The use of Information and Communications Technologies in the Greek Educational System: Initial results and evaluation

Papailias Theodoros[1] **and Andreas Alexopoulos**[2]

[1]Professor in Economics, TEI Piraeus
[2]Visiting Lecturer, TEI Kalamatas

The use of informatics in Greece was intensified after the mid 90's. However, it was not until after 2002 that the first measurable results appeared. The third Community Support Framework of the European Union through the Operational Programme "Information Society" for the programming period 2000-2006, provided an important contribution to that.
This paper has a dual purpose:
First, to examine and evaluate the penetration of new technologies to all levels of the Greek educational system, and second, to appraise the impact of their use in the Greek society.
The methodology followed for to achieve the above was based upon the analysis of the curricula in the primary, secondary and tertiary level of education as well as a review of relevant surveys and literature.
Despite the limited period during which Information and Communications Technologies have been extensively applied that is due to a series of multifaceted problems with particular characteristics in the Greek paradigm, an early effort has been made to assess the impact of their application.
A reference to other practices from other member states of the European Union taking into account all Greek particularities, offers a complete view of the case study in the European context.

Keywords: Information Communication Technologies, Education System, Information Society, Technological Education.

General

Technology and especially the technological changes were considered to be the causes of the social evolution. Ricardo was the one who, in the third edition of the "Principles of Political Economy" (1821), in the famous chapter "About machines"[1], claimed that it is possible for technology to play a negative role in the social structures. This position was expanded by Marx with his industrial reserve army, considering it as a key element for the overthrow of capitalism.

Later, the neoclassical economists, from Wicksell to Samuelson, using the Cobb-Douglas function, indirectly tried to evaluate the technological procedure through the substitution of labour with capital.
In 1957, Solow tried to assess the contribution of technology to economic development. The measurement though, of the increase of productivity, finally proved to be, a hard thing to do, since the quality of labour varies parallel to technology. Schultz (1961) showed that the investment in human capital is essential for the benefits of technology to be absorbed. Hence, until today (2006) there has not been a satisfactory commonly accepted index for the measurement of the total contribution of technology to the economy[2].

However, after 1980, the once again domination of liberalism and the gradual recession of the state from business activity, the "freeing" of the markets began. The field of Information and Communications Technology was widely expanded. The extension of globalisation constituted the strongest promoting factor. The rate of investments in all the countries is such that one gets the impression that he is found in the upward course of a Kondradieff circle.

[1] This chapter created sharp conflicts among economists, most of whom did not accept these positions.
[2] Of course, various attempts to evaluate various indexes of productivity have occurred, especially of labour, with uncertain results. For a review of the bibliography see: Papailias 2002, and OECD 2001.

The innovation, as interpreted by Schumpeter, does not merely consist of the supply of a new product, but of the reconstruction of the whole way of organisation of companies and the state, as well as of the entire society.

Within this framework, the educational systems of all countries are reconstructed in all levels, lessons of Information and Communication Technologies (ICT) are introduced, while the structure of studies itself is transformed. The distance education, e-learning, the platforms of asymmetrical education etc. tend to dominate, overruling the classical teaching ex cathedra. Therefore, gradually a new citizen starts being formed, a digital citizen of the world.

From the beginning of human history it was the needs of society that mainly defined technological development. Although technology initially was a dependent variable[3] in terms of human needs, it gradually gained such a dynamic that enabled it to form and define new needs in the society, as well as to develop a mutual relation with the society itself.

Despite the fluctuations of the technological progress through history (especially in the Medieval ages), its evolution was positive. However, this progress was marginal due to the fact that all this evolution consisted of a considerable overturning of some previous perceptions. This made the evolutionary trends for a long term period appear as a non-harmonious procedure.

The rapid progress of the technological evolution, especially in the wider sector of the telecommunication and computer science, as well as the prevalence of the market economy model in a world scale, were those that allowed the spread of technological achievements in the society.

Technology in many cases constitutes the hope of developed societies and states as a mean of preserving their hegemonic position among other countries. At the same time, developed countries relied on their technological progress for to overcome their underdevelopment.

Three are the implications of the new technologies:

a) the creation of new production models.

b) the change of the labour practices along with important geographical effects.

c) the reformation of the market system and the creation of a new international and inter-territorial division of labour.

The evolution of Technological Education in Greece

Historically, technological education remained throughout the whole European region in a more inferior place compared to the movement of humanism and the Renaissance reached its peek during the 18th century.

On the contrary, technological education began to develop after the industrial revolution and dominated the world after the Second World War. The causes are both of social and economic character. From the economic aspect, it is technology that defines the subordinate production system thus, undermining the role of classical education. From the social aspect, the wave of liberalism after 1980 and the collapse of the Social system resulted in the expansion of the markets and the reinforcement of globalization. The later, depended and still depends on the use of technology. It could be claimed that globalization would have been impossible to exist, at least in the degree that appears to exist today, if information and communication technologies hasn't been developed. The dominance of technology shrinks the role of classical education and radically alters the operation of universities. Information technology courses are being introduced in nearly all schools and departments while teaching methods have been completely changed. More specific, in Greece, took a long time for those changes to take place, since up to a few years ago classical and theoretical studies as well as the in-cathedral way of teaching prevailed in all levels of education. The acceptance of technological education is thoroughly due to a social ''anchylo-

[3] Many technological inventions, like watermill, gunpowder, and paper which utilitarian value was made obvious through the years, were left unexploited through ages. Papaelias T.(2006) Political Economy Lectures, Stamoulis, Athens, p.48.

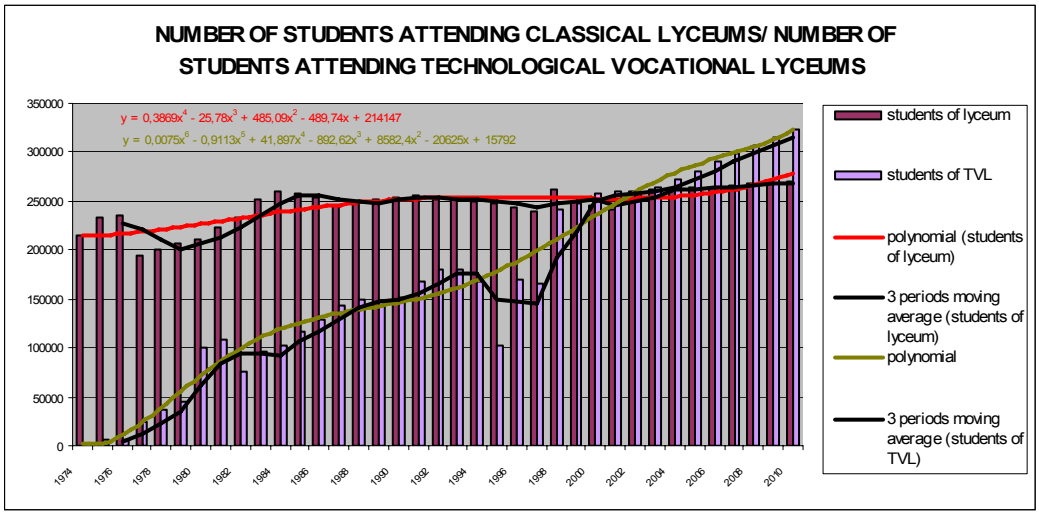
sis'' as some people could agree. The upper class and the largest part of bourgeoisie were lead to typical theoretical studies such as history, philology, mathematics, chemistry while only the lower social classes and a small part of bourgeoisie studied initially tactics and lately technological items.

