Informatics in secondary education schools of Greece
Students' view on the course in Chios' public schools

K. Kaltsa[1], D. Rorris[2],

[1] Teacher of Secondary Education, MSc in Information Systems,
PhDc of University of Macedonia, Department of Educational and Social Policy
Chios, Greece
katerina.mis@gmail.com
[2] Teacher of Secondary Education, MSc of Electronic Automation,
PhDc of University of Athens, Department of Physics
Chios, Greece
dimitris.rorris@gmail.com

Abstract

The course of Informatics was introduced the curriculum of secondary education in Greece since 1984. During the last years, curricula have been institutionally changed with regards to the embodiment of new technologies to every day aspects of the secondary school and special computer laboratories have been created, even at the most remote geographically dispersed schools of the country. Educational staff of every speciality is being further educated through seminars and Informatics teachers are being employed on the basis of advanced qualifications. This paper aims to present the present status of Informatics education in secondary education, by means of institutional and law framework, curricula analysis and educators' profile in secondary education in public schools of Greece. In addition, the paper proceeds to examine through questionnaires the beliefs of students of public gymnasiums, high-schools and vocational schools ("Lyceum" and "EPAL") about the course of Informatics as it is taught nowadays in Chios, along with expectations for future professional usability of the course.

Key words: Secondary education; Informatics course; curriculum; students; teachers

Introduction

The introduction of Informatics in secondary education was achieved gradually, starting from 1980's, in three periods of time:

- In the first period (1983-1992), Informatics was introduced in Technical Vocational and Multidisciplinary Schools[i] with the creation of a totally new sector in this direction.
- In the second period (1992-1998), an introductory course of Informatics was established in Gymnasium. In the same period, a new formal faculty for teachers of Information Science was created.
- During the third period (1998 – today) Informatics was entered in General Lyceum (GEL) and was also developed in Technical Vocational Schools (EPAL).

1. Institutional and law framework

As already mentioned, Informatics as a separate educational sector, was adopted firstly in Vocational Schools as the most convenient solution. Then it was easily introduced in Gymnasium, as a totally new course of the school program. Lyceum coped with Informatics years later mostly due to insufficient knowledge concerning teachers and its strict system of exams[ii]. From school year 1998-1999, Informatics is introduced eventually in General Lyceum (GEL) as an optional course in the 1st, 2nd and 3rd grade and also as a circle of courses, both compulsory and optional, in the technological sector of the 3rd grade. Students learn programming, operating systems, word processing, spreadsheets applications, presentation creation and multimedia. It is notable that all courses are taught in the lab[iii]. The courses taught in Lyceum are presented in the following table:

Distribution of Informatics courses in General Lyceum (GEL) - Table 1 [iv]

Grade of GEL	Course	Compulsory/ Optional	Hours per week
1st grade (A Lykeiou)	Informatics Applications *("Efarmoges Pliroforikis")* +	**Optional**	2
2nd grade (B Lykeiou)*	Computer Applications *("Efarmoges Ypologiston")* ‡	**Optional in all directions**	2
3rd grade (G Lykeiou)*	Computer Applications *("Efarmoges Ypologiston"*) ‡	**Optional in all directions**	2
3rd grade (G Lykeiou) Technological sector	Application development in a programming environment ("*Anaptyksi efarmogon se programmatistiko perivallon"*)	**Compulsory**	2
	Technology of computational systems & operating systems ("*Tehnologia ypologistikon systhmaton & leitourgika*	**Optional**	2

	systhmata")		
	Multimedia – Networks ("*Polymesa – Diktya")*	**Optional**	2
	Software Applications ("*Efarmoges Logismikou")*	**Optional**	2

* The course "Computer Applications" *("Efarmoges Ypologiston")* can be selected only once (in the 2nd or in the 3rd grade of Lyceum (GEL)[v].

+ The course "Informatics Applications" *("Efarmoges Pliroforikis")* is not being taught in the 1st grade from school year 2011-2012[vi].

‡ There are no examinations in the end of the school year for subject "Computer Applications" *("Efarmoges Ypologiston")*. The teacher grades students according to their performance in a (individual or collective) project during the year (article 10 of Presidential Decree 246).

