ICT and E-Learning – Catalysts for Innovation and Quality in Higher Education

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Abstract

In the current dynamic and international environment, all sectors of the economy and, in particular, tertiary sector (service sector) have to keep track with the information and communication technologies and to align with this fast evolving technology in order to satisfy all stakeholders’ needs and expectations and to develop, improve and enhance the quality of the provided services. In this context, universities have to adapt the services they provide and their content because they cannot ignore the societal trends related to the information and communication technologies due to the fact that one of the required skills in our current era is technological literacy. The change in higher education institutions doesn’t depend exclusively on these technologies, but more on the human resources and how they can approach and use all the new technologies and e-learning possibilities. ICT and e-learning can enhance the quality of higher education through innovative methods by increasing the students’ motivation, interest and engagement, by facilitating the acquisition of skills and by enhancing teacher training which will eventually improve communication and exchange of information.

Keywords: knowledge society, innovation, information, technology-enhanced learning., quality assurance.

1. The importance and the contextual framework of the information and communication technologies

“Information and communication technologies (ITC) are changing the society and the economy, so it cannot be expected that education and training should not be affected. Through many applications of information and
communication technologies that can presently be observed do not substantially change the conventional teaching habits, when technology use is integrated in a broader innovation effort its potential to stimulate, accompany and amplify change is enormous” (Dondi, 2005).

The phrase Information and Communication Technology has been used since the 1980s by academic researchers, but became more popular after 1997, after it appeared in a governmental report in UK.

ICT is central to today's most modern economies and the money spent on IT and IT related processes worldwide is continuously growing. The importance of ICT depends more on the ability to create greater access to information and communication than the technology itself. ICT brings unique responses to society's challenges such as the growing needs for sustainable healthcare and ageing well, for better security and privacy, for a lower carbon economy and for intelligent transport.

Information and Communication Technologies for Development (ICT4D) refers to the use of information and communication technologies (ICTs) in the fields of socioeconomic development, international development and human rights. This means that a better information and communication will help at the development of the society or of some specific regions.

Information and Communication Technologies for Development rely on advances in technologies, but also it is necessary to some societal sectors important for community development such agriculture, healthcare, poverty and education.

![Figure 1. The Information and Communication Technologies for Development cube](image)

Source: Hilbert, (2012)

This three-dimensional conceptual framework shows the transition towards an information society and has its origins in Schumpeterian innovation theory that considers innovation and technological change the main catalyst for social evolution and development. It is focuses on the interdependency among technology, policies and socio-economic sectors that are being changed (e-government, e-business, e-health, e-education and others). The list of e-sectors can be expanded also to other important fields, as it shows the arrows in the diagram. The vertical sectors (Infrastructure, Generic services, Capacities and Knowledge) are the application areas of the technology that can lead to social change.

Since the characteristics of every particular field vary by region and country, there is no one-size-fits-all recipe for the transition towards an information society; the optimal transition path depends on country and region specific particularities (Hilbert, 2012).

Many international development agencies recognize the importance of ICT4D. For example, the World Bank's GICT section has a dedicated team of approximately 200 staff members working on ICT issues. A global network
hub is also promoting innovation and advancement in ICT4D. Global Knowledge Partnership (GKP) is the world’s first multi-stakeholder network, bringing together public sector, private sector and civil society organizations with the goal of sharing knowledge and building partnerships in ICT4D.

At international level the United Nations International Telecommunication Union (UN ITU) publishes an index based on internationally agreed indicators in order to measure and compare ICT performances within and across countries, called **ICT Development Index (IDI)**.

The ICT development process and the transformations towards an information and knowledge-based society can be explained by using a model with three stages:

- **ICT Readiness** – the level of networked infrastructure and access to ICTs;
- **ICT Intensity** – the level of use of ICTs in the society;
- **ICT Impact** – results/outcomes of effective and efficient ICT use.

![Three-stage model in the evolution towards an information society](http://www.itu.int/)

Latest data show that internet use continues to grow steadily, at 6.6% globally in 2014 (3.3% in developed countries, 8.7% in the developing world). The number of Internet users in developing countries has doubled in five years (2009-2014), with two thirds of all people online now living in the developing world.

For 2014, the IDI top 30-ranking include countries from Europe and high-income nations from other regions including Australia, Bahrain, Canada, Japan, Macao (China), New Zealand, Singapore and the United States. Almost all countries surveyed improved their IDI ranking this year.

Denmark ranks in first place, replacing the Republic of Korea which occupied first position for several years, but the values obtained are very tight, with a difference of only 0.01%. The only new entrant in top ten is Hong Kong (China) and the other countries from top ten are from Europe.

In this index regarding the ICT development, Romania ranks 58 place. At regional level, Europe ranks first, with a percentage of 74.8, almost double compared to the world average (40.4%), as showed in the figure from below.
These are also preoccupations of the European Commission in this regard. Many countries around the world have established organizations in order to promote these information and communication technologies, because it is feared that unless less technologically advanced areas have a chance to catch up, the increasing technological advances in developed nations will only serve to exacerbate the already-existing economic gap between technological "have" and "have not" areas.