This trend was reinforced by the strong presence of the agricultural sector in the economy and the weak industrialization, which lost even greater part of its importance in 1980.

After 1990 and especially after 2000 and under the impulse given by the European Union and especially the second and third CSF in all levels of education, the courses that had to do with technology and information systems were reinforced, while the investments in infrastructural works were quite remarkable having as main source of funding the operational program information Society and other programs such as the operational program of 'Initial Education and Training'.

However, as indicated by international comparisons, Greece lacks behind in relation to other countries of the European Union even though it is believed that up to 2010 this situation will gradually change. It is plausible that a large part of the companies remains technologically underdeveloped, taking into consideration the fact that country preserves a large number of self-employed while the greatest part of the companies is composed of less than 10 people.

However, the extroversion of the Greek economy influences positively the technological insinuation of the companies. Various development programs that support such actions play a positive role.

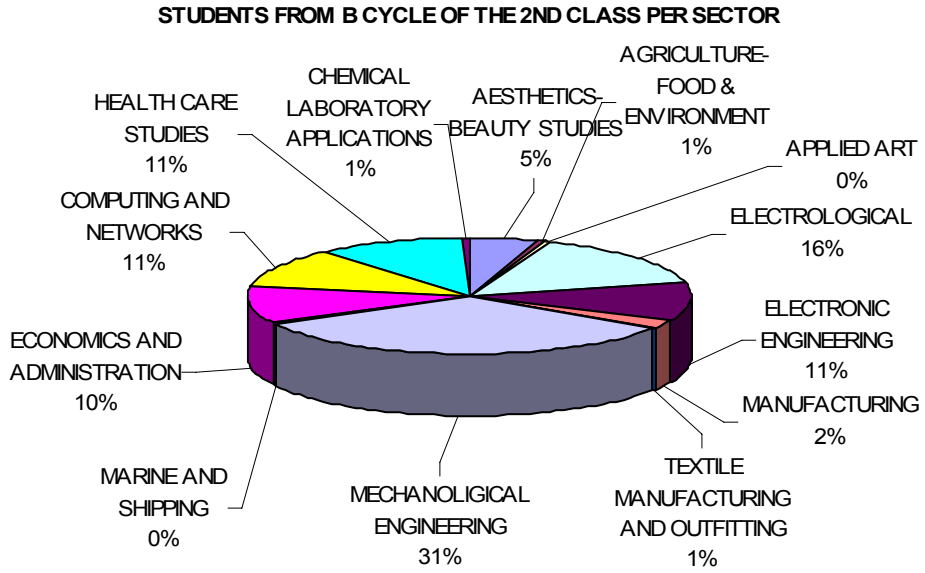


Source: Papailias, "An investigation of skills in post high school education" in the 4th Global Conference Regional development through education: the idea of education, 8-10 August Prague, Czech Republic,2006.

Figure 1. Number of students attending Classical and Technological vocational Lyceums

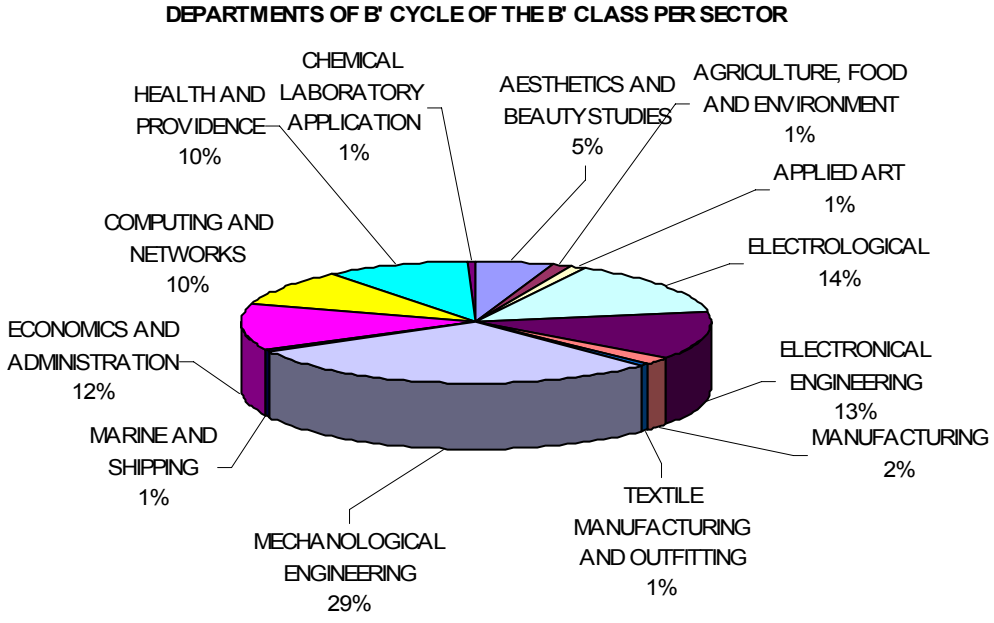
The number of the students in Technological Vocational Lyceums (TVL) presents a substantial increase during 1975-1982, which in total, comes up to 1507 per cent. In 1983 there is a decrease in the number of the students (30 per cent) but a new increase in 1984 will follow and last until 1993 (138 per cent). In 1994 and 1995 there is a considerable decrease that exceeds 43 per cent. The following six-year period (1996-2001) is characterised by a steady increase which in total exceeds 136 per cent. The trend for the period 2002-2010 is very positive. In 1975 the number of the students in Classical Lyceums came up to 233008 while in technological vocational lyceums to 6732. In 1980 these figures changed and the number of students in TVL reached 47,5 per cent while in 1990 went beyond 58 per cent. In 2001 the balance between the two institutions of education was overturned and the number of the students in TVL (260453) overrun that in Classical Lyceums (241445).

Student outputs



Source: Ministry of Education

Figure 2. Student outputs – Students attending technological vocational lyceums per sector (2004-2005)



Source: Ministry of Education

Figure 3. Departments of Technological Vocational Lyceums per sector (2004-2005)

Figure 2 illustrates that 11 per cent of the students from the second cycle of the Technological Vocational Lyceums have chosen the computer –networks sector while another 11 per cent percent have chosen the electronics sector. In sum 22 per cent percent of the total number of the students is considerably interested in the wider sector of ICT.

The above percentage brings the specific sector to the second place in terms of importance, compared to the mechanical engineering sector which accounts for the 33 per cent of the total number of students.

