

Reflections on Learning and Teaching through ICT: Case Studies in Albania and Croatia

Jozef Bushati

Advising Information Student Centre
University of Shkodra 'Luigj Gurakuqi
Sheshi '2 prilli' 4001 Shkodër, Albania
{jozefbushati}@gmail.com

Violeta Vidacek-Hains

Faculty of Organization and Informatics
University of Zagreb
Pavlinska 2, HR 42000 Varaždin, Croatia
{vvidacek}@foi.hr

Albana Gorishti

Faculty of Economy
University of Tirana
Rruga 'Elbasanit' 1001, Tirana, Albania
{albana.gorishti}@unitir.edu.al

Ezmolda Barolli

Faculty of Economy
University of Tirana
' Rruga 'Elbasanit' 1001, Tirana, Albania
{ezmolda.barolli}@unitir.edu.al

Abstract. *Nowadays, the growing use of ICT in all economical and social domains has had a great impact on educational institutions. Development of countries within our region is bound up with the use of new technologies in the teaching process at all levels, especially in higher education. Integrating ICT in education, not only helps students and teachers to share knowledge, but also affects the process of development and integration of Higher Educational Institutions in international educational networks. ICT in teaching and learning renders pedagogical methodologies more effective. This paper presents the authors' reflections on learning and teaching through ICT in the Albanian and Croatian HEI-s, as examples of case studies.*

Keywords: ICT, learning, teaching, higher education.

1 Introduction

One of the most significant achievements of recent decades that has strongly influenced human interaction is the development of Computer Science (Information and Communication Technology: hereinafter referred to as ICT). Originally, the breadth of the computer spectrum was very small, but currently none of us can manage without a computer, the internet or a phone. Furthermore, our memories fail us in recollecting how we could 'live' without them. Today, the impact of ICT has embraced almost every aspect of daily lives. Consequently, ICT had gained special importance in academic and research studies.

The ever growing speed of communication has been evinced in the process of social changes of every society in general and the teaching and learning process in particular. Today the key problems are: How much access do students have to ICT? How do they use it? How could the process of teaching and learning be improved? Teaching and learning through ICT can be achieved if the necessary infrastructure exists. Another prerequisite is the training those who operate technological equipment. Albania and Croatia were chosen as case studies for their geographical proximity and the transitional changes that are taking place in both countries in the area of education.

2 Infrastructure for ICT

Author [14] identified infrastructure as a critical catalyst for the adoption of ICT in the teaching and learning process. The establishment of technical infrastructure is usually the first strategy that most institutions adopt. Author [4] asserts that this strategy will, by necessity, be closely related to other strategies undertaken by universities. ICT infrastructure consists of physical elements such as desktop computers, laptops, software, projectors, data servers, networks, and telecommunication links as well as technical staff to support these resources. Author [4] also argues that: 'people who support the technological infrastructure are more important than the infrastructure itself'.

Author [4] offers four levels of human resource support required to fully exploit the use of ICTs: infrastructure to support staff of technology (technical support - installs, management, updates and networks and device maintenance), technologies to support staff education (staff that support the development and implementation of programmes and educational materials using technology), design of teaching material (for staff that provide services and educational expertise such as the design of instruction, professional development, project management and support for the use of teaching technology) and subject experts (those who create content, such as academic staff).

At present, computing power is increasing, the cost is decreasing and new portable forms are being produced. These achievements have facilitated the use of ICT in learning. ICT is being used to support teaching, learning, and assessment. Current technology is trending with the potential to further change learning practices. Focusing on the framework of this study, it should be noted that it is very important for educators to be able to understand which technologies should be used in their courses.

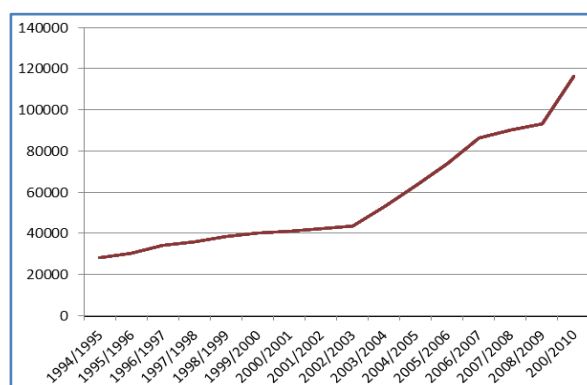
3 Education in Albania

Education in Albania dates back to the 15th Century, when the first book written in Albanian was published. The first Albanian school opened in 1887 and the first university in 1957. Now, it consists of pre-university and tertiary education, which is both public and private. There are about 800,000 pupils and students. The motto of education in the recent years has been to admit as many pupils and students as possible in all its stages. Most obviously, tertiary education, be it public or private, is characterized by increased enrolment rates, improved facilities, textbooks, and the implementation of ICT in all learning processes: 'Higher education continues to have problems modernizing and liberalizing and efforts to rectify the degrees with foreign universities, the implementation of the Bologna Charter etc'.¹