2. Quality, certification and excellence in E-learning

E-learning (or eLearning) is the use of electronic media, educational technology and information and communication technologies (ICT) in education. The term “e-learning” is taken from Anglo-Saxon literature. According to Oxford Dictionaries, e-learning is defined as a learning conducted via electronic media, typically on the Internet. Successful e-learning depends on the self-motivation of individuals to study effectively. E-learning includes numerous types of media that deliver text, audio, images, animation, and streaming video, and includes technology applications and processes such as audio or video tape, satellite TV, CD-ROM, and computer-based learning, as well as local intranet/extranet and web-based learning.

The worldwide e-learning industry is economically significant. Developments in internet and multimedia technologies are the basic enabler of e-learning, with five identified key sectors of the e-learning industry: consulting, content, technologies, services and support. E-learning is suited to distance learning and flexible learning, but it can also be used in conjunction with face-to-face teaching in the classroom.

There are several benefits of e-learning, such as saves time and costs or the possibility of learning 24/7, anywhere. For many students, e-learning is the most convenient way to pursue a degree in higher education. A lot of these students are attracted to a flexible, self-paced method of education to attain their degree. Moreover, in asynchronous e-learning classes, students are free to log on and complete their assignments at the times they wish, whether it be early in the morning or late at night. However, many teachers have a harder time keeping their students engaged in an e-learning class. One reason for this is the lack of face-to-face contact between students and teacher, being difficult for teachers in this way to read their students' nonverbal cues, boredom or frustration.

At the European level, a not-for-profit organization was established in 2005, in order to ensure and develop quality in ICTs used in education and in e-learning, the European Foundation for Quality in eLearning (EFQUEL). It contains over 120 member organizations worldwide, including universities, corporations and national agencies. EFQUEL was created for quality assurance and enhancement of the technologies used in education and promotes excellence and innovation in learning and e-learning. During the years, the organization had many initiatives in this regard, such as creating e-learning tools and labels, UNIQuE or the annual EFQUEL Innovation Forum.
The UNIQUe Certification is a quality label awarded for quality use of information and communication technologies to higher education institutions. UNIQUe is the result of extensive testing and research, offers a transparent and reliable certification and represents an accelerator for quality improvement and innovation, by providing industry-wide benchmarks in the area of technology-enhanced learning. The applicants for this certification have to meet high quality standards for programme objectives and structure, content, resources and learning processes. The UNIQUe quality label is not only related to e-learning, it is a diagnostic tool for self-assessment of the institution, it focuses on innovation and ensures continuous quality improvement mechanisms.

The process for certification contains six stages, as follows:

0 – Inquiry
1 – Application
2 – Eligibility – checking the compliance with the UNIQUe criteria
3 – Self-Assessment – the institution complete a questionnaire about its processes
4 – External Peer Review – visiting the institution in order to check the UNIQUe criteria
5 – Awarding Body – give the certification or not if the institution meet the UNIQUe criteria and after the recommendation of the reviewers
6 – Continuous Quality Improvement – along with the decision from the awarding body, a set of recommendations for improvement will be dispatch.

EFQUEL Innovation Forum represents a multidisciplinary conference bringing together experts in learning from around the world to discuss the latest innovations in learning and teaching.

3. Innovation and quality in higher education through ICT and E-learning

Globalization and technological change are one of the main goals of ICT. One of the main sectors that should be changed and modified is education in general and higher education in particular. All the new information and communication technologies are changing the learning process in higher education. ICT based learning becomes more and more widespread in higher education institutions and therefore quality assurance processes and quality management systems are of highly importance.

E-education can provide access to the best gurus and the best practices or knowledge available (UNESCO, 2002).

The higher education sector plays a vital role in the social and economic development in any country from all over the world. Nowadays, a lot of universities are integrating information and communication technologies in order facilitate the acquisition and absorption of knowledge and to align with this fast evolving technology.

The trend towards a knowledge-based economy has emphasized the importance of universities as repositories of valuable human capital to help secure shares in the global market.

The process of education using ICTs can be classified in: e-learning, blended learning and distance learning.

The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counselling, interactive voice response system, audiocassettes and CD ROMs have been used in education for different purposes (Bhattacharya and Sharma, 2007).

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<th>Rationale</th>
<th>Basis</th>
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<td>Social</td>
<td>Perceived role that technology now plays in society and the need for familiarizing students with technology.</td>
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<tr>
<td>Vocational</td>
<td>Preparing students for jobs that require skills in technology.</td>
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<tr>
<td>Catalytic</td>
<td>Utility of technology to improve performance and effectiveness in teaching, management and many other social activities.</td>
</tr>
<tr>
<td>Pedagogical</td>
<td>To utilize technology in enhancing learning, flexibility and efficiency in curriculum delivery.</td>
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Source: Cross and Adam (2007)
ICTs can be used in education in order to:
- facilitate the acquisition and absorption of knowledge;
- offer opportunities to developing countries to enhance educational systems;
- improve policy formulation and execution;
- widen the range of opportunities for business and for individuals.