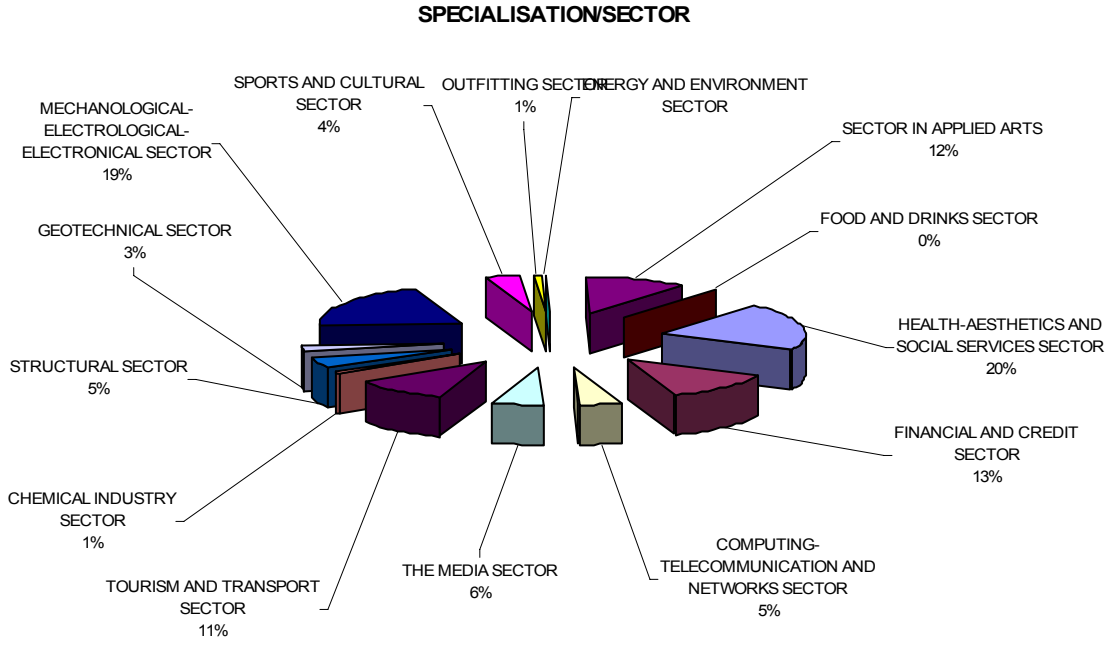
Figure 3 illustrates the proportional allocation of departments. The Computer science and networks department accounts for the 10 per cent of all departments, while the electronics department for 13 per cent. These two percentages add up to 24 percent referring to the total number of departments falling under ICT, and get the second position compared to the departments of the Mechanical engineering sector that account for the 29per cent.

From the above, the relation that exists between the demand of Technological Vocational Lyceums' students and the equivalent supply by the departments is made obvious.

Institutes of Vocational Training

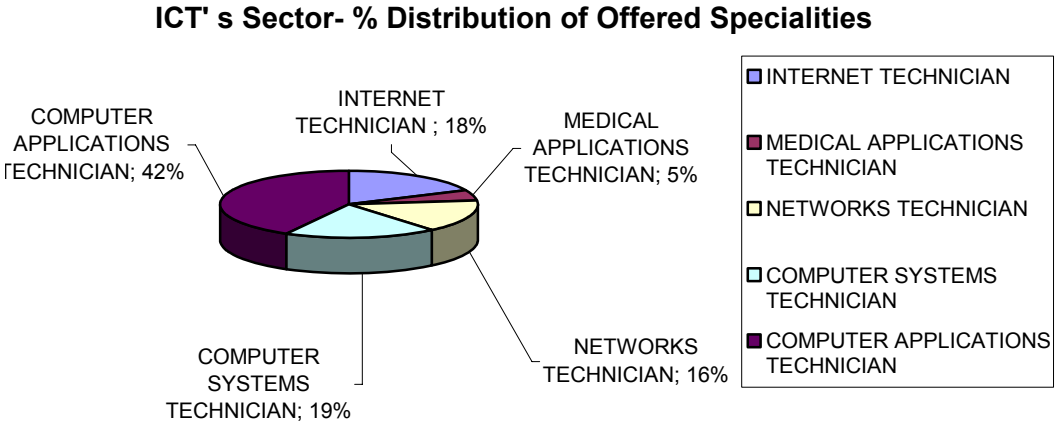
Public Institutes of Vocational Training (IVT) offer specialisation in 12 different sectors. However, there are some Institutes that offer specialities from one sector and some others that offer specialities from different sectors.

Among the 12 sectors of specialisations offered by public Institutes, the majority of them belong to the Health-Aesthetics-Social Services sector. 22 specialisations belong to the Mechanical engineering sector while 21 to Electrology and Electronic engineering sector. 13 specialisations make reference to financial and administration services sector, 12 specialisation belong to the Applied Arts sector while 11 specialisations are offered by the Tourism-transport sector. For the rest 7 sectors, offered specialisations range from 1 to 6. The following figure represents the offered specialisations by sector.



Source: Organization for Education and Vocational Training

Figure 4. Offered specializations -Public Institutes of Vocational Training (2005-2006)



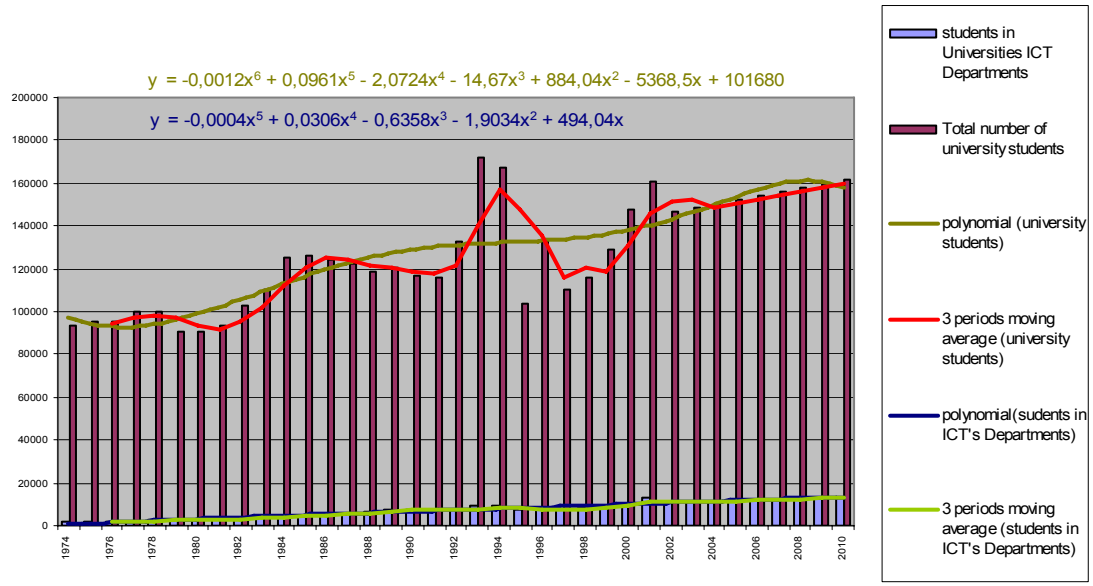
Source: Organization of Education and Vocational Training

Figure 5.

Figure 4 illustrates the proportional allocation of the specialities by sector. Specialisations from the Computer Science-Communications and Networks sector come up to 5 per cent of the total number of IVT specialisations. In the Mechanical-Electrology-Electronic sector specialities account for 19 per cent of the total number.