In Technical Vocational Schools (EPAL), Informatics course, named "Informatics Applications *("Efarmoges Pliroforikis"),* is common in the 1st grade, regardless of the sector that students follow in the next grades and it is taught 3 hours per week. The curriculum then differentiates according to the chosen sector. As expected, Informatics sector has the most Informatics courses especially in the sector of Informatics (from the 2nd grade of EPAL) and the sector of systems support, implements and computer networks in the 3rd grade of EPAL such as Computer Networks I ("*Diktya Ypologiston"),* Operating systems (*"Leitourgika systimata "),* Computer Maintenance ("*Syntirisi ypologiston"),* Databases ("*Vaseis dedomenon"),* Structured Programming ("*Domimenos Programmatismos"),*Graphical User Interface Programming ("*Stoiheia Programmatismou se grafiko perivallon")*etc.

In Gymnasiums, the curriculum remains as before, namely 1 hour per week in every grade, while technology is being taught only in 1st and 2nd grade.

According to the Cross-thematic Unified Frame of School Curriculum (2003) the course of Informatics in Gymnasium has a clear laboratory orientation. School teaching is encouraged not to be "book-centric". For the implementation of laboratory exercises a variation of tools is used:

- general purpose software,
- freeware (e.g. Open Office), Gimp for image processing, Audacity for sound processing etc)
- programming environments (Logo-like, Scratch etc.)
- educational software provided by the Pedagogical Institute for the course of Informatics
- software produced under specific projects of the Ministry of Education (Pleiades and Niriides) serving the objectives of curricula.

2. Curricula analysis

In modern curricula, literacy in Information and Communication Technology (ICT) is considered as a cognitive - learning object comparable with lingual literacy, mathematics and scientific literacy. The term "ICT literacy" describes the ability of students to use the modern digital technology, communication tools and network services for the access, management, integration, assessment and creation of information, with the objective that students obtain a problem-solving capability and that they actively participate in Information society.

From 1998 until today, the general aims of Informatics teaching, according to curricula, are summarized below:

Gymnasium: A greater awareness of the basic principals and terms of Information science and the basic simple concepts concerning the general structure and function of computers and acquisition of basic knowledge and skills of computing.

Lyceum: Expansion of general information literacy with a particular emphasis on the development of competencies and skills in use of information and communication technologies as learning, thinking and programming tools. Acquaintance of computer applications in today's world, potentials and perspectives of the academic direction they choose to follow. Awareness, questioning and constructive criticism development from students, in social, ethical, cultural etc issues posed with the "intrusion" of computing and networking technologies in all aspects of human activity. It is worth mentioning that the course in the 3rd grade of Lyceum presents a relative autonomy, in the sense that while in previous grades students are taught Informatics courses, yet none of these are related with the 3rd grade course examined for university admission[vii].

EPAL: The close examination of specialized subjects of Informatics and the acquirement of professional level skills in programming, use and development of computers, computational systems, networks and the Internet.

3. Educators' profile

Teachers in secondary education in Greece are being appointed with two ways: the nationwide examinations held by the Supreme Council of Personnel Selection (ASEP), or by a list of previous employment of substitute teachers.

Educators teaching Informatics in secondary education schools in Greece are graduates from twenty two (22) university departments.

In addition, in 2007 the seat of school counselor of PE19 and PE20 was enacted. The school counselor has a supportive and consultative function in the educators' work.

3.1 Educators' training

When a teacher is finally appointed in Secondary education, he/she must attend a 3-phase, 60-hour introductory pedagogic training called PEK. Besides this, further opportunities exist in new technologies training. Thus, in the framework of the "Odysseia" project, one-year post-graduate education cycles have been created in 3 of the country's universities (National and Kapodistrian University of Athens, Aristotle University of Thessaloniki and University of Macedonia) in which educators are specialising in the area of introduction of ICT in Education, so as to become training executives of the field. A total of 100 such executives have been trained and are working in training programs. In about 300 schools, a total of 2,000 educators have been trained in-school in the use of ICT in every day's education procedure.

Furthermore, in recent years, a large number of educators have been trained via the "Educators' Training for the utilization and application of ICT in the teaching procedure" program, co-funded by the National Strategic Reference Framework 2007-2013.

4. Case-Study of Chios Public Schools

In the context of our study, a questionnaire was elaborated and distributed to secondary education students of the island of Chios in Greece, inquiring their beliefs about the course of Informatics as it is taught nowadays. In this research, a total of 886 students (425 boys and 460 girls) took part from 8 out of the 20 schools of the island, particularly from:

- 3 Gymnasiums of Vrontados, Kallimassia and Volissos (LC)[viii] (240 students)
- 4 Lyceums (GEL) of Vrontados, Kallimassia, 1st and 3rd of Chios (577 students)
- 1 Vocational School (EPAL) of Vrontados (68 students)

This selection consisted of schools from both the capital of Chios and from remote villages of the island, in an effort to best represent today's status of Informatics education in Greece. Students were asked to fill in an anonymous questionnaire with 19 questions about the course itself, the computer laboratory, their teacher and the book, along with some data about their gender, residence, type of school they attend and whether they have a computer or not at home. They were also asked to rank the course.

