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IMPLEMENTATION OF ICT AND THE ISO 9001:2000 STANDARD CAN IMPROVE THE QUALITY OF STUDYING IN CROATIA

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Abstract: *The process of integrating the Republic of Croatia in the EU calls for an adaptation and improvement of many of the Croatian society elements, among which there is also the education system as a foundation for creating of a generation who will, by their knowledge and a world view, easily embed into the European virtues. The conformation of the high education system has been consolidated under the term "the Bologna process". Although the basic accent of this process has been put to conformation in order to form a unique European education system, the efficiency of knowledge acquiring process within the sole endeavour to ensure the quality, also represents one of the main objectives. The article hereto points to the possible advantages of implementing the ICT and the international ISO 9000 standards as a base for an efficient increase of the quality of studying in the Republic of Croatia.*

Keywords: *High education, ISO 9001, ITC.*

1. INTRODUCTION

The globalisation process and the increasing development of knowledge and technology are one of the factors that influence important changes in all the activities, including the education system. The society based on knowledge mainly depends on the efficiency and effectiveness of the educational system, particularly the high education one. The countries with the highest developed economy are the main generators of these changes. In order to protect its own interest, but also due to the necessity of joining the European Union, the Republic of Croatia has to undergo through conformation of many of its society organisation segments, among which the educational system plays an important role. The pace of changes in science and technology causes the knowledge once acquired to easily become out-of-date, and therefore one has to amend and renew his knowledge. At first, we have to face with what it seems to be a paradox situation – the larger the knowledge of an individual is; the greater are his needs to renew it. The high education institutions, therefore, need to become involved in these processes.

The actual technological development degree calls for a large number of persons who need to acquire certain knowledge. In the same time, the quantity of the knowledge necessary grows per person. Due to the economical reasons and limited capacities of high

education institutions, it is of utmost necessity that the individual in a unit of time acquires larger and larger quantities of knowledge. Therefore, the educational processes need to adapt to the actual technological development degree and increase their efficiency and effectiveness. The experience gained in other activities points to the fact that one needs to use methods implemented in past, which made the efficiency and effectiveness in the economy and other activities grow. Development and implementation of the information-communication technology (ICT) are surely one of the reasons that caused the stated changes. Simultaneously with the above process, there also evoluted a conscience about the necessity to increase the product and/or service quality, as one of the important conditions to survive at the market. The quality management principles penetrated every segment of human activities, putting the objective to meet the users' expectations or to increase the degree of the customers' satisfaction with the product delivered and/or service rendered, in the centre of every process undertaken. The high education institutions accept these principle. One of the result of their results is the change the relation towards the students, who are now considered users and who are participating in the process of education in this new role. In such a way, the satisfaction of students becomes one of the criteria to valuate the quality of the educational process itself.

The initiatives to adapt the educational system to the requests stated above and to form an unique high education system which would correspond to the ones in the countries of European union have been introduced and united under the name the Bologna process, although other materials[1] were published either before or after the publication of the Bologna Declaration, where all of them together form what we now consider under such denomination.

"By reviewing the basic documents, one may note a total of nine areas recognised as a priority ones in the process of formation of the European high education segment: (1) quality assurance; (2) appraisal system; (3) two-cycle system; (4) comparable degrees; (5) mobility; (6) life-lasting education; (7) European dimension, (8) social dimension and (9) recognising of the degree and the studying period"[2]

Which are the problems that may be expected by Croatia during this process?

The table 1. shows the amounts invested in education, demonstrated as percentage of GDP for the European Union, Slovenia, Hungary and Croatia. It can easily be seen that Croatia falls behind the EU average, but especially behind Slovenia and Hungary.

Table 1. Total public expenditure on education as a percentage of GDP

	2000.	2001.	2002.	2003.
EU (25 countries)	4,71	5,02	5,14	5,22
EU (15 countries)	4,73	5,01	5,13	5,21
Slovenia		6,08	5,98	6,02
Hungary	4,50	5,10	5,45	5,94
Croatia			4,32	4,66

Source: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1334,49092079,1334_49092794&_dad=portal&_schema=PORTAL, retrieved 25.06.06.

