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The Impact of Information Technologies on the Knowledge Society

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Abstract

The world is constantly changing and knowledge is the main force that drives those changes. Today, our society has achieved tremendous results in all fields of science, but of course, there is a lot more than can be achieved; nothing is absolute, nothing is fixed.
In trying to find ways to facilitate the road to success, mankind has developed a lot of methods and tools, which are also changing contantly. This is where IT technologies come in help.
Nowdays it's impossible to imagine our education system wihtout IT tools, be it in the form of a software or a hardware.

Introduction

Our society which we describe with the term 'Knowledge Society' is going through a lot of changes. This has a great impact on almost every field of human life, escpecially business and education. Technologies such as the Internet have significantly changed the way we learn and communicate. New methodologies are developed continously in order to make the best use of those new technologies so they can benefit our society in its way to a better tomorrow.
Ettore Bolisani in his 2008 book "Building the Knoledge society on the Internet" makes a great description when he writes: "Even in the scientific context, sometimes the words can become buzzwords, after they are used for sometime. This is the case of "Knowledge Society". An impressive number of studies in many disciplines deals with, mentions, or has

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something to do with this term (more than 17.000 documents that includethis keyword can be retrieved with a simple look-up in "Google Scholar"). Indeed, the knowledge is increasingly recognised as the pivotal element of our activity, our economy, and, thus, our society. Today, much of the work of scientists and practitioners, in several fields, is centred on how this "asset" can be produced, handled, exchanged, stored, and more generally used to generate value for individuals and organisations.

But what does "knowledge society" exactly mean..., Here, it is not a matter of definitions (which we will happily leave to philosophers and luminaries) but, rather, of more basic questions: what is exactly the difference between "knowledge society" and jusfsociety"? Does this mean that we witness some sort of change, the birth of something that did not exist before? Does it mean that only today we are aware that something (the "knowledge") can assume unprecedented forms, or is finding fresh ways to be processed, which justifies our new (or renewed) attention?

It would be easy to say that the key of this change has to be found in the impressive advancements of ICT and Internet technologies. Indeed, it appears even obvious to associate the development of the

knowledge society with the progress and widespread use of ICT applications. Unfortunately, this is not an answer but, rather, raises additional questions. The revolutionary potential of these technologies has been fully recognised only decades after their invention. Computers were invented about 70 years ago, an almost biblical time, considering the speed of our current lives. The Internet was ideated in the 1950s,and its technical feasibility was demonstrated a few years later."

Knowledge exchange

Exchanging knowledge is the most important step by which Knowledge Society develops. To make this step more grounded and beneficial, there must be some form of methodical and exchange standards and rules by which this process will flow. This is very important because knowledge exchange can be between people who work on a same organisation, it can happen between people of different enterprises; in other words it represent a complex process which must be controled by specific rules that will produce the nedded results.

Another very important issue is exchanging knowledge between humans and machines. Knowledge can be stored in a lot of devices such as computers, tablets and cellphones, which other humans can retrieve based on what they need in correlation with their businesses. This is an area where we must put a lot of effort considering the vast usage of the aformentioned devices.

Empowering motivation

Being motivated is an important driving force in everything we do. Developments in the Knowledge society also need to be motivated so there can be any sort of changes. "The motivation of exchanging knowledge with others, or in other terms, the value that the players ascribe to this activity, is another hot issue for KM, and a central theme of this paper as well. The currentpractice shows that KM initiatives that do not account for the motivations of participants in knowledge exchanges are likely to fail (Brydon & Vining,

2006). There is, thus, the need to explain the factors that can facilitate and hinder the personal participation in a process of knowledge exchange. Motivation can be seen from different viewpoints, and based on various conceptual references. It can be related to distinct but intertwined concepts, such as the personal utility (i.e., knowledge is exchanged to solve a problem or accomplish a task), the economic value (knowledge is exchanged as a sort of good), orthe social motivation (individuals exchange knowledge because they belong to a particular context).”(1) As we can see, people need to be motivated to exchange knowledge based on what their needs are; and IT technologies can be a valuable tool in facilitating this process. This is quite obvious in this era of cloud computing where platforms such as Microsoft Azure, Office 365, iCloud, etc., are providing tremedous help in knowledge exhange.

As we mentioned before, knowledge exchange is a complex phenomenon. It requires "exchange actors” (individuals, enterprises, devices), control, motivation, which all together represent a network of interoperability with a structure and nature that should be constantly analised to attain the stability needed for a healthy Knowledge Society.

Inside Knowledge society

"A Knowledge Society is developing in which Information and Communication Technology (ICT) is both a catalyst and a necessity. Knowledge is an invaluable asset in this ICT-integrated society where production, services, consumption and trade are rapidly changing. To keep up with developments (knowledge) workers need to adapt continuously and acquire newcompetences: working and learning melt together. At the work place new knowledge is created to keep up with developments: both tacit knowledge in the heads and hands of the workers and explicit knowledge (codified, operational knowledge). The concept of knowledge is changing from scientific, theoretical knowledge ('old knowledge') to more operational knowledge ('new knowledge'). Human capital is becoming more and more important and workers become more and more responsible for all dimensions of their work.”(2)

In other words, the market, competition and scientific landscapes are some of the main reasons why knowledge needs to be elastic and changeable. It is a must if we want to adapt to the constant evolution of our society. It must be analyzed and verified before exchange, because a lot of times it can be unforgiveable to make a step back, considering that the nature of Knowledge Society is to look ahead, to strive in finding new ways to make our lives better.