Apart from the general outcome, students' answers were processed in 3 additional dimensions:

- by gender (boy/girl),
- by type of school (Gymnasium/Lyceum/EPAL)

- and by residence (city, i.e Chios and Vrontados /country, ie rest of the island)

It is worth mentioning that only 2% of the students asked did not possess a personal computer at home, regardless of residence, gender or type of school.

4.1 Ranking the Informatics course

Students were asked to show their preferable course by ranking the course of Informatics in regards to the rest courses taught in their school. A 59% of the students rank Informatics in the first 5 places, with the 2nd place as most popular (21%), while a resonant 14% ranks it at the last place (although only 5% in EPAL rank it last). *(see Diagram 1)*

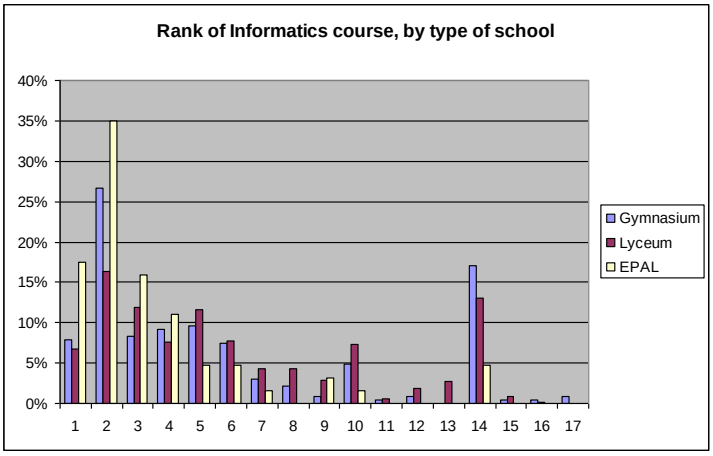


Diagram 1

It is worth mentioning that it is usually girls *(Diagram 2)* and students from outside the city *(Diagram 3)* that tend to rank the course as last *(ie 14th)*.

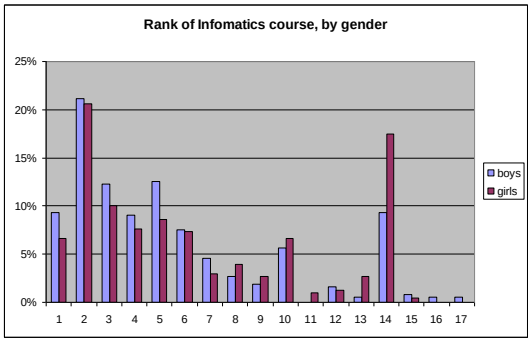


Diagram 2

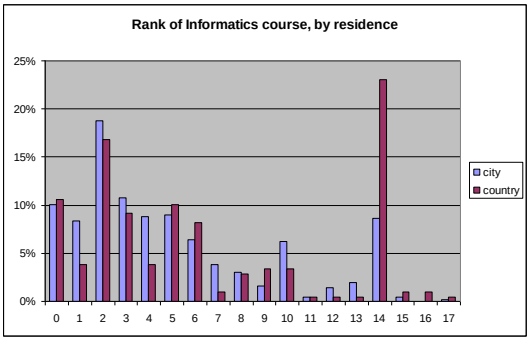


Diagram 3

4.2 Answering general questions

Quite interesting is that a large percentage (74%) of students feels at least mostly comfortable operating a computer – with boys more confident than girls (Diagrams 4 and 5) – while about 89% do not regard the course difficult; maybe due to the presence of a PC at home. A significant divergence however regarding the course's difficulty was observed between students from the city and the country (Diagrams 6 and 7), with students from the country regarding the course at least 2 times more difficult than it is regarded by city students.