Nevertheless, the Computer Science-Communication-Networks sector distinguishes itself from the rest of the sectors not only for the number of the specialisations it offeres but for the considerable number of IVTs that offer part of these specialisations as well. In detail, in the above mentioned sector, the specialisation: Technician of Applied Computing is offered by 61 different IVT of the country, while 28, 26 and 24 IVTs offer the following specialisations:Computer Systems Technician, Internet Technician and Computer Networks Technician respectively. Four of the five specialities mentioned account for 95 percent. All of the above demonstrate the high demand in terms of the post-lyceum studies for specialisations that concern ICT. Given the fact that the institutes of vocational training tend to adapt offered specialisations to current demand, the above thesis is reinforced.

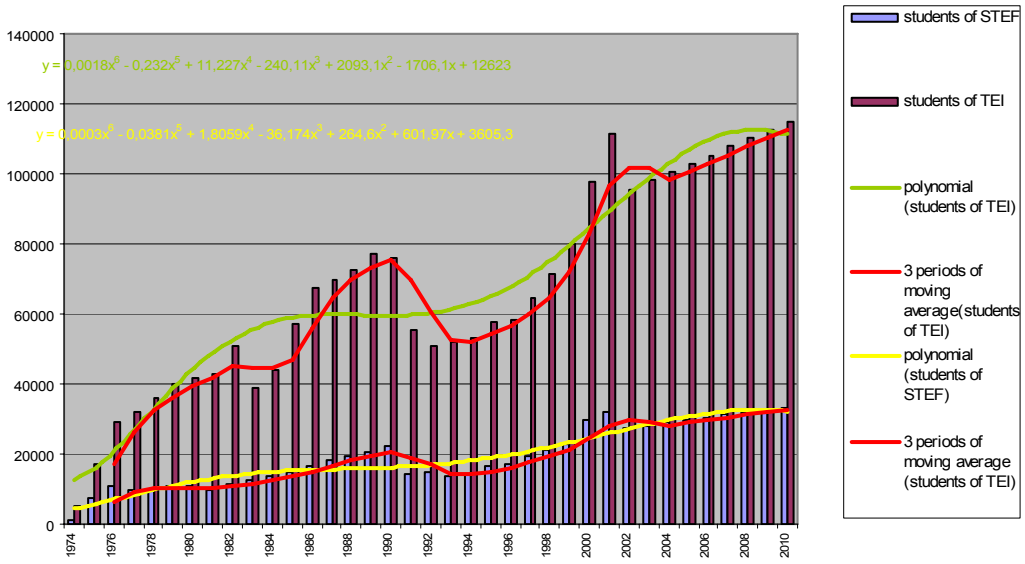
In Figure 5 the proportional allocation of the provided specialisations in the Computer Science-Communication-Networks sector is illustrated, where Computer Application Technicians account for 42 per cent, Computer System Technicians reach 19 per cent, Internet Technicians come up to 18 per cent, Computer Networks Technicians to 16 per cent and Applied Health Computing Technicians to 5 per cent of the total percentage of the sector. From the above, it is made clear that the range of the specialities in the above sector is relatively limited regarding the invasion of the ICT's applications in all economy sectors and especially orientated in the technical sector.



Source: Papailias, "An investigation to the skills in post high school education", Research Program "Arhimedes",2004-2006.

Figure 6 Students in universities' ICT departments- Total number of University students

As far as universities are concerned (Figure 6), there are some departments related to ICT's where the number of students increased approximately 526 per cent during the 1974-1994 period. In 1995 this rising course was interrupted and a decrease that came up to 24 per cent followed. In the following six-year period an increase that exceeds 83 per cent is observed. There is also a prediction that shows an increasing trend until 2010. In 1974 the number of the students in departments of ICT's accounted for 1,6 per cent of the total number of graduate students. In 1980 this percentage doubled, while in 1990 itreached 6,6 per cent of the total students population in universities. Finally, in 2001 this number reached 8 per cent.



Source: Papailias, "An investigation to the skills in post high school education", Research Program "Arhimedes", 2004-2006.

Figure 7 Students of ICT's departments-Total number of students in Technological Educational Institutes

The number of students in ICT related departments of Technological Institutes (Figure 7) indicates a substantial increase during the 1974-1990 which in total comes up to 2485 per cent. In 1991 there is a decrease in the number of students but a new increase the next year will follow and will last until 2001. The trend for the period 2002-2010 is positive. In 1974 the number of students regarding the above institutions reached 17 per cent of the total number of students in TEI while in 1980 it reached 25,6 per cent. Finally, in 1990 this percentage increased substantially (29 per cent) indicating at the same time the dynamic of these schools in the academic area.

Identity of the Research

The present research has been carried amongst all schools of all educational levels in the country, as part of a study for determining and monitoring the indicators of e-Europe plan. The project is co-funded by the European Union and forms part of Action Line 5 "Technical Assistance", Measure 5.2 of the Operational Programme "Information Society" of the 3rd Community Support Framework.
It was designed and supervised by the Observatory for the "Information Society" and implemented by Opinion S.A.

The purpose of this research was to record the number of the students who use computers connected to the internet.

Research Methodology

Information was collected through telephone interviews with the use of Co4 system. The sample was random and concerned Schools of all educational levels across the country. A very well structured questionnaire was used and the average duration of the phonecall was approximately 11 minutes.

Sample: the entire population of schools, both public and private, of all educational levels in Greece,. (9.642 schools units).

Sampling: the methodology adopted was that of random selection from the schools' file. This procedure was assisted by particular guidelines compiled electronically and used not only for random sampling but also for replacements as well.

Two stages were followed:

1. Schools allocation (public and private) from the three educational levels of the country, and determination of the desirable sample by periphery.
2. Choice of school sample in each district.

The final sampling comes up to 101 schools. Totally, 381 come within the initially chosen school units. Replacements concerning the selected schools have been made in cases where the detection of the appropriate person was impuissant (after five attempts in different days and times) as well as in cases of refusal.

Weighting: There was no data weighting.

Basic findings of the research

1. A high penetration rate was recorded with regard to schools owning computers, mainly desktops that reached 99 per cent.
2. Students use computers for educational purposes. Teachers use computers for the pursuit of information, the preparation of the lessons, e-mails etc.
3. Net work infrastructure is quite high (77 per cent) while the internet access penetration is almost catholic (96 per cent).
4. Students use internet in 8 out of 10 schools that have relevant infrastructure. This use is mainly getting familiarized with computers and for preparing projects ing.

Summary of research outcomes

1. Almost all schools of the country have relevant infrastructure.
2. The penetration of computers depends on the school level, the number of students and the urbanization level. For instance, the number of computers is very high especially in Lycea and in Attica's schools.
3. The majority of schools own desktop computers. More specifically, 73 per cent of the schools use desktops while only 5 per cent use laptops.
4. Computers are mainly used by students for educational purposes. As mentioned before, teachers use computers for the pursuit of information, the preparation of lessons etc. Finally, in one out of two schools, computers are devoted to administration personnel.
5. Most of the schools have network connection infrastructure.
6. Internet access in schools is almost universal (96 per cent). The main internet connection type used is ISDN (71 per cent). PSTN connections come up to 7 per cent while broad band connections account for 12 per cent of the total.