The number of students enrolled in tertiary education in the academic year 2009/2010 in Albania² was 116,292 far higher

than 28,331 students in 1994/1995. Public universities and private have 95,449 and 20,884 students respectively. Rapid growth started in 2003 and this trend has continued in the following years. The number of students in this academic year is 4 times higher than that of 1994/1995 and it is expected that the 2012/2013 academic year will see 5 times as many students enrolled as in 1994/1995.

Table 1. Increase in Enrolled Students in Recent Years²



3.1 ICT Education in Albania

Computers were introduced in Albania in the seventies. Regular ICT education in Albania started in the eighties, when the first department of informatics was established at University of Tirana. Its establishment was contemporaneous with the creation of the first metropolitan computer network [6]. In 2003, the Albanian government accepted and approved first the cross cutting National Strategy for the development of ICT in the country.

3.1.1 ICT in pre-university education

Currently, children begin to attend ICT classes in the sixth grade of elementary school and continue to get informed on ICT at high school (gymnasium), be it specialized or secondary vocational training schools. The new law that was proposed these days for pre-university education anticipates the ICT education should start in second grade of the elementary school. Thanks to the e-School Project³ initiated by the Albanian Government in 2005, 1,749 primary schools and 384 secondary schools were targeted to be equipped with computer labs and Internet connections. The cost of this project was 16,000,000 USD. Other projects include: 'Albania in the Age of the Internet' and 'the

¹ MASH <http://www.mash.gov.al>

²Source: Institute of Statistics http://www.instat.gov.al/tregues_sociale/excel/Studente

Introduction of Informatics and the Internet in all Schools Country-wide'. In relation to the utilization of ICT in the Albanian education, the ICT Profile highlights³ that 'a very simple, yet quite representative indicator of the level of the country's investment in the ICT infrastructure within education is the number of pupils per computer in primary and secondary schools. The strategy for education defines the objective as 1 PC per 10 pupils by 2012 [4]. The latest available information states that the average number of females per computer in primary and secondary schools is 16.91, while the average number of males per computer is 18.10. There is 100 % internet access to all schools of pre - university education, which is mainly broadband.

Table 2 Percentage of Broadband Internet Access within Regional Primary and Secondary Schools⁵

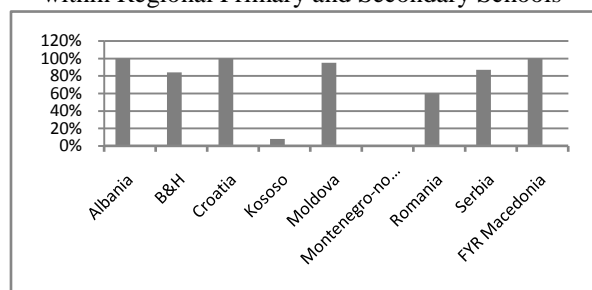
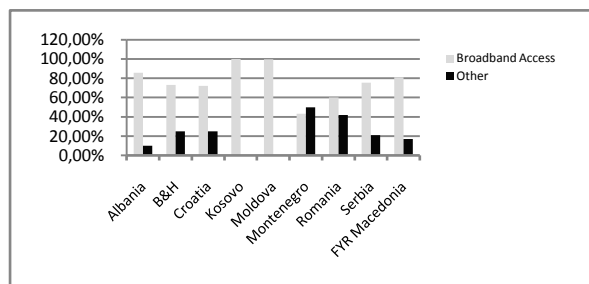


Table 3. Internet access in Regional Primary and Secondary Schools⁵



Up to 2009 results⁵ showed that all schools in the country, be they large and small, had installed 1,429 labs, 17,000 computers, 2,000 laptops and video projectors and about 2,000 schools were connected to the Internet. To achieve this objective a modern ICT curriculum was compiled in order to train students in

³ Source: e Governance and ICT usage report for South East Europe - 2nd Edition Sarajevo 2010

⁴ Source: <http://www.mash.gov.al>

⁵ Source: e Governance and ICT usage report for South East Europe -2nd Edition Sarajevo 2010

accordance with European standards. This process will be accompanied by:

- the development of digital learning content and multimedia materials,
- equipping schools with laboratories and applicable curriculums which aims to continuously improve the quality of teaching and learning and
- the integration of ICTs in various subjects within the curricula.