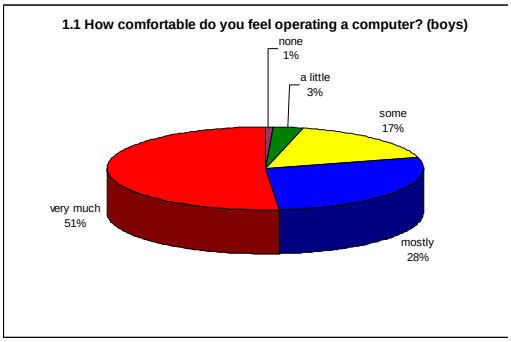


Diagram 4

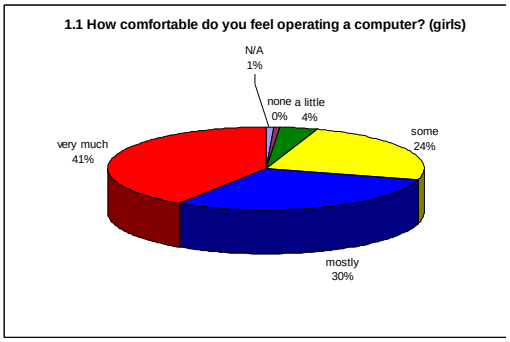


Diagram 5

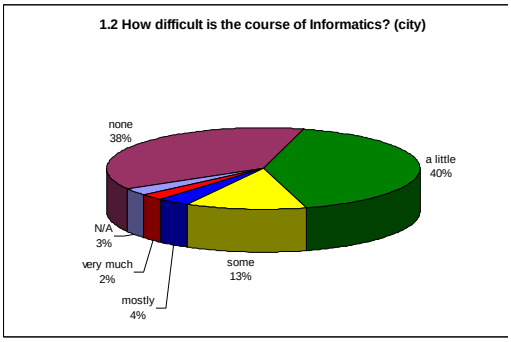


Diagram 6

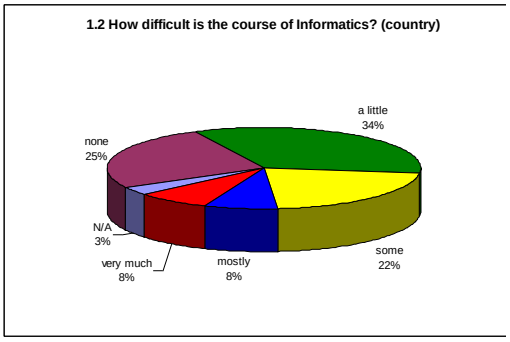


Diagram 7

In general, 38% regard the course as quite interesting. In terms of usefulness of the course, it is expected to be more useful in the future and professionally (32%) than nowadays (18%) with a slight (5%) differentiation in girls reckoning the course more useful in the future than boys and a considerable divergence in future usability between students of EPAL and Lyceum (75% opposed to 57%), maybe due to the more targeted professional character of EPAL students' studies (Diagrams 8 and 9).

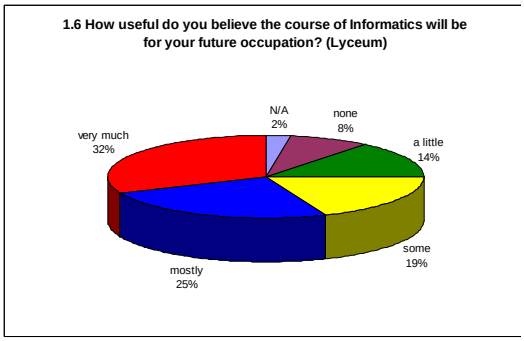


Diagram 8

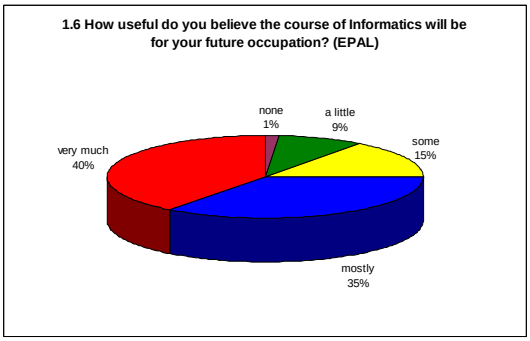


Diagram 9

4.3 The Informatics Laboratory

Application of the course's theory is put into practice in the lab nearly three times more from EPAL students, than those of Lyceum (Diagrams 10 and 11).