7. Students in 8 out of 10 schools have access to the internet. Students use internet not only for acquaintance purposes but also for preparing projects and playing games.
8. Few are the schools (11 per cent) that provide internet connection to students through Edunet. Furthermore, only 3 per cent of the schools provide e-mail accounts to the students, either personal or common. While on the contrary, 45 per cent of the schools High Schools and Lyceums mainly, provide e-mail accounts to teachers through the Edunet network.

e-Europe Indicators

The following table presents the findings regarding the ratio of students and computers and they are based on estimations of teachers.

Table 1

		Total number of schools		
		Total	**Non Amplitude**	**Amplitude**
Number of students that corresponds per computer connected to the internet	Index range	**17,37** (17,09-17,65)	**17,25** (16,97-17,54)	**17,40** (16,68-18,18)
Number of students by computer connected to the internet in schools that provide computers connected to the internet	Index range	**15,06** (14,84-15,29)	**14,91** (14,67-15,17)	**14,77** (14,15-15,44)
Number of users by computer in schools connected to the internet	Index range	**9,41** (9,26-9,56)	**9,40** (9,24-9,57)	**9,73** (9,30-10,19)
Number of students by computer in total, either in schools with computers or in schools without computers	Index range	**12,63** (12,47-12,80)		

Source: Observatory for the Greek Information Society

Table 2

		Primary schools		
		Total	**Non Amplitude**	**Amplitude**
Number of students that corresponds to one computer connected to the internet	Index range	**29,54** (28,74-30,37)	**29,17** (28,35-30,04)	**34,01** (31,21-37,26)
Number of students per computer connected to the internet in schools that provide computers connected to the internet	Index range	**23,40** (22,79-29,04)	**23,32** (22,65-24,03)	**25,52** (23,37-28,01)
Number of users per computer in schools connected to the internet	Index range	**9,11** (8,85-9,38)	**9,18** (8,89-9,49)	**12,48** (11,36-13,79)
Number of students per computer in total, either in schools with computers or in schools without computers	Index range	**19,12** (18,72-19,54)		

Source: Observatory for the Greek Information Society

Table 3

		Secondary schools		
		Total	**Non Amplitude**	**Amplitude**
Number of students that corresponds to one computer connected to the internet	Index range	**13,63** (13,22-14,07)	**13,54** (13,13-13,99)	**14,00** (12,64-15,61)
Number of students per computer connected to the internet in schools that provide computers connected to the internet	Index range	**12,90** (12,53-13,29)	**12,94** (12,53-13,36)	**14,00** (12,64-15,61)
Number of users per computer in schools connected to the internet	Index range	**12,09** (11,74-12,46)	**12,18** (11,80-12,58)	**13,17** (11,88-14,69)
Number of students per computer in total, either in schools with computers or in schools without computers	Index range	**10,53** (10,25-10,81)		

Source: Observatory for the Greek Information Society

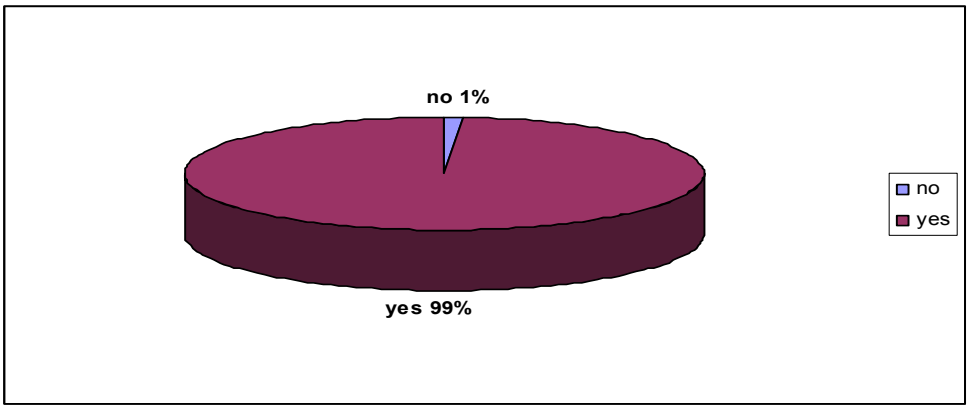
Table 4

		high schools (lycee)		
		Total	**Non Ampli-tude**	**Amplitude**
Number of students that corresponds to one computer connected to the internet	Index range	**11,15** (10,87-11,45)	**11,09** (10,79-11,40)	**12,58** (11,89-13,34)
Number of students by computer connected to the internet in schools that provide computers connected to the internet	Index range	**10,70** (10,45-10,96)	**10,11** (9,84-10,40)	**11,23** (10,61-11,91)
Number of users by computer in schools connected to the internet	Index range	**7,92** (7,72-8,12)	**7,60** (7,39-7,83)	**7,76** (7,31-8,25)
Number of students by computer in total, either in schools with computers or in schools without computers	Index range	**8,59** (8,41-8,78)		

Source: Observatory for the Greek Information Society

Research outcomes

According to the findings of the present research up until today almost all schools of the country, have at least one computer (99 per cent) as illustrated in the following diagram.



Source: Observatory for the Greek Information Society

Figure 8.

Nevertheless, the number of the computers that corresponds to each school varies considerably and dependents not only on the educational level but on the school size (in terms of the students' number) and the urbanization level as well.

Schools of Athens and Attica, in general, own the highest number of computers (considerably greater than of that in schools of semi-urban and rural areas). Furthermore, the same situation holds for lyceums in regard to secondary schools and even greater in regard to primary schools. Finally, schools that have more than 200 students in contrast to medium and smaller schools also benefit from the high number of the computers.

Table 5

Number of computers in schools																				
	Total	Public	Private	Primary schools	Secondary schools	Lyceums	Athens	Thessaloniki	Urban	Semi-urban	Rural	Attica	North	Central	South	Small	Medium	Large
	n=795	n=763	n=32	n=476	n=160	n=160	n=141	n=46	n=260	n=285	n=73	n=192	n=213	n=200	n=190	n=297	n=255	n=243
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	1-99	100-199	200+
1-2 PCs	17	17	3	26	4	2	13	7	16	19	25	12	9	24	23	32	12	4
3-5 PCs	13	13	6	20	1	2	13	13	8	15	14	13	15	14	8	17	12	7
6-9 PCs	21	22	9	31	11	3	16	17	24	20	27	17	25	21	21	22	25	16
10-19 PCs	36	36	44	21	65	52	43	46	37	35	29	44	37	30	35	23	40	49
20+ PCs	13	12	38	2	19	41	15	17	15	11	5	14	14	11	13	6	11	24
Average	**11,7**	**11,3**	**21,1**	**6,6**	**14,8**	**23,8**	**14,8**	**13,7**	**12**	**10,5**	**8,3**	**13,8**	**12,7**	**9,8**	**10,5**	**7,4**	**11,5**	**17,2**
Median	**9**	**9**	**15**	**6**	**15**	**17**	**12**	**12,5**	**10**	**9**	**7**	**12**	**10**	**8**	**9**	**6**	**10**	**14**

Source: Observatory for the Greek Information Society

The most popular type of computers across schools is the desktop type. On the contrary, few schools have laptops (5 per cent). Network servers appeared in 73 per cent of schools and the majority has only one of that type.