3.1.2 ICT in tertiary education

The rising trend of student admission has been especially noticeable in higher institutions that offer specialized courses on Information and Communication Technology, because the enrolment quotas at public universities are determined by the Ministry of Education and Science which has given priority to ICT. This is an attempt to respond to the needs of our developing country. The students, who apply for to study ICT, are accepted on a merit basis: the predicted grades students are expected to achieve in the final examinations at the end of secondary school/gymnasium. The quality of students in these branches is the highest, despite the demands of the discipline. Recently, private universities have established ICT studies in all three levels of education. The trend of development continues to gain impetus.

Table 4 Students that Graduated in ICT, in Albanian Public Universities from 1997 to 2009⁶

Students graduated in ICT in public universities	1997	1998	1999	2000	2001	2002	2003	2005	2006	2007	2008	2009	Total
Economic Informatics									0	41	41	44	126
Informatics: University of Tirana	14	15	22	22	35	108	56	54	55	70	23	97	571
Information, mathematics, engineering											88	0	88
Electronic Engineering	51	50	54	57	45	148	65	75		28	6	3	582
Informatics: Polytechnic University of Tirana											3	14	17
Telecommunications											2	8	10
Informatics: University of Shkoder									21	6	0	0	27
Informatics: University of Gjirokastra									0	23	5	45	73
Information Technology: University of Vlora									22	11	20	11	64
	65	65	76	79	80	256	121	129	98	179	188	222	1552

The number of graduate students on ICT in public universities in 2009 compared to 1997 is 4.3 times higher. In total, the number of graduate students in ICT has amounted to 2,000 in the 2011/2012 academic year⁶.

Nowadays e-Learning is identified to be the future of learning worldwide since the very

⁶ Source: Institute of Statistics http://www.instat.gov.al/tregues_sociale/excel/Studente

powerful platform of the internet has accelerated the speed of communication. The adoption of e-learning has become the latest trend across universities all over the world. Albania is part of a global shift from material resources to knowledge and intellectual resources as the basis for economic growth. E-Learning inclination is an initial part of e-Learning development. In order to benefit from e-learning, higher education institutions in Albania should conduct considerable up-front analysis to assess their readiness³.

4 The Albanian model based on the projects

4.1 New technologies in learning and teaching

Creating virtual labs for the subjects of Physics, Chemistry and Biology at the Faculty of Natural Sciences⁷ has made it possible for the students to demonstrate or experiment on the computer, entering data and receiving results in a similar way to that of laboratories. In most cases the experiments are simple simulations or animations of phenomena. They enable users not only to observe these phenomena or experiments, but also to perform any measurements or change the outcome of any measure and record the results. Often these results are presented graphically or calculated by the curriculums that the user does not see, but they can get the results of these calculations. In some experiments and assignments given to students, which can be enriched by the users be they pedagogues or students, can be downloaded or executed by the instructors to help students and teachers to improve and enrich teaching courses.

4.2 Internet Access at Universities.

Albanian universities already have full access to the Internet, through private Internet Service Providers (ISP), such as: ABISSNET, ABCOM, ALBTELECOM, ALFA, CABLE, IT TEL, MA-ISP, PRIMO, PRONET etc. They are well-equipped with, amongst others: dedicated lines, optic fibers and satellite dishes. Thanks to the Academic Network Project of Albania, secure access has been provided to networks such as GEANT, GARR 2 and ANA (Academic

Network Albania), and the Project for the 'Creation of an Inter-University Service Centre and a Telemetric Network' is aiming to promote scientific research and improve and strengthen the Albanian University System as a teaching resource at the highest level in the country.

The Inter-University Centre will offer software services to both public universities and research institutes, and will manage the Albanian Academic Network programmes. ANA will play a crucial role to securing the participation of the professors and researchers from the Albanian academic world in the research and development activities of the European Union.

Solutions derived recently in the framework of the umbrella project 'Digital Albania'⁸ and later for 'Albania is a developed country'⁹ aim to increase the level of Internet access in all parts of Albania¹⁰.

