ICT EDUCATION IN ALBANIA

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Abstract

Computers were introduced in Albania in early seventies. Regular ICT education in Albania started in eighties with creation of the first chair of informatics at University of Tirana, at the same time with creation of the first metropolitan computer network. After radical changes of nineties a number of departments giving ICT diplomas are created in several faculties in public and private universities. The system of Bologna is introduced. Recently a part of ICT units is joined in a the Faculty of Information Technology. Results of teaching combined with research are reflected in the important contribution given in the regional Balkan Conference on Informatics. There is participation in regional projects funded by FP6 and FP7, as the project SEE-GRID-SCI. At the same time shortcuts from legislation instability and lack of financial resources are creating lot of difficulties, and the progress is slow and painful.

Introduction

Fast development of education in Albania happened after the Second World War. In fifties the first University of Tirana was created, with scientific, engineering and social profiles. K12 education was spread in the whole country. This fast development backed up the introduction of first computers in seventies, and the development of IT education in latter years. In this paper a historical view of this development was given, leading to the presentation of actual situation with its successes and difficulties.

History of ICT Education

University education in Albania started in 1951 with creation of the Polytechnic Institute, transformed in the State University of Tirana in 1957. Another University of Agriculture was built near Tirana. The From the beginning Chair of Mathematics was created in Faculty of Natural Sciences. Chair of Low Currents was created in Faculty of Electrical Engineering in 1961, changed in Radio-Electronics in 1969 and developed in Department of Electronics in 1991. Gradually few branches of the University were created in other main cities, serving as cores of new universities in nineties. In 1991 the University of Tirana was split in two:

– Polytechnic University of Tirana, composed by engineering faculties as Mechanical Engineering, Electrical Engineering, Civil Engineering, Geology and Mining. In 2007 two new faculties were created: Information Technology, and Mathematics and Physics Engineering.

– University of Tirana, composed by non-engineering faculties as Natural Sciences, Medicine, Law, Philology etc.

After changes of 1991, university branches in other cities were upgraded to universities in Shkodra, Elbasani, Korca, Vlora, Gjirokastra, Durresi. Some of them have departments of IT, in Shkodra and Vlora diplomas of IT are given.

Considering computers and computer networking, It started in 1971 with creation of the first Center of Mathematical Calculus, firstly as department of University of Tirana, and latter part of Academy of Sciences. The Center was equipped with computers of second generation and used for application of mathematical methods in different areas of human activity. The first generation of specialists got training in programming and applied mathematics abroad. The same curricula was introduced in the course of mathematics of specialty in University of Tirana, and in few other engineering courses. Some short term courses were organized for specialists from different fields, in order to facilitate the collaboration between the Center and other institutions.

The next jump forward was initiated by creation, as a project funded by UNDP, of the Institute of Informatics and Applied Mathematics (INIMA) in 1985 (under the Academy of Sciences). The project brought in Albania up

to date mainframes, and a metropolitan network was built in Tirana, connecting different ministries and faculties. With the new infrastructure new knowledge was necessary.

The Center helped many specialists of different fields to improve the quality of their work and their doctorates using computers as supporting tool. A great number of specialists was trained abroad, and the Chair of Informatics was created at University of Tirana, Faculty of Natural Sciences. The task of this Chair was organization of full 5-year course in Informatics, as well as short and medium term courses for specialists of other areas.

Beside INIMA, competence on digital technologies and on-line systems was increased in the Institute of Nuclear Physics (under the Academy of Sciences) in Tirana.

Radical changes of nineties were reflected in the education system. Training on ICT was offered by many organizations, and departments of ICT were created in several universities. Radical changes happened in the Department of Electronics of the Faculty of Electrical Engineering at the Polytechnic University of Tirana, with creation of three teaching directions – electronics, telecommunication and computer engineering.