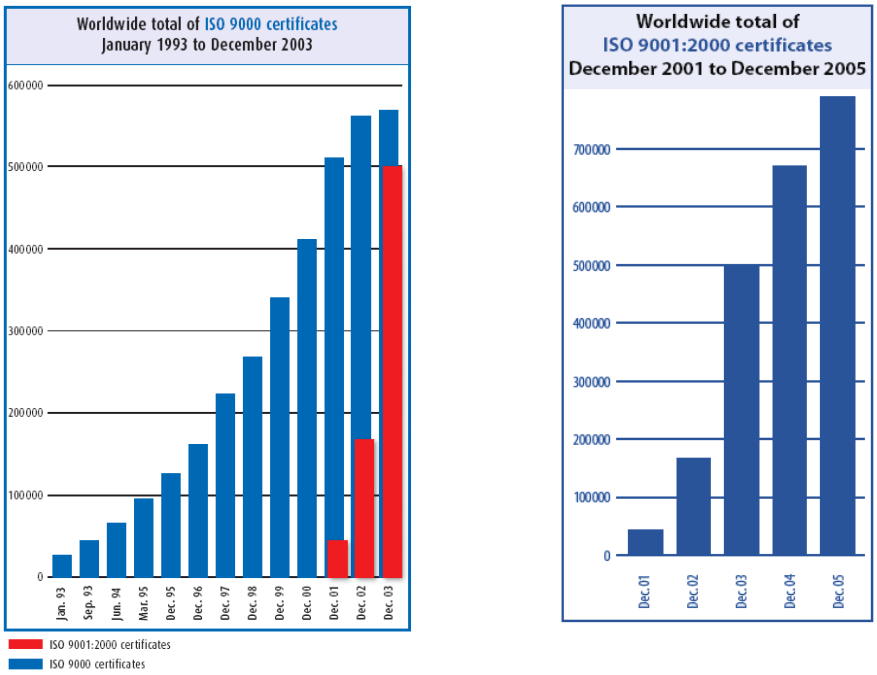
If we know that GDP per capita in Croatia meets only 40% of the EU average, it is

[1] for example http://www.bologna.ie/publications/default.asp retrieved 28/05/2006
[2] http://bolognjski-proces.idi.hr/Default.aspx2?tabid=52 retrieved 31/05/2006

obvious that Croatia will have to invest important amounts in education if it wishes to keep-up with the EU pace. This problem may partially be remedied if the efficiency and effectiveness of the educational system grow higher than the EU average. The measurement of efficiency and effectiveness of the educational system is a separate item of the agenda that will not be discussed in this article. The objective of the article hereto is to point out the elements that can contribute this increase.

2. IMPLEMENTATION OF ISO 9001 STANDARD IN EDUCATION

The economy has already met with various endeavours and concepts to build an effective quality management system. From the historical point of view, the most important ones are Deming Prize (1950), followed by Malcom Baldrige National Award (1987) and international standards pertaining to ISO 9000 (1987) family. The implementation of this last standard grows continuously, either in Europe or in the world, as shown in the picture 1. In the period from 2001 to 2003, there was a slight stagnation, which was the consequence of the organisations having to adapt to the requests of ISO 9001:2000 edition of the standard. Croatia also actively participates in this trend, as illustrated by figures from the table 2, which show that at the end of 2004, 670.399[3] organisations were certified, of which 970 of them were from Croatia.



Source: http://www.iso.ch/iso/en/iso9000-14000/pdf/survey2003.pdf p. 3. retrieved 21.06.06. and [9]

Picture 1. Total number of ISO 9000 certificates from January 1993 to December 2005

[3] Please see http://www.iso.org/iso/en/prods-services/otherpubs/pdf/survey2004.pdf.str.2 retrieved 10/06/2006. This presentation includes no grow prior to 2000, and therefore the picture 1 was taken from the earlier presentation.