In a study performed by the authors, it is revealed that 'the public tertiary education institutions in Albania are still at the stage of integration of ICT initiatives in teaching and learning. Integrating ICT in education is considered as a very important process and it is seen as the main purpose of providing educational opportunity anywhere and at any time. Students and teachers see it as a tool that would help in a more effective education as in creating opportunities for more personalized instruction in accordance with the personal needs of students and encourage individual study' [2].

4.3 ICT and Pedagogy

The knowledge and skills that teachers need differ depending on the perceived purpose and anticipated impact of technology integration which varies from improving learning effectiveness in school subjects to fostering the development of 21st Century skills such as lifelong learning and collaborative problem solving. When applied to a case study of interactive teaching when a variety of technology-based activities are informed, the framework reveals a confusion of purpose in student use of an ICT resource. When students are working independently their potential for learning is limited. ICT is a tool for modernizing teaching and learning. Students associate the use of ICT with changes in the nature of classroom

⁷ <http://www.fshn.edu.al/projekte/lab-virtual>

⁸ <http://www.km.gov.al>

⁹ <http://www.km.gov.al>

¹⁰ <http://www.postashqiptare.al>

relations, as well as with the reshaping of learning and teaching. A variety of factors that hinder this process have been identified.

Whilst there is evidence of changes in the educational practice with the introduction of ICT into tertiary teaching and there are concerns that this technology is not often used with an appropriate pedagogy [18]. A number of researchers take the view that it is not the technology that engages or disengages the learner, but the learning activities and the pedagogy that is used [7], Windham states: 'The simple rule is engagement: moving students beyond mere participants in the class to becoming active learners and discoverers'. Starting with the great importance of this process, the Albanian public universities have taken the first steps in this direction. This fact is reinforced by the data processing and analyzing in their study process results that, in general, all consider the incorporation of ICT in teaching and learning important. In spite of this assertion, there is much to be done in this respect. More efforts have to be made to respond to the growing trend of ICT incorporation.

5 Croatian Model Based on Case Studies

Today's higher educational institutions are making a great deal of effort to include various aspects of ICT in the processes of student learning and acquiring academic and communication skills. This is one case study linked to the model of research conducted at the Faculty of the Organization and Informatics followed by an overview of previous research. The overall objective of these research projects is to evaluate the usage of information and communication technology in the process of higher education.

Some of the research results are linked to the various aspects of computer mediated communication in the context of the development of language skills. It places an emphasis on the needs for redefining the role of the ICT teachers in to support the learning environment. The computer skills of teachers and professors need to be extended by knowledge of meta communication. They need to learn how to apply strategies, didactic tools and methods [25]. ICT in higher education is very often used [21] in the area of biomedicine and health care studies, technical and biotechnical studies [8].

The effectiveness of teaching and creating a stimulating learning environment have an important influence on the learning process [20], starting very early [22].

Table 5: Students Enrolled by Institutions of HE by Academic Year from 2006 to 2011 (University Study) Croatian Bureau of Statistics, Zagreb 2012

Academic Year	Total	First Year
2006/07	92 392	30 141
2007/08	93 179	29 481
2008/09	88 722	34 017
2009/10	96 171	37 932
2010/11	97 434	36 416

According to the Croatian Bureau of Statistics 2012 Statistical Yearbook [5], the number of computer users at the higher level of education has reached 462,944 as compared to 432,374 in 2009. However, the number of users of the secondary level of education has slightly increased from 1,722,179 (2009) to 1,778,182 (2010). The biggest change is related to the number of the computer users receiving basic education that rose from 1,272,260 to 1,778,182. There are statistically significant differences in student attitudes towards e-learning issues related to gender and year of study [9].

The important research question is still why some Croatian students choose information and communication technology as their major for undergraduate study. The motivation of Croatian students enrolling in information sciences is linked to the following social and economic factors: job opportunities, the advantages of this particular profession and specific programmes of study [24].

The majority of students think that the ICT plays an important role in their education. Undergraduate students in Croatia estimate the importance of using the information and communication technology as a very important factor in any effective university learning environment. At a Likert's scale ranging from 1 to 5, the average estimate is high, placed higher than the median value of the scale ($M=4.44$, $sd=0.72$). The next results that appeared from the same comparative study are the estimates of the Albanian students to the same questionnaire items. Their estimates are also over the median value ($M=3.95$, $sd=1.3$) [23].