In beginning of years 2000 Albanian universities started to adopt the Bologna system. In 2007 there was an important event – creation of the Faculty of Information Technology in Polytechnic University of Tirana, joining together departments of electronics, telecommunication and computer engineering from the Faculty of Electrical Engineering labs. Government launched also the master plan for introduction of IT education and Internet connectivity for all schools countrywide.

Policies for ICT Education

In the framework of legislative (see [1], [2], [3]) and strategic documentation of government of Albania (see [4], [5], [7], [8], [9], [11]) there are two key groups of documents directly related with the ICT education in the country:

    i)   Cross-sector Strategy for the Information Society

    ii) Master-plan for E-Schools Programme in Albania

The Cross-sector Strategy for the Information Society considers the improvement of ICT infrastructure for fast broadband Internet services country-wide. One of principal objectives of the strategy is education in all its aspects:

– Equipment of all schools with computer labs and broadband Internet within 2013 , with 25 pupils for 1 computer in 2010

– Introduction of elements of ICT in elementary schools, improving teaching of ICT in high school following EU standards, and train of teachers.

– Connection of all universities and research centers with the GEANT via a national fiber backbone.

– Dissemination and teaching the wide public for better acquittance of ICT, to make people able to use the technology and be active in a society based on Information.

– Realization of the Master-Plan for E-Schools.

The Master-plan for E-Schools Programme in Albania [6] is a specific document for introduction within 2008 in all schools of the country teaching of elements of informatics, based on new curricula, PC labs and Internet connectivity. Improvement of teaching of informatics in pre-university education system is expected to increase the use of IT in every aspect of the life considering the concept of information society, also to improve university and post-university teaching and research as result of better prepared new students entering in universities.

After many years of tentatives from key IT academic people, the signature of an agreement [10] with the Italian government for creation of an inter-university services center has created conditions for building of the National Research and Education backbone in the country; the work is progressing under the joint attention of Ministry of Education and Science of Albania and Delegation of Italian Collaboration for Development of Albania [14].

Implementation of these strategies would make possible the intensification of usage of up-to-date technologies and consolidation of knowledge database for education of students. Actually the curricula used in schools has little differences with those applied in other countries, as it results from communications with Albanian students doing their studies abroad, in particular in Italy. Development of e-content and video-conferencing technologies would improve collaboration with foreign universities, in order to better face challenges of the future. Improvement of curricula following recommendations of UNESCO and strengthening the work for teaching of software technologies and programming would open wider perspectives for new generations.

Structures for ICT Education

Actual structures for ICT education in Albania are:

– Polytechnic University of Tirana
    – Faculty of Information Technology
        – Department of Computer Engineering
            – Diploma in Computer Engineering
        – Department of Electronics and Telecommunications
            – Diploma in Electronics
            – Diploma in Telecommunications
    – Faculty of Geology and Mining
        – Diploma in Geo-Informatics
– University of Tirana,
    – Faculty of Natural Sciences
        – Department of Informatics (former Chair of Informatics)
            – Diploma in Informatics
    – Faculty of Economy
        – Department of Mathematics, Informatics and Statistics
            – Diploma in Economic Informatics
– University of Agriculture in Tirana
    – Department of Informatics
– University of Shkodra
    – Department of Informatics
        – Diploma in Informatics
– University of Vlora
    – Department of Informatics
        – Diploma in Informatics
– University of Gjirokastra
    – Department of Informatics
– University of Korça
– University of Durresi
– Private universities
    – New York University, Department of Computer Sciences
    – University UFO Dental, Faculty of Applied Sciences
    – University Marin Barleti, Department of Applied Mathematics
    – University KRISTAL, Faculty of Electronics
    – University EPOKA, Department of Computer Engineering
    – European University of Tirana
    – ...

Some departments give diplomas in mathematical and/or physical engineering, with a strong component of IT: Faculty of Natural Sciences (University of Tirana) and Faculty of Mathematical and Physical Engineering (Polytechnic University of Tirana).

The system 3+2 of Bologna is introduced in all universities. Faculty of Information Technology has already completed this process, 2 years ago, in 2007.