Table 2. Overall growth of the ISO 9000 certificates worldwide and in Croatia[4]

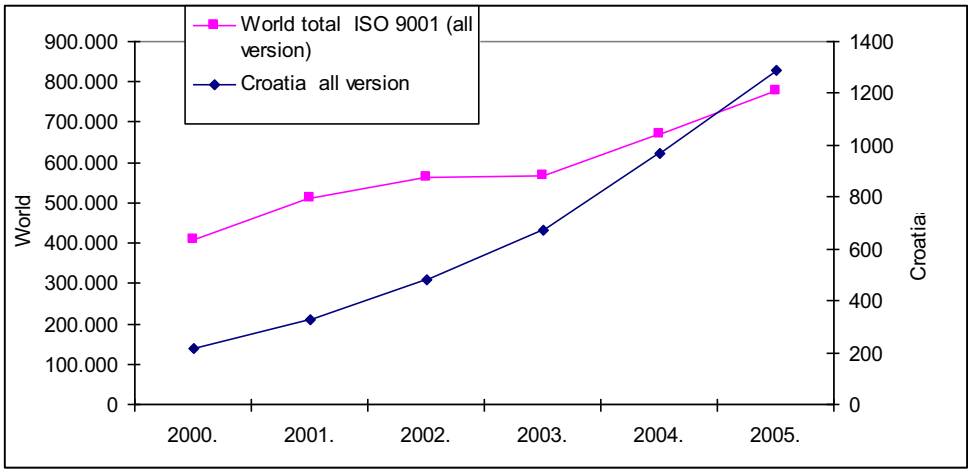
	2000.	2001.	2002.	2003.	2004.	2005.	2006.
World total ISO 9001 (all version)	408.631	510.616	561.747	567.985	670.339	776.608	
World total ISO 9001:2000		44.388	167.210	497.919	670.399	776.608	
World education		580	1.529	5.915	9.625	12.607	
Croatia all version of ISO 9000	217	328	479	674	970	1288	1347
Croatia education	6	14	24	27	30	31	32

The implementation of the stated standard in educational activities took a somewhat slower pace. Trends in Croatia do not completely follow the World ones[5]. Based on the data shown in the table 2, diagrams were elaborated and presented in the pictures 2 and 3. The picture 2 shows that the overall number of ISO 9001 certificates grows in Croatia faster then in the world.

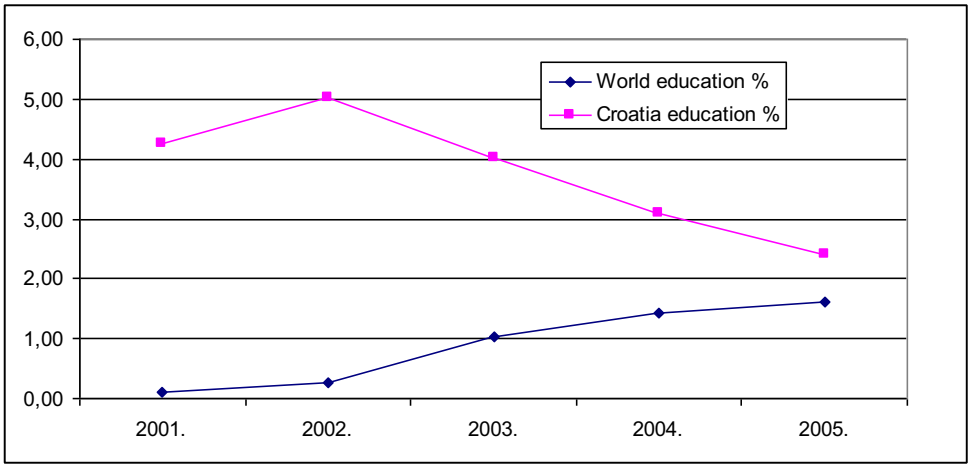
The 2002 and 2003 stagnation, which, as already mentioned, was mainly caused by transfer from one issue of the standard to the next one, had no particular impact to Croatia, partially because the data for Croatia includes standards from both the previous and the new issue of the ISO standard. The picture 3 shows that the number of certificates related to the education in Croatia has no trend equal to the one in the world. Although, considered by percentage, Croatia has a greater number of certificates in the sphere of education, this percentage tends to decrease in Croatia, while it grows in the world.