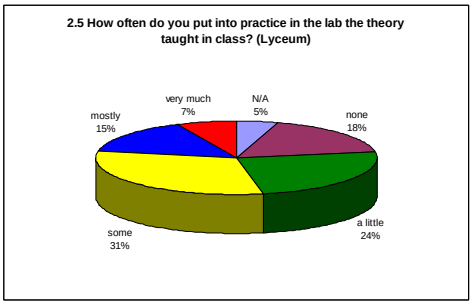


Diagram 10

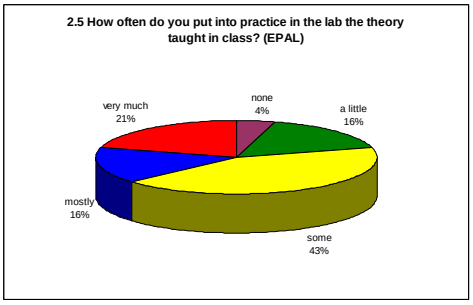
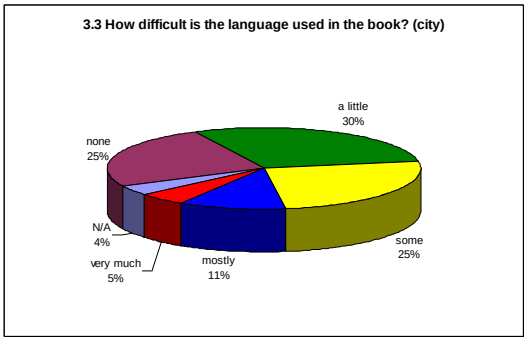


Diagram 11

When asked about the computer laboratory's sufficiency, students generally agreed that it is quite sufficient (35%) for the course, regardless of gender. However, differences arise when students' residence is taken into account, with students from the country being more pleased from the lab's sufficiency (24%) contrary to city students (12%). In addition, students from Gymnasiums tend to find the lab's sufficiency higher (56%) than students from EPAL (46%); and them from Lyceum students (25%).

4.4 The course's book

The language used in the book seems to present more difficulties for country students (21% at least mostly difficult) than for city students (16%) (Diagrams 12 and 13)



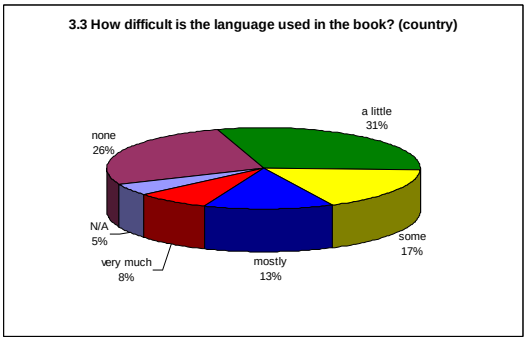
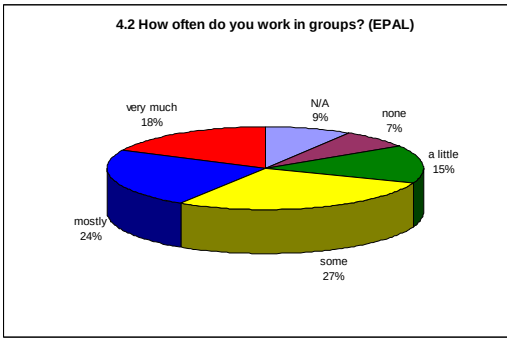


Diagram 12 ***Diagram 13***

In addition, Lyceum students find at least mostly difficult (21%) the book's language, opposed to 15% for Gymnasium students and – maybe surprisingly – only 10% for EPAL students.

4.5 Course characteristics

Students from the city tend to work a little more in groups (26%) than students from the country (19%), maybe due to overcrowded city school classes. This is more obvious when it comes to EPAL students (42%), contrary to Lyceum (27%) and Gymnasium (13%) students and maybe that has to do with the applicable nature of vocational training in EPAL (diagrams 14, 15 and 16).



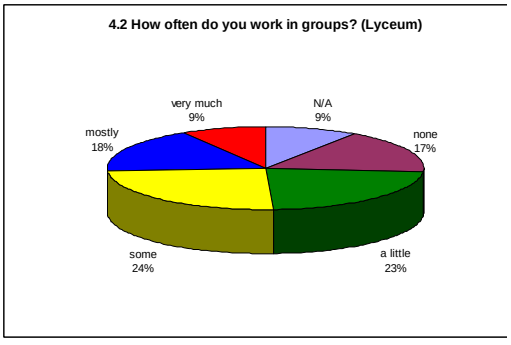


Diagram 14 ***Diagram 15***

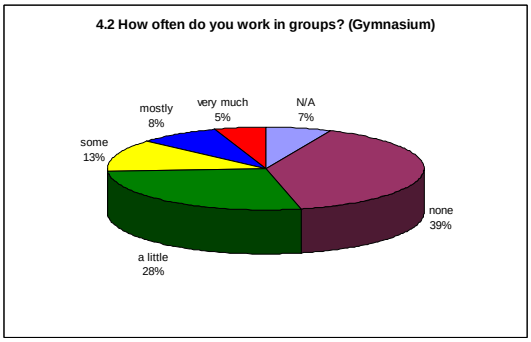


Diagram 16

The majority of the course's hours in taught in the lab and not in class, regardless of type or school or residence. However, EPAL students work in the lab for about 3 hours per week, while for Lyceum students this is 2h/week and for Gymnasium students 1h/week. (Diagrams 17, 18 and 19)