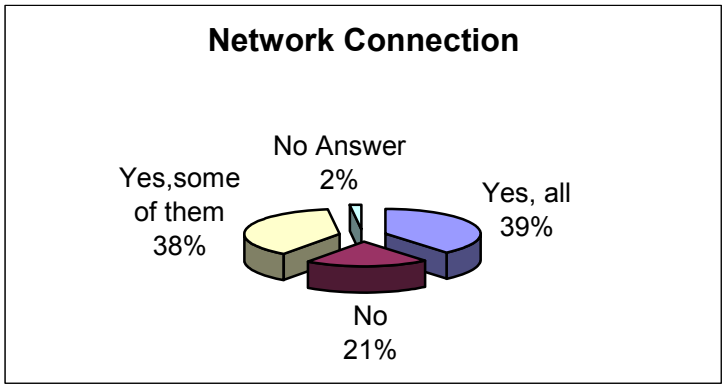
Table 6

Desktops			**Laptops**			**Network servers**	
	Total n=795 %			Total n=795 %			Total n=795 %
1-2 PCs	20		1 PC	4		1 PC	63
3-5 PCs	13		2 PCs	1		2-5 PCs	9
6-9 PCs	23		4 PCs	-		6-10 PCs	1
10-19 PCs	34		5 PCs	-		none	27
20+ PCs	10		none	95			
Average	10,7		**Average**	0,1		**Average**	0,9
Median	8		**Median**	0		**Median**	1

Source: Observatory for the Greek Information Society

Almost all schools have computers used by students (98 per cent) for educational purposes mainly. Furthermore, the majority of schools also provide computers to teachers (86 per cent) from which 61 per cent owns this provision. Moreover, 1out of 2 schools have some computers used by the administrative personnel.

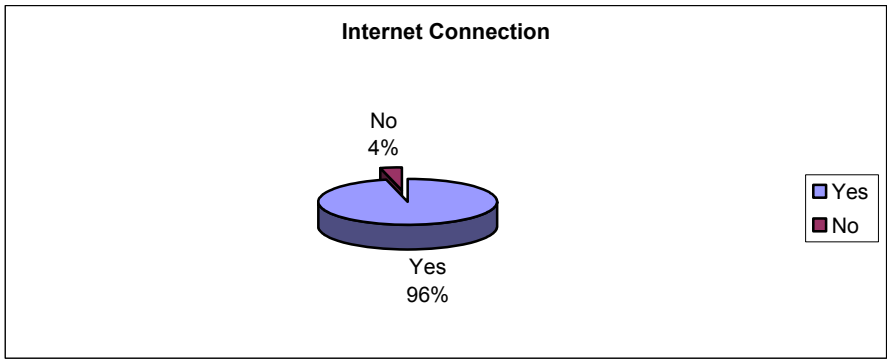
The majority of schools have computers that have access to the internet as illustrated in the following diagram.



Source: Observatory for the Greek Information Society

Figure 9.

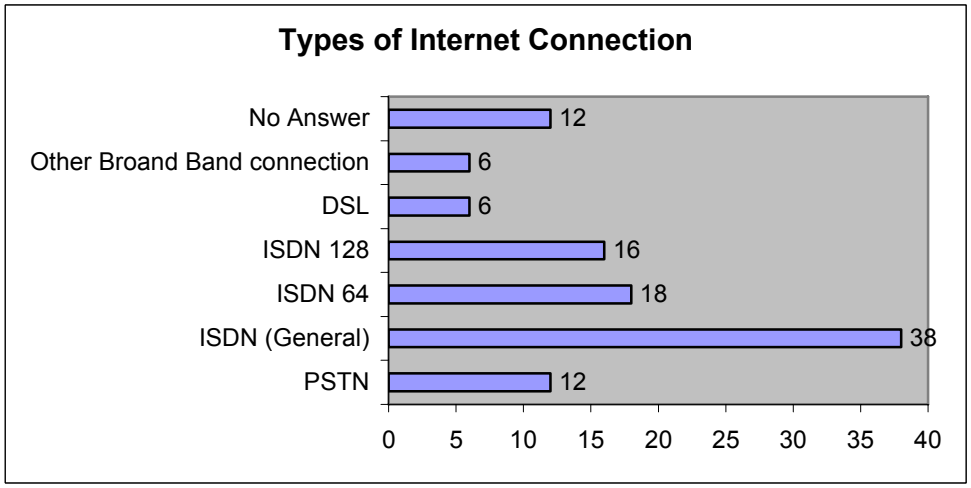
Internet access is available in almost all schools that have computers (96 per cent).



Source: Observatory for the Greek Information Society

Figure 10.

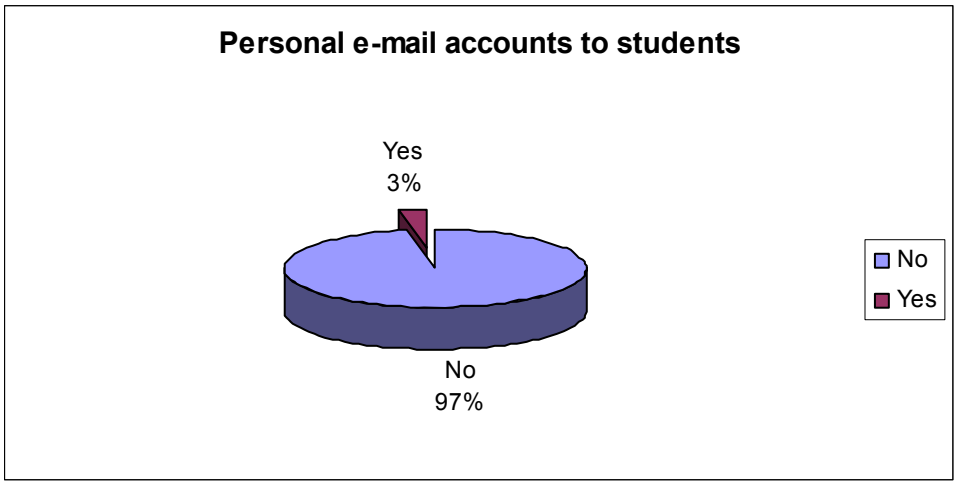
The majority of schools have a specific type of internet ISDN connection (71 per cent) while broad-band connection is available in only 7 per cent of the schools. PSTN connection concerns 12% of the schools.