The research conducted with undergraduate students at one Croatian University shows that successful students think more positively about usage of information and

communication technology than students that are not so successful. In this research the method of semantic differential was used as a tool for students' evaluations. There are also some gender differences: male students respond more positively than female students [12].

Another aspect of computer mediated communication, that of social media, was used for evaluation in this case study. Social media is becoming more and more important and the following example is illustrated by students' evaluations of this part of IST communication. Croatian students attended an international online conference with students of one American University. After the conference, students were asked to complete a survey concerning the importance of the social media. Student responded that they appreciate the possibility to make new contacts, that they like to be informed about their colleagues' experience in different countries and that it makes for a new personal and academic experience in general. The opportunity to communicate in a foreign language was of additional importance. This conference motivated them to participate in other international activities [1]. Regarding this model, the future comparative studies will be focused on examples of good practice and exchange at the international level.

6 Conclusions

Conclusions regarding attitudes of students, teachers, lecturers and policy makers are inseparably bound up with the advantages and disadvantages of the process of teaching and learning with the usage of the ICT, as well as recommendations for the improvement. According to author [4], ICT implementation costs are inevitably high at the beginning because of the technology required for teaching. The reason for the high cost is related to the fact that time and energy is needed by the teachers who are preparing materials such as CD-ROMs, PowerPoint presentations and Web sites. Difficulties are encountered in demonstrating the link between the usage of technology and improvements in the teaching and learning processes. Academic staffs require more technical support as well as more research studies aiming at evaluating the usage of technology to supplement traditional classroom teaching.

Moreover, good policies are needed that lead teachers to digital culture and help them to

understand digital changes at all levels of education. Those policies need to be recognized by teachers with good knowledge of digital culture and by users of ICT for educational purposes. Understanding how ICT can improve teaching and learning processes.

Any discussion about the relationship between technical and pedagogical serves the emergent learning goal: to enable learners to be more autonomous in exploiting ICT facilities. The case studies identify the variables and issues which need to be considered in future research studies. Teachers should be encouraged to continue their development of reflective practice with ICT and to enhance their positive attitudes in relation to the usage of ICT in schools.

Usage of ICT increases flexibility. Students have better access to educational resources and may learn how to learn. Information and communication technology may also enable collaborative development of skills and acquisition of creative knowledge. These processes will prepare students for future lifelong learning and enhance their opportunity for development. Students can improve the quality of learning and their future careers can contribute to the economy overall. These trends are likely to make ICT an increasingly important factor in learning.

There are also some risks of using ICT in education, which should be alleviated through appropriate mechanisms. Here are some possible disadvantages of using ICT in education:

- ICT can create a digital gap within the classroom. Students that are more familiar with ICT will have more benefits and learn faster than others,
- ICT can remove the attention from the main goal of the learning process to develop ICT skills, which may be a secondary goal in this process,
- ICT may affect the connection process between teacher and student, as ICT becomes a communication tool instead of face to face communication. In this case the distance of the transaction will increase,
- Not all teachers are ICT experts and they may be negligent in updating the content of courses, which can slow down the process of learning for students and
- Plagiarism may increase, because students can copy the information rather than learn and develop their skills

7 Challenges

Author [13] emphasizes that it is not clear yet whether technology is part of the problem or the solution, because of the increasing costs as well as benefits of the usage of ICT. There is also the necessity to take into account the respective costs of ICT (hardware and software, training and continuous updating). For small countries, this is the important part of the budget, but it is also a challenge that accompanies our societies towards integration into Europe. Moving towards Europe obligates higher education institutions to respect their standards regarding knowledge that is based on ICT.

In the future, this development will have an impact on ROI - Return on Investment, and that needs to be continually measured in its relative or absolute figures. Investment in ICT shows that different worldwide experiences in the education sector contribute to the growth of knowledge and human capital and provides benefits to many different groups of society.

There are efforts being made by Albanian and Croatian researchers to analyze the measurements of intellectual capital at universities, especially the impact and the value of ICT in intellectual capital. According to authors [15] Technological progress and innovation are catalysts for increasing capital productivity and ensuring sustainable economic growth'.

Case studies from both countries show that there are achievements in the field of knowledge in spite of the differences arising from internal and external factors.

This is a joint effort to analyze the level of achievement and to identify opportunities for further co-operation.

As with the end of this paper:

'This is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.'¹¹

¹¹ Winston Churchill

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