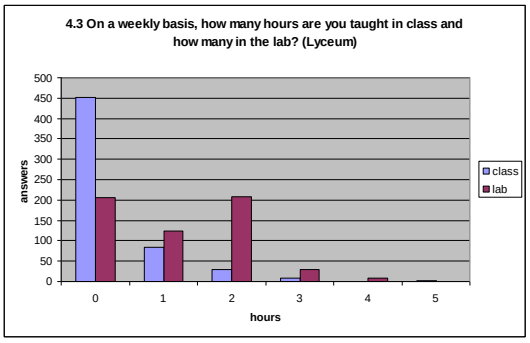


Diagram 17

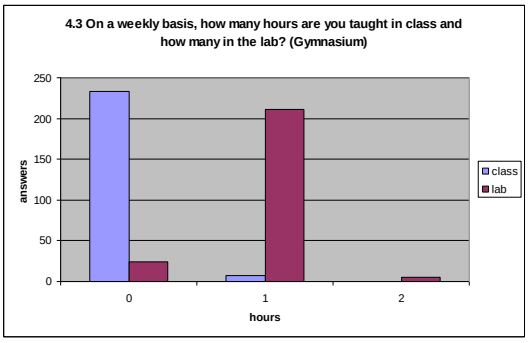


Diagram 18

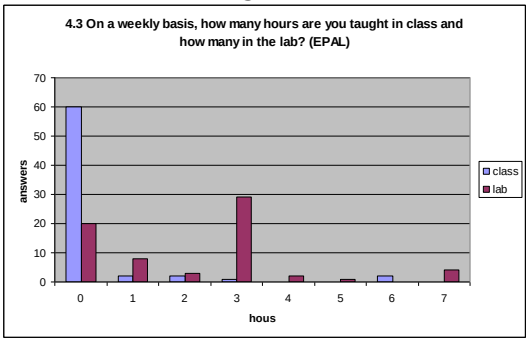


Diagram 19

4.6 The teacher

The educator's literacy was also put to the test between students and scored relatively high (66% as at least mostly adequate), with boys questioning their teacher's knowledge a little harder than girls (60% opposed to 69% as at least mostly adequate) (Diagrams 20 and 21).

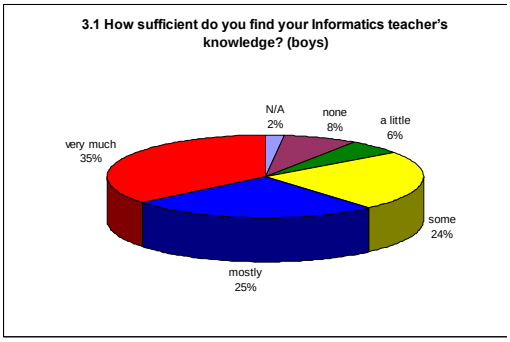


Diagram 20

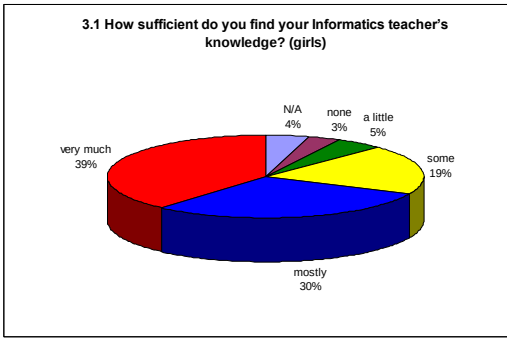
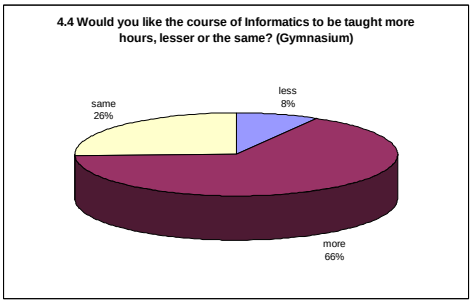
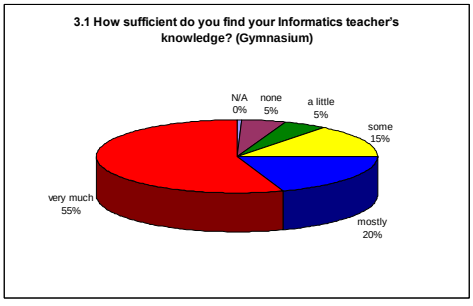
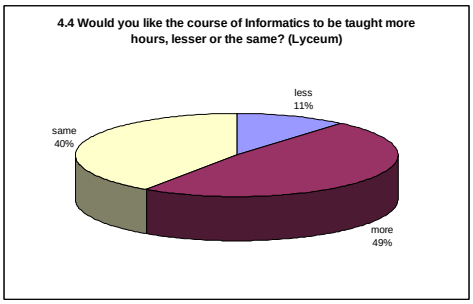