Fig. 1 - Structures of university and post-university studies
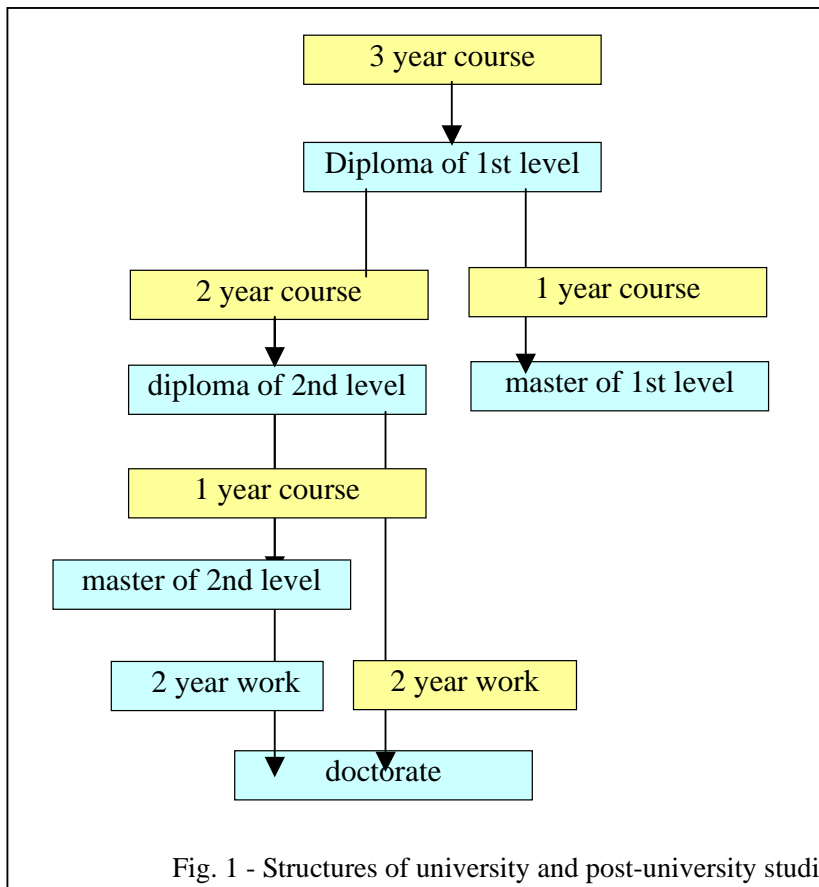
With the new law for high education of 2007, the structures of university and post-university graduation are as Fig. 1.

Compared with definitions of Bologna, Albanian diplomas are situated as follows:

- 1st level Diploma = Bsc
- 2nd level Diploma = Msc
- Doctorate = PhD

Typical structure of academic year is:

- 1st semester of 14 weeks, 30 creedits
- 4 weeks for exams
- 2nd semester of 14 weeks, 30 credits
- 5 weeks for exams
- 2 extra weeks for exams

The level of research component applied in Faculty of IT is presented in the Fig.2. Continuation of studies from the 1st to 2nd cycle in this faculty is permitted for all cases within the faculty, with condition of having collected 180 credits and having a good average mark (Fig. 3).
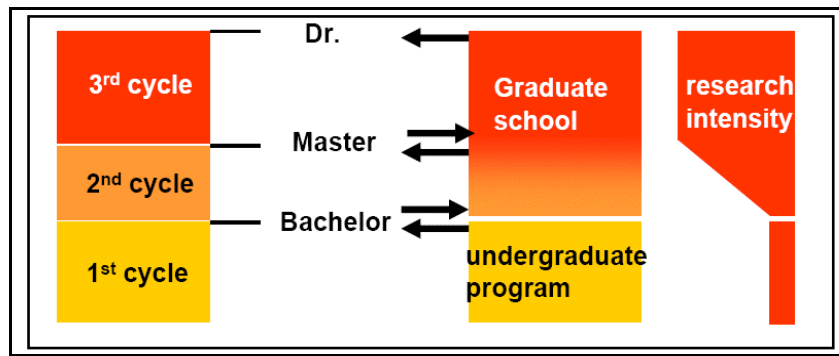
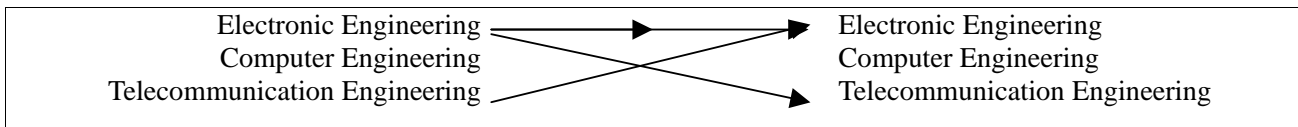Fig. 2 – Level of research in FTI (based on the Bologna System)