Key advantages of ICTs used in education and e-learning include an improved open access to education, better integration for non-full-time students (particularly in continuing education, provision of tools to enable students to independently solve problems, acquisition of technological skills through practice with tools and computer, cost effectiveness and developing students self-discipline. Is, therefore, important for a higher education institution to have innovative ICT practices in key areas, such as: open and distance learning, blended learning, research, administration and management.

Table 2. Benefits of ICT in education to the main stakeholders

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<th>Stakeholder</th>
<th>Benefits</th>
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| Students    | ✓ Increased access,  
|             | ✓ Flexibility of content and delivery,  
|             | ✓ Combination of work and education,  
|             | ✓ Learner-centred approach,  
|             | ✓ Higher-quality of education and new-ways of interaction. |
| Employers   | ✓ High quality, cost effective professional development in the workplace,  
|             | ✓ Upgrading of employee skills, increased productivity,  
|             | ✓ Developing of a new learning culture,  
|             | ✓ Sharing of costs and of training time with the employees,  
|             | ✓ Increased portability of training. |
| Governments | ✓ Increase the capacity and cost effectiveness of education and training systems,  
|             | ✓ To reach target groups with limited access to conventional education and training,  
|             | ✓ To support and enhance the quality and relevance of existing educational structures,  
|             | ✓ To ensure the connection of educational institutions and curricula to the emerging networks and information resources,  
|             | ✓ To promote innovation and opportunities for lifelong learning. |


In a study regarding E-learning and ICT in European higher education there were identified, among advantages, some obstacles (EC, DG Education and Culture, 2004):
- Lack of knowledge in these areas and insufficient information;
- Resistance to change;
- Absence of a coherent and comprehensive management and quality management approaches;
- Lack of high-quality materials;
- The possibility of cheating;
- Difficulties in using the ICTs;
- Less communication and interaction between students and teacher.

The four most common mistakes in introducing ICTs into teaching are (UNESCO, 2009):
- a) installing learning technology without reviewing student needs and content availability;  
- b) imposing technological systems from the top down without involving faculty and students;
c) using inappropriate content from other regions of the world without customizing it appropriately;
d) producing low quality content that has poor instructional design and is not adapted to the technology in use

The EU’s programme for research and innovation, Horizon 2020, for 2014-2020 has a budget of €80 billion and is bringing together all funding currently provided through the Framework Programme for Research and Technological Development (FP), the Competitiveness and Innovation Framework Programme (CIP) and the European Institute of Innovation and Technology (EIT). According to the European Commission, EU will support the information and communication research and innovation that can best deliver new business breakthroughs, often on the basis of emerging technologies. In particular, ICT in Horizon 2020 will support the development of ICT in Science, ICT in industrial leadership and ICT in societal challenges.

Apart from enhancing student’s learning experience, role of ICTs in capacity building/training of educational personnel has very large potential. National level institutes can provide leadership role in enhancing technical and managerial manpower in different disciplines through ICT networks and collaborations. Technology facilitated learning would result in preparation of staff regarding innovative pedagogic methods, new ways of learning and interacting, easy sharing of new practices among teaching community and result in widening the opportunities for their participation. The capabilities of competent and trained teachers/academic experts can be made available to larger audiences/students through flexible and virtual settings (Modal and Mete, 2012).

All these advantages and disadvantages of using ICTs and e-learning in higher education are available also for Romania. The enhancement of digital skills represent a key factor nowadays for the development and innovation in Romanian education and higher education. The implications for the whole education process is to deal with key issues of access, equity, management, efficiency, pedagogy and quality. The demand for more ICT-skilled human resources is increasing and also the demand for quality and access in higher education institutions. In recent times, all the new technologies were included in higher education in order to develop, grow and innovate.

4. Conclusion

Information and communication technologies play a key role for the future development of higher education institutions and represent a catalyst for innovation, quality and excellence in this sector. At national level, the integration of ICT and E-learning for innovation and quality in higher education should become a key priority for all involved institutions. At the university level, there should be developed a holistic strategy focusing integrating ICT for e-learning.

Technological literacy is one of the required skills in the current knowledge-based society and ICT and e-learning have a great impact on the educational processes and systems, researches and learning initiatives, especially within higher education institutions.

ICT policies and investments are clearly beneficial to higher education institutions, even though ICTs have not replaced and will not replace classroom-based modes of learning or teaching. For successful and effective use of ICT in enhancing the quality of teaching and learning, policy makers need to be aware of how this evolving technologies can be of best value in their country's education system, and, in this regard, have to develop a supportive policy environment and framework at the national level for the integration of ICT into their education systems. ICTs can provide greater access for different target learners, and have become vehicles for enriched pedagogical experiences, particularly for distance educators and learners separated by time and space. Universities have to face the challenge of increasing access to higher education and improve the quality of higher education against the stark reality of decreasing resources.

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