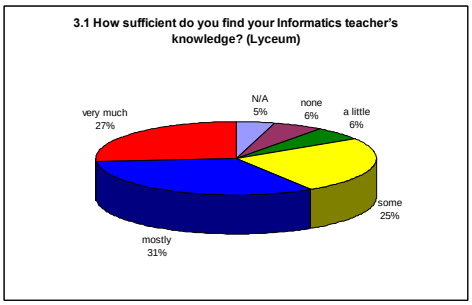
Diagram 21

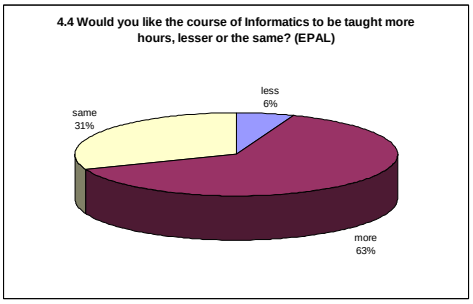
Notably, the Informatics teacher enjoys a much higher appraisal between the younger ages of Gymnasium and the professionally-oriented students of EPAL, than in the seniors of Lyceum, something that is reflected in the desire for more hours of Informatics course in the weekly schedule (see Diagrams 22 and 23), with a divergence by gender (62% of boys prefer more hours opposed to 47% of the girls).

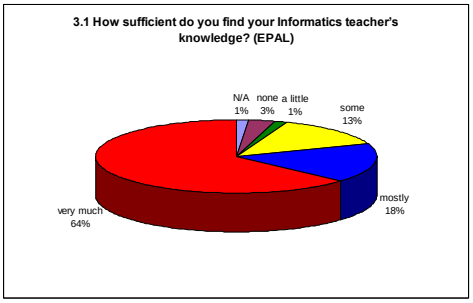












Diagrams 22 ***Diagrams 23***

6. Conclusions

Informatics in Secondary Education in Greece has come a long way from firstly being introduced in the 80's. Teaching staff of advanced and well documented qualifications can be appointed to schools highly equipped with computer labs. Curricula assign Informatics to general education courses only at Gymnasium's young ages, whereas limit teaching hours in older students with high academic obligations to only Informatics-specialised sectors of education during the last 2 years of secondary education. Students acknowledge that ICT skills are very useful for their future professional needs and ask for more hours in their curriculum, since they seem to rather prefer it than other courses and it doesn't seem to present significant difficulties to them. The course itself is both adored and hated by students – a typical feature in the teaching procedure – but with the latter percentages significantly smaller than the former. The Informatics teacher is generally accepted by students as of a scientist well adequate for his position and enjoys a relatively high appraisal from students who need him/her most: young ages and technically-oriented students.

References

Dagdilelis, V., (2004). History in the making: Informatics route in Greek Education (Ιστορία εν τω γεννάσθαι: η διαδρομή της Πληροφορικής στην Ελληνική Εκπαίδευση). *3rd International Conference in the History of Education*, Patras.

Dagdilelis, V., (2004). Information and Communication Technologies (ICT) in the Greek Education: Administration and Staff. *European Conference Education Research*, Rethymnon, Crete.

Greek School Network (2012). *Η ανάπτυξη του Πανελλήνιου Σχολικού Δικτύου.* Ανάκτηση από το (http://www.sch.gr/)

Informatics Union of Greece (2012). *Το προφίλ του καθηγητή Πληροφορικής στο ελληνικό σχολείο.* Ανάκτηση από το http://www.epe.org.gr

Information society (2012). *Ψηφιακός αναλφαβητισμός και Κοινωνία της Πληροφορίας.* Ανάκτηση από το http://www.infosoc.gr

Komis, V., (2004). Introducing the application of ICT in education (Εισαγωγή στις Εφαρμογές των ΤΠΕ στην Εκπαίδευση). Athens: New Technologies Publishing.