Source Observatory for the Greek Information Society

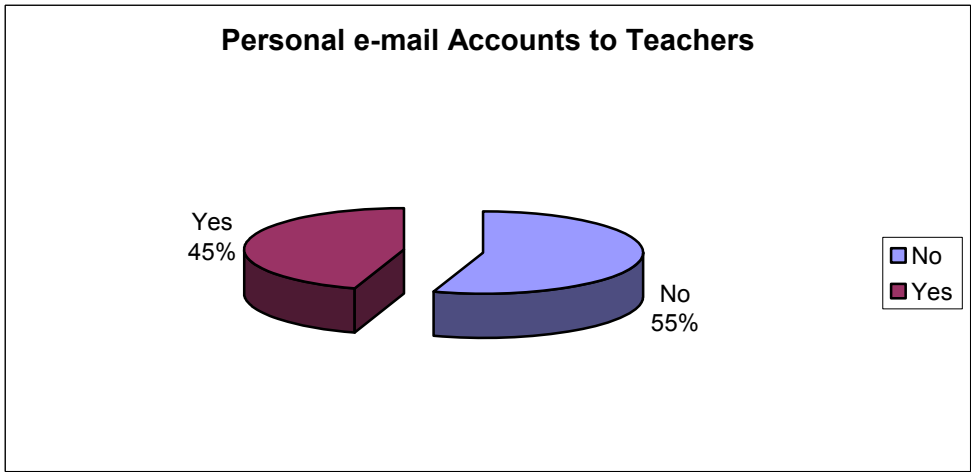
Figure 11.

The two following diagrams demonstrate the capability of students and teachers to use personal e-mail accounts through the EDUNET network.



Source: Observatory for the Greek Information Society

Figure 12.

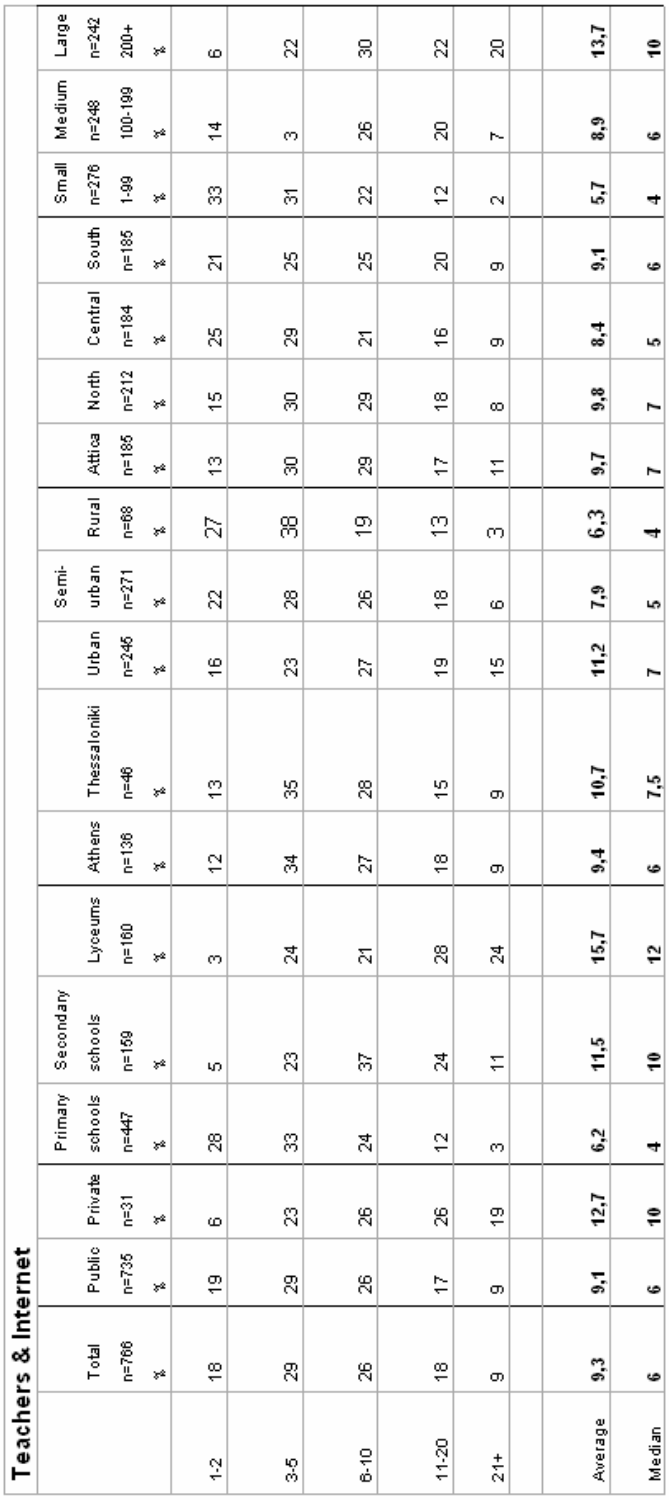


Source: Observatory for the Greek Information Society

Figure 13.

9 teachers on average use internet in each school (Table 7). The number of teachers that use internet in 74 per cent of the schools does not exceed 10.
The number of the teachers/users is considerably high in lyceums, in schools in urban areas as well as in schools that the number of the students exceeds 200.

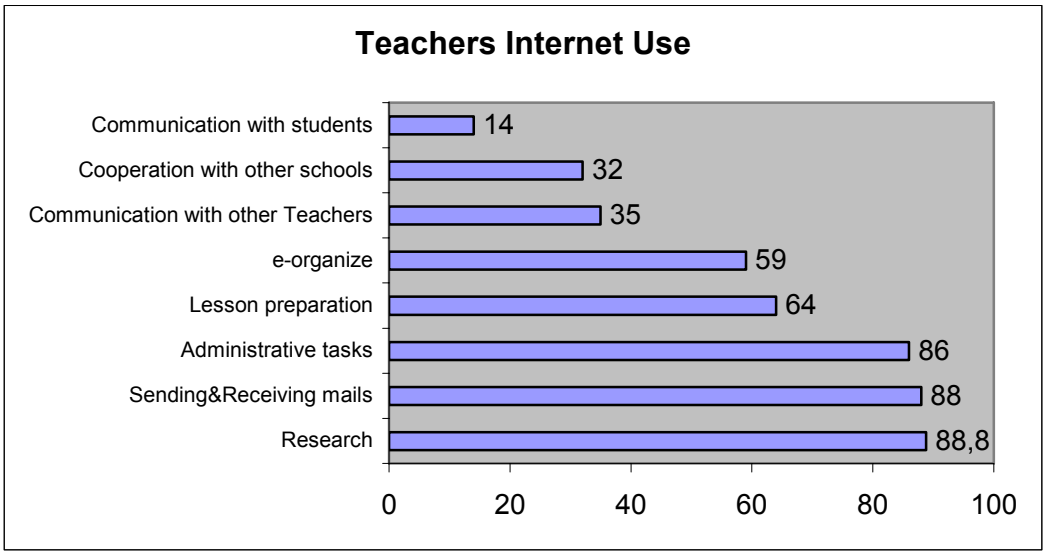
Table 7



Teachers & Internet																					
	Total n=766 %	Public n=735 %	Private n=31 %	Primary schools n=447 %	Secondary schools n=169 %	Lyceums n=160 %	Athens n=136 %	Thessaloniki n=46 %	Urban n=245 %	Semi-urban n=271 %	Rural n=68 %	Attica n=185 %	North n=212 %	Central n=184 %	South n=185 %	Small n=276 1-99 %	Medium n=248 100-199 %	Large n=242 200+ %
1-2	18	19	6	28	5	3	12	13	16	22	27	13	15	25	21	33	14	6
3-5	29	29	23	33	23	24	34	35	23	28	38	30	30	29	25	31	3	22
6-10	26	26	26	24	37	21	27	28	27	26	19	29	29	21	25	22	26	30
11-20	18	17	26	12	24	28	18	15	19	18	13	17	18	16	20	12	20	22
21+	9	9	19	3	11	24	9	9	15	6	3	11	8	9	9	2	7	20
Average	**9.3**	**9.1**	**12.7**	**6.2**	**11.5**	**15.7**	**9.4**	**10.7**	**11.2**	**7.9**	**6.3**	**9.7**	**9.8**	**8.4**	**9.1**	**5.7**	**8.9**	**13.7**
Median	**6**	**6**	**10**	**4**	**10**	**12**	**6**	**7.5**	**7**	**5**	**4**	**7**	**7**	**5**	**6**	**4**	**6**	**10**