[4] The worldwide data for education refer only to ISO 9001:2000 while those for Croatia include all the versions of the standard. Therefore, data for the year 2001 and 2002 cannot be directly compared.

[5] The data for Croatia was taken from the address http://kvaliteta.inet.hr/prikaz.asp retrieved 31/05/2006. The situation refers to the one in force as of 01/04/2006. There needs to be pointed out that at the web page http://kvaliteta.inet.hr/HR%20Survey%202005.pdf data concerning Croatia were published, which was methodologically considered in the same way as the one demonstrated in table 1 concerning the World situation. This information is slightly different from the one shown, but its main shorgate is that it shows only the final situation, with no changes throughout the years.



Picture 2. Comparison of overall growth of numbers of ISO 9001 certificates in Croatia and in the world (source: Table 2)



Picture 3. Comparison of ratio between the number of ISO 9001 certificates in education in relation to the total number in Croatia and in the world (Source: Table 2)

The impression is that the percentage of certificates in the educational segment is generally rather low, which calls for a detailed investigation as to the causes thereof.

3. APPROACH TO THE QUALITY ASSURANCE IN THE HIGH EDUCATION PROCESS

The number of ISO 9001 certificates in high education could not be established because the International Standard Organisation (ISO) does not publish them separately. Considering the fact that there exists no unique, generally accepted definition of quality, then the terms such as quality assurance or quality management often are not defined as an unique term. There are many definitions, which in principle help to comprehend the term of quality, but often are of no use when one wishes to assure the quality of certain product or service. For example, “Harvey and Knight (1996) suggest that quality can be broken down

into five different but related dimensions: quality as exceptional (e.g. high standards), quality as consistency (e.g. zero defects), quality as fitness for purpose (fitting customer specifications), quality as value for money, and quality as transformative (an ongoing process that includes empowerment and enhancement of the customer satisfaction). While the authors advise that quality as transformative incorporates the other dimensions to some extent, it can also be argued that different stakeholders are likely to prioritise the importance of these different dimensions of quality according to their motivations and interest. In some quality initiatives therefore, there may be a preference for the monitoring of some quality dimensions at the expense of others'[6].

For the states members of the European Union, and for Croatia as its future member as well, the basic document which regulates the segment of quality in high education area is the Standards and Guidelines for Quality Assurance in the European High Education Area (QAEHEA) issued by the European Association for Quality Assurance in Higher Education[7] .

It is interesting to learn that this document defines no term of quality and that the word ISO is nowhere mentioned. The fact that over 300.000 organisations in Europe have introduced the quality management system and certified it according to the above standard, with an important number of high education institutions among them, was not a reason enough to mention this approach. This situation gives us no base to conclude that the standards and guidelines mentioned exclude the approach recommended by ISO standards. Even, comparing the quality management principles introduced by the ISO standards with the basic principles mentioned in QAEHEA, many similarities can be seen, as shown in the table 2.

The basic difference in the approach related to these two documents is that QAEHEA considers separately the internal quality assurance from the external one. From the other hand, the ISO Standard recognises no such terms. From the previous facts, one should not conclude that QAEHEA is therefore more detailed.

