allyn and Bacon, N.Y.

Hijazi, S., Bernard, P., Plaisent, M. & Maguiraga, L. (2003). "Interactive technology impact on quality distance education"*, Electronic Journal of e-Learning,* volume 1 Issue 1.

Jaba, E. & Grama, A. (2004). *Statistical analysis with SPSS in Windows*, Polirom, Iaşi.

Jenkins, M. & Hanson, J. (2003). *E-Learning Series: A guide for Senior Managers*, Learning and Teaching Support Network (LTSN) Generic Centre, United Kingdom, August 2003.

Commission of the European Communities, (2002). *Decision of the European Parliament and of the Council adopting a multi-annual programme (2004-2006) for the effective integration of Information and Communication Technologies (ICT) in education and training systems in Europe (eLearning Programme),* Brussels.

**Commission of the European Communities, (2003). Decision No 2318/2003/EC of the European Parliament and of the Council.
European Commission, *E-Communications Household Survey*,
http://ec.europa.eu/public_opinion/archives/ebs/ebs_249_en.pdf**

**_Les européens et les technologies de l'information et de la communication dans le cadre de l'emploi,_
http://ec.europa.eu/public_opinion/archives/ebs/ebs_159_fr.pdf**

http://www.europa.eu.int/comm/education/policies/2010/doc/progress_towards_common_objectives_en.pdf

http://register.consilium.eu.int/pdf/en/01/st05/05980en1.pdf

http://europa.eu.int/comm/education/programmes/elearning/index_en.html