Komis, V., (2005). Introduction in teaching Informatics (Εισαγωγή στη διδακτική της πληροφορικής). Athens: Kleidarithmos Publishing.

Ministry for Education, Lifelong Learning and Religious in Greece (2012). *Ωρολόγιο πρόγραμμα μαθήματος Πληροφορικής.* Ανάκτηση από το http://www.minedu.gov.gr

Panhellenic Union of Informatics Teachers (2012). *Ιστορική αναδρομή του μαθήματος της Πληροφορικής στη Δευτεροβάθμια Εκπαίδευση.* Ανάκτηση από το http://www.pekap.gr

Papadopoulos, G.K, (1996). Informatics in school (Η Πληροφορική στο Σχολείο). Pedagogical Institute of Greece.

Pedagogical Institute of Greece (2012). *Χρηματοδότηση σχολικών εργαστηρίων Πληροφορικής από το ΕΚΤ.* Ανάκτηση από το http://www.pi-schools.gr

Secondary Education Informatics Teachers' Association of Cyprus (2012). *Σύγκριση προγραμμάτων σπουδών του μαθήματος της Πληροφορικής στην Κύπρο και στην Ελλάδα.* Ανάκτηση από το http://www.sykap.com.cy

Stahteas, H., (2002). Informatics in education – Computers in schools of the future. (Η πληροφορική στην εκπαίδευση – Οι υπολογιστές στα σχολεία του μέλλοντος). Athens: Τυπωθήτω Publishing.

Van Weert, T., (2000). Information and Communication Technology in secondary education. A Curriculum for schools. Unesco/IFIP.

---

[i] Technical Vocational and Multidisciplinary Schools have been named now as EPAL.

[ii] www.netschoolbook.gr

[iii] Document of the Ministry of Education (Γ2/4243/22-09-1999)

[iv] Source: Pedagogical Institute of Greece: http://www.pi-schools.gr

[v] Ministerial decree Γ2/6953 (Official Gazette of the Greek Republic (ΦΕΚ) 1057/1-12-97, issue B΄)

[vi] Official Gazette of the Greek Republic (ΦΕΚ) 1213 issue B/2011 –No 59609/Γ2/25-05-2011

[vii] "History in the making: Informatics route in Greek Education" Vassileios Dagdilelis, Assistant Professor, Department of Educational and Social Policy, University of Macedonia, Greece

[viii] Gymnasiums with Lyceum Classes (LC) such as Volissos exist in remotely located villages of the country, due to the small number of students

Περίληψη

Το μάθημα της Πληροφορικής, έχει εισαχθεί στο αναλυτικό πρόγραμμα σπουδών της δευτεροβάθμιας εκπαίδευσης της χώρας μας από το 1984. Τα αναλυτικά προγράμματα σπουδών έχουν πλέον αλλάξει ριζικά, εμπεριέχοντας τις νέες τεχνολογίες σε πολλές πτυχές της καθημερινής ζωής των σχολείων δευτεροβάθμιας εκπαίδευσης. Όλες οι ειδικότητες του εκπαιδευτικού προσωπικού επιμορφώνονται στις τεχνολογίες της πληροφορίας και των επικοινωνιών μέσω κατάλληλων προγραμμάτων και οι καθηγητές πληροφορικής προσλαμβάνονται πλέον με αυξημένα προσόντα. Η εργασία αυτή έχει ως στόχο την παρουσίαση της σημερινής εικόνας της «πληροφορικής εκπαίδευσης» ή του «πληροφορικού γραμματισμού» στη δευτεροβάθμια εκπαίδευση, διερευνώντας το θεσμικό πλαίσιο, τα αναλυτικά προγράμματα σπουδών και το προφίλ των εκπαιδευτικών Πληροφορικής στα σχολεία στης δευτεροβάθμιας εκπαίδευσης. Επιπρόσθετα, η έρευνα στοχεύει, μέσω της χρήσης του ερωτηματολογίου ως εργαλείου, στην καταγραφή και ανάλυση των απόψεων των μαθητών των δημόσιων γυμνασίων, γενικών (ΓΕΛ) αλλά και τεχνικών λυκείων (ΕΠΑΛ) για το μάθημα της πληροφορικής όπως αυτό διδάσκεται σήμερα στη Χίο, σε αντιστοιχία με τις προσδοκίες και τις προτάσεις τους για τη μελλοντική χρησιμότητα του αντικειμένου.