Namely, taking in consideration the ISO definition of quality, which reads: Quality is 'degree to which a set of inherent characteristics fulfils requirements'[8] where requirement means ' need or expectation that is stated, generally implied or obligatory'[9], there results that the criteria for quality are the requests posed by the users and other interested parties. We could say that by this definition ISO elegantly unites the above cited five aspects of quality. What implicitly results from the definition stated is that the quality cannot be realised partially – there is no external quality without firstly reach the internal one, and vice-versa. After all, QAEHEA, at the page 7, implicitly suggests the same when the "use of internal quality assurance procedures" are defined as the first principle to reach the external quality assurance.

We point out this fact because the implementation of the experience in sphere of implementation of ISO 9001 standard could significantly accelerate the implementation of quality assurance in the sphere of high education and could also increase it efficiency. This is of a particular importance for Croatia, because the results of the research demonstrated at the Picture 4 show that Croatia falls behind the European average.

This valuation can be well confirmed by the Report on situation of institutional quality

[6] Please see [3]

[7] Taken from the web address http://www.bologna-bergen2005.no/Docs/00-Main_doc/050221_ENQA_report.pdf on 20/04/2006.

[8] [7] page 7

[9] Ibidem

systems at members of the University of Zagreb[10] .

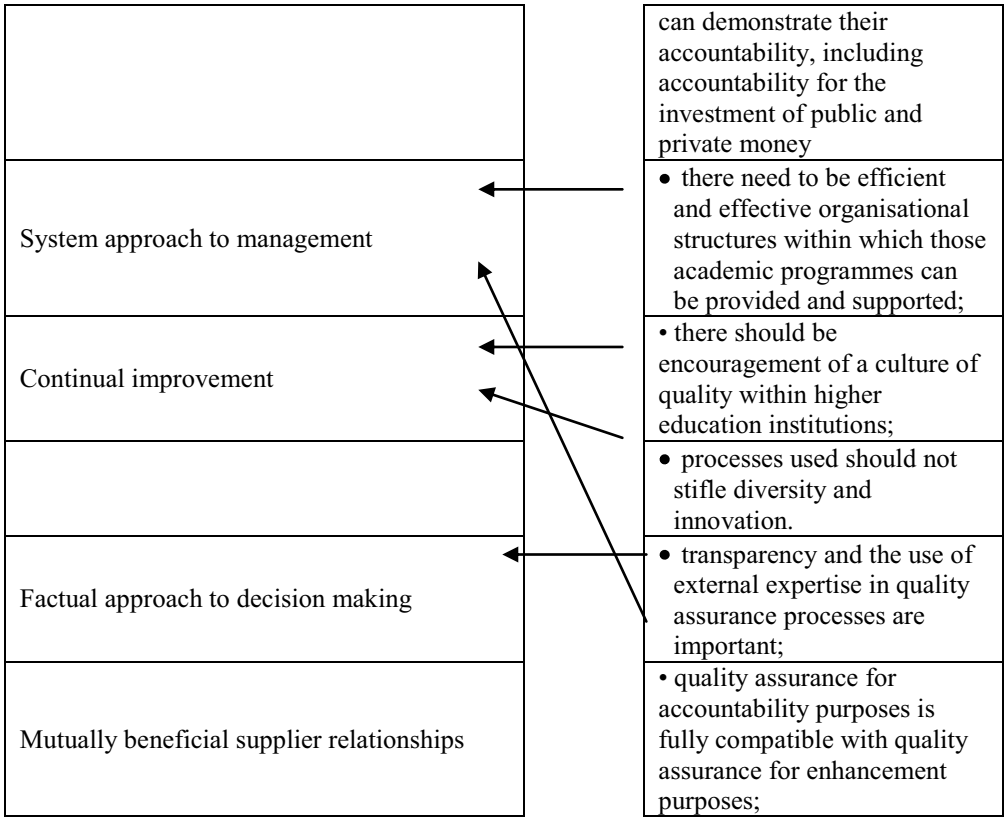
4. INFLUENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ITC) TO THE QUALITY OF STUDYING ITSELF