Source: Observatory for the Greek Information Society

Teachers use the internet (Figure 14) mainly for research/search of material, receiving and sending e-mails, administrative tasks and documents dispatch. The use of internet is also important for the lessons' preparation as well as for organizing personal tasks. To some extent internet is used between teachers for communication reasons and for cooperation reasons with other schools. Nevertheless, internet is less used for communicating with students.



Source: Observatory for the Greek Information Society

Figure 14.

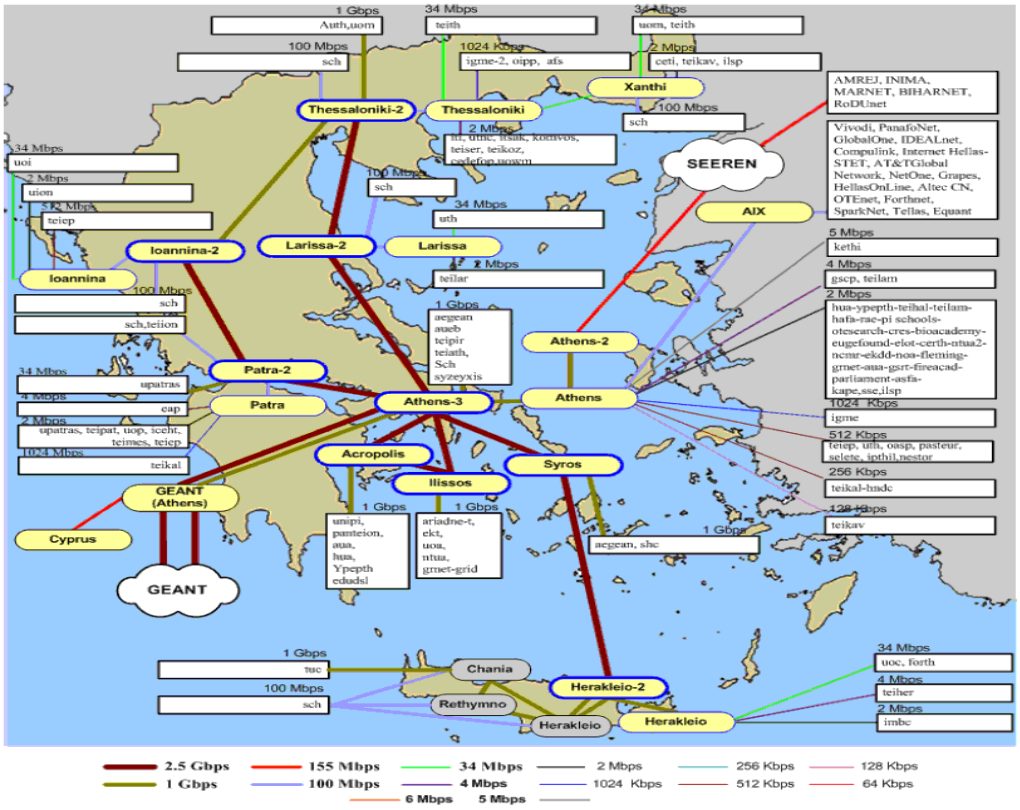
As far as to the penetration of new technologies in the area of higher education, is concerned, one can distinguish some basic parameters. The first is related to the reformation of the educational programmes of the majority of the departments of higher institutions introducing lessons relative to the ICT's.

The second, with the creation of up to date laboratories which allow students to have free access to the internet, to practice and gain thorough learning of the use of the ICT's.

Findings show that the ratio, of available computer in universities per student is 1 per 10,2.

While the corresponding ratio of available computer per student for technological institutes is 1 per 6,3.

The third is the development of broadband connections in all higher education institutions and the availability of high speed internet access like the one provided by the National Net of Research and Technology.



Source: National Net of Research & Technology

Figure 15.

In addition, the possibilities of new ways of teaching which are gradually applied, the last two years mostly, with the greatest example that of asychronous education, gave to the educational procedure special dynamics. This specific model of education is already used in higher education institutions with the prospect of extending to secondary education in the forthcoming years.

Conclusion

The whole social, economical and cultural system as moulded in this particular period on a global scale, appears to be quite volatile regarding the effects of technology now turned from results to cause, forming that critical size that will make her act as an independent variable that determinately influences the shaping of socioeconomic system.

The picture in Greece, as compared to the former development CF presents some kind of a hysteresis as far as the pervasion of the (ICT) is concerned. With last year as the only exception during which the development of broadband in the country presented a spectacular increase. A relative acceleration of the operational program information society works. The penetration performance of the (ICT) in the Greek area appears quite poor. In the field of education. The data compared to the root areas of the Greek society are more positive in particular.

The rate of use of ICT in the whole educational system is estimated to double up to the year 2010 with the generalization of their use through: the system of synchronous and asynchronous education, the creation of laboratories, with expansion of the education, the creation of digital libraries etc.

An amplificated role is anticipated to be played by the assessment of highter education institutes that is expected to begin in 2007 and through which, the use of (ICT) in an extended scale is promoted.

The organization of education training programmes, that address to the community of the academics is being generalize, aiming at the upgrade of their level of knowledge regarding the use of (ICT) in the educational process.

Bibliography

Marx, Karl (1877), "the Capital".

Ministry of Education- National Statistical Service of Greece, www.statistics.gr

National Net of Research & Technology, *www.grnet.gr*

Observatory for the Greek Information Society, www.observatory.gr

Organization of Education and Vocational Training, www.oeek.gr

Papaelias Theodore.(2006) "*Lectures on Political Economy*", Stamoulis, Athens, in Greek

——— *(2004-2006) "An investigation to the skills in post high school education", Research Program "Arhimedes".In Greek.*

——— *(2006) "An investigation of skills in post high school education" in the 4th Global Conference Regional development through education: the idea of education, 8-10 August Prague, Chezh Republic.*

——— (2002) "Productivity and the labor market: The Greek practice and the international experience" Stamoulis. In Greek

Ricardo, David (1821), "*Principles of Political Economy and Taxation*".

Solow, Robert M. (1956), "*A Contribution to the Theory of Economic Growth*", Quarterly Journal of Economics.

——— (1957), "*Technical Change and the Aggregate Production Function*", Review of Economics and Statistics.

Schultz, Theodor *(*1971),"*Investment in Human Capital: The Role of Education and of Research"*, New York: Free Press.

Wicksell, Knut (1933), "Lectures on Political Economy".