Fig. 3 – Continuation of studies in FTI

Problems and Perspectives

During last 5 years Department of Computer Engineering at Polytechnic University, today part of Faculty of Information Technology, improved the work with students of 5th year. This improvement lead to an increase of presentations in two recent Balkan Conferences on Informatics beginning with 16% of all presentations in BCI'2007 and 20% in BCI'2009, almost all from students' works of this department.

With the opening of regular doctorate schools, the prognosis is for a further improvement of research activities. The next BCI conference is already planned to be organized in Tirana, and this would help to extend the local community of presenters.

Together with BCI, in the region there are organized small conferences with diplomas and doctorates works of students, one such conference is planned to be held in Tirana in 2010. Combination of such factors must have strong positive impact, in particular for students doing last 2 years of their studies and doctorates.

Faculty of Information Technology is collaborating with German universities, which professors are giving lectures in Tirana. Also some Albanian professors working abroad give lectures in this faculty.

At the same time universities in general, and particularly the Faculty of Information Technology, have several difficulties that include:

– low number of teachers, actual status as at the end of September 2009 of the rate teacher/student reaches 1/50 at FTI.

– inadequate infrastructure (insufficient number of laboratories, Internet connectivity of low bandwidth, etc.)

– low levels of direct funding, both for infrastructure and activities.

Such difficulties may deteriorate overall teaching and research conditions. Not only it will be difficult to assure qualitative teaching for all students, but also the overload of the staff is already reflected in results of participation in regional projects. Actually Polytechnic University is leading the participation of local research community in SEE-GRID-SCI of FP7 [12]. Expected applications are oriented towards environmental sciences. The future of grid activities in the region will be included in new project proposals under the umbrella of EGI (European Grid Initiative [13]). Successful realization of such projects requires dedicated personnel for both the infrastructure and applications, and involvement of doctorate students would be crucial here.

Internet connectivity is expected to be improved because of realization in process of a funding from Italian government, for creation of a Inter-University Center of Services. Main tasks of this Center would be helping universities in the domain of curricula, management of projects and running of the national network backbone

for research and education.

Government is working to implement a new strategy for the research and technological innovation in the country. Concrete modalities of this implementation will have a strong impact in the activities of universities. In this aspect Albania is before a new period of transition and experimentation of a new research system.

Conclusions

Teaching of elements of IT has a long story in Albania, beginning in early seventies. Significant progress was done in eighties with the creation of the first Chair of Informatics, and recent disputable developments that lead to creation of the Faculty of Information Technology.

Actual IT teaching in Albanian universities is following a modified version of Bologna system, with 3+2 years of regular teaching and master and doctorate studies. The weight of research work from students of last years is increased and reflected in important participation in regional conferences. Main IT departments are involved, in different degrees, in FP7 projects like SEE-GRID-SCI.

There are possibilities for continuous improvement of teaching and research in IT departments. But at the same time difficulties coming from missing of adequate infrastructure, lack of direct funding and drastic increase of the number of students may neutralize these possibilities. Definitive would be the implementation of the strategy for research and technological innovation, which is in its first steps.

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