In the last fifty years, the ICT had an enormous influence to the development of society. The global economy and society based on knowledge are the most characteristics of a today world, which have a direct impact to further development of human society. As in the story of a shoemaker with his shoes worn out, ICT takes a relatively late share in knowledge acquiring processes. The high education institutions, which are partially responsible for an accelerated development of ICT, now have to implement this technology in order to increase their own effectiveness and efficiency. If acquiring of knowledge and scientific research are the basic processes in the high education, than the effectiveness of implementing the ICT should primarily be valuated through its implementation in the basic processes. Having in mind that the main characteristics in the knowledge acquiring process are similar at the majority of the high education institution, generally acceptable solution may be realised more easily in this segment. Implementation of ICT in other, support processes in high education may also cause the increase of studying quality. When we talk about the quality management, one of the greatest reproaches to ISO 9001 standard was the enormous quantity of paper generated by its implementation.

Table 3. Comparison of basic principles from ISO 9001 and those from Standards and Guidelines for Quality Assurance in the European High Education Area (Source: prepared by the author based on [7] page v and [4] page 13)

ISO 9001 principles	QAEHEA basic principles
Customer focus	• the interests of society in the quality and standards of higher education need to be safeguarded;
Leadership	• the quality of academic programmes need to be developed and improved for students and other beneficiaries of higher education across the EHEA;
	• institutions should be able to demonstrate their quality at home and internationally;
Involvement of people	• providers of higher education have the primary responsibility for the quality of their provision and its assurance;
Process approach	• processes should be developed through which higher education institutions

[10] Please see [2]

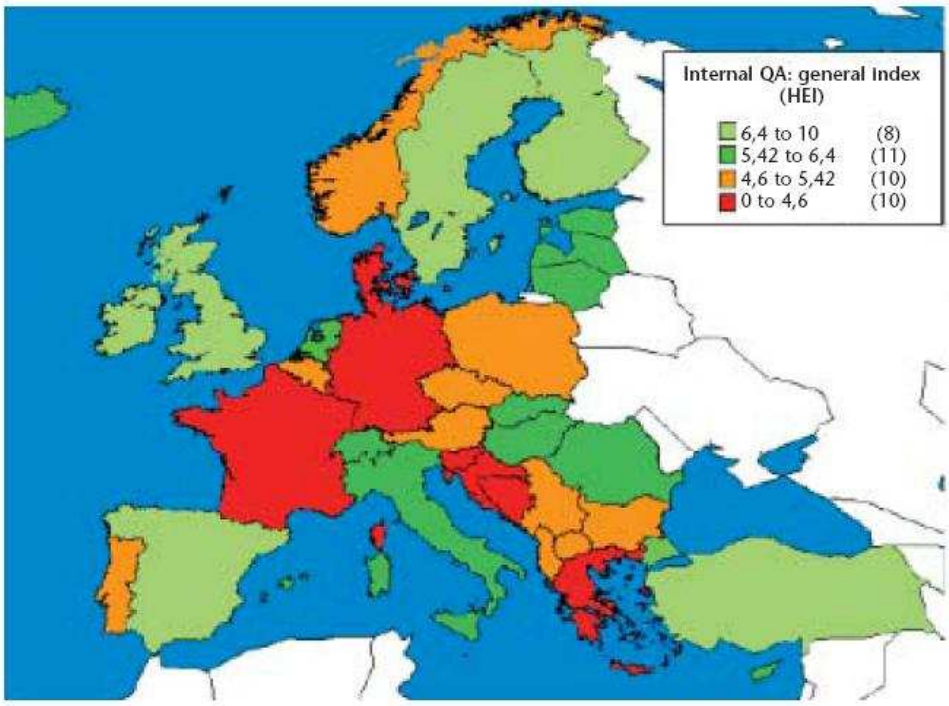


The ICT enables the realisation of paperless quality management system[11], remedying or annulling the problems related to managing the documentation. In Croatia, there is currently applied and developed the Information system of high education institutions (ISVU)[12]. This system is primarily oriented towards the support functions in high education and represents a very well initiative of the Ministry of science, education and sport, which will certainly contribute in increasing the efficiency in managing the high education institutions and increasing of quality of studying itself.

The following characteristics are important for the actual knowledge gaining process:

- Number of individuals who should participate in the process is constantly growing
- Quantity of knowledge required from the individual is growing
- Quality of necessary knowledge is changing, with special accent taken at the possibility to implement the knowledge gained
- Quantity of the overall human knowledge is growing fast, and this influences the knowledge gained becoming obsolete in a relatively short period of time, and its constant improvement
- ICT enables a fast transfer of knowledge to every place at the planet.

[11] See, for example [8]
[12] Please see: http://www.isvu.hr/javno/hr/index.shtml#vrh



Picture 4: **Internal quality procedures at HEIs in Europe: aggregate index**[13]
(Source: [5] page 83)

In short terms, it is necessary to increase the quantity and quality of knowledge per individual and simultaneously increase the number of individuals participating in the educational processes, either in regular studying or in the process of improvement of knowledge once the education was completed – so called lifelong learning. So, it is necessary to increase the output of educational institutions, which, as a principle, calls for increase in their resources, additional financing, but also time. For instance, the quantity and quality of education personnel cannot be increased only by investing additional amounts of money, it also calls for certain time-frame. The response to these challenges may lie in ITC in the process of acquiring knowledge, which can be grouped under the denomination "e-learning".

Most of the authors today agree that in order to realise a certain quality of studying, the media in which learning material is presented is not important – what is important is its contents[14]. From the educational institutions' point of view, the researches have shown the

[13] This aggregate index is based on HEI responses to three questions, namely whether they have internal mechanisms for monitoring quality with regard to teaching, to research and to other aspects of their mission. An aggregate score on a scale from 0 to 10 is computed for each country, based on the scores for each HEI within that country. The higher the index values, the higher the declared achievement of the Bologna goals with respect to the promotion of quality assurance. An index value of 10 indicates that all HEI within the respective country declared they had developed all three internal quality mechanisms.

[14] Please see [1] pages 5,6

following main advantages realised by e-learning compared to the traditional approach[15] :

- Decreasing of overall costs because of elimination of the expenses of renting the offices, voyages and stay of students, shorter engagement of teachers etc.
- Reducing of learning time, averagely by 40-60%
- Increased retaining of knowledge (retention) and ability to implement the knowledge gained, by 25%

The main shortage in this solution lies in the increased initial costs connected with the supply of equipment and elaboration of didactical materials. If we consider the time-frame of several years, we can see that the above costs have an "one time only" character.

5. CONCLUSION

The global economy development influences the knowledge, which becomes a basic resource to reach a competitiveness of the economy and its future development. Due to this fact, the high education system has become a generator of the society's economical development. This fact was recognised in the European Union and therefore the Bologna process was born as a consequence of a conscience that the effectiveness and efficiency of the high education system must be improved.

Croatia has to keep up with the states of European Union, and it needs to secure appropriate resources, which call for the investment of additional amounts of financial assets. Besides the stated financial assets, the significant factor in the success is also the time itself. The sooner the educational system which will create personnel who will become carriers of the country's economy development is formed, the sooner will Croatia be integrated in the European Union based on the principle of equality. The implementation of ICT and an appropriate approach to management of the quality in the high education institutions may accelerate these processes. Croatia must therefore elaborate or improve its strategy of development of high education system, not waiting to receive the possible solutions from the EU, but making every endeavour to be the first in the line, in order to gain competitive advantage with relatively low investments. One does not need to seek the scientific solutions to the problems, which are resolved in practice on a routine basis. The existing experiences in implementing ICT and quality management in other activities must be critically but also pragmatically implemented also in the high education system.

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[15] Please see [6]

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