"The new professionals give meaning to their lives through their work. They continually engage in new challenges and learn on the job. They therefore need other skills than in the 'old fashioned' Tayloristic economy.

"Social-communicative and social- normative skills and competences (soft skills or people skills) are needed to be able to function adequately in teams and cooperate with colleagues: communication skills, empathy, team player skills. Self-direction and autonomy require initiative, pro-activity, flexibility and risk taking of professionals.” (WRR 2002; p. 148). Another of these new qualifications is the capability to deal with a professional environmentcharacterized by fast change. For the modern professional lifelong workingis

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identical with Lifelong Learning; the modern professional is a learningprofessional." (Weert 2004)." (2)

Knowledge Society and The Importance of Information
IT technologies have gone through huge changes in the last decades. It has had a lot of impact on the way we deal with information, knowledge and our way of life as a whole. The digitalization of information has transformed our ways of communication. This trend has changed the characteristics of what we perceive as information or knowledge. These are the main areas of change that are of crucial importance to be mentioned:

As can be seen, we are using two notions here, information and knowledge. This is something that we must be able to distinguish, because a lot of people thing that they are one and the same.

"It would be a mistake to confuse information with knowledge. Knowledge has to do with human beings and cannot be reduced to a set of "0's" and "l's", as information is. Knowledge has an "institutionalised" dimension: it is recognised as knowledge by a community of people and is related to a corpus of knowledge with its specific uses and applications. In the information society knowledge takes a central place. It has most of the characteristics of information in terms of processing and of transportation, but knowledge cannot simply be transmitted and taught as before as it has become an economic good. In this sense one can say that new "knowledge societies" have appeared. In a simple "information society" it would be easy to circulate and disseminate information, but it would be a society without any innovation. As education deals with the transmission of knowledge, not only of information, it has to be considered in knowledge societies." (2)

We understand that these two concepts are in a very tight relation, but still, they are not the same. Information is unusabel without knowledge, while knowledge cannot be attained without information.

The majority of IT technologies deal with the technical side of the issue, which is information, whereas knowledge requires a human touch, requires reasoning.

This doesn't mean that there are no developments to make the machines think. We are all familiar with Artifical Intelligence. It is an area that has developed quite a bit, although not on the levels seen on sci-fi movies.

Transformation is another concept that connects information and knowledge and develops them even further to more complex concepts.

"In knowledge societies not only traditional knowledge takes a new form, but knowledge is transformed. In each discipline main concepts and processes are changed. But in addition there are other kinds of knowledge, more complex, more transverse, which address the needs of society and of education of the future. We are forced to rethink what knowledge is. Access to knowledge is also profoundly changed. It is not only accessible in books and libraries, or in the teachers' head,

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but also accessible from a huge variety of sources, varying in certainty and accuracy, at any place at any time.(2)

Knowledge Society and New Technologies (Educatronics)

"The constant change and growth in information technologies make it almost impossibleto keep a continuous line of work to cover all technical aspects encompassing the New Communication and Information Technologies (NCITs). In the past, scientific studies in this area were exclusive to large research and businesses institutions that have a rich budget for the experiments, NCITs now have invaded most of the classrooms in public and private schools and are found in the academic grid title as:

- "Automation andControl",
- "Mechatronics",
- "Development of Artificial Intelligence", among others.(3)

These are some scientific fields that will probably become more advanced as humanity moves forward. But in order to educate new generations to be prepared with such endevours, there must be an educational programme, which will provide the needed preparations.

This where the technology of Educatronics comes to view.

"The term Educatronics was developed by Ruiz-Velasco, he presented a pedagogical perspective of robotics, which seeks to introduce a new technological and global culture. The result applies in the integration of different areas of knowledge, a structural enriched thinking, logical and formal. The Educatronics could be defined as an object of study, focusing on those areas in New Communication and Information Technologies, and these machines and devices that process information are characterized by their immateriality, interactivity, instantaneous, high image quality and sound, automation and networking."(3)
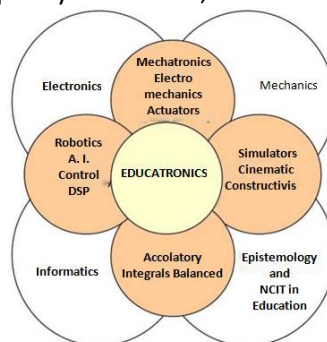

Fig. 1 Educatronics

Educatronic derives many of it concepts from other scientific disciplines, such as: Electronics, Mechanical, Computer Science and Epistemology.

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"The semantic roots of the Educatronics conceptual chain defined as follows: the study generates knowledge, application of the study generates more knowledge, and new knowledge focused on and   generates   levels   of   academic   education decreases the technology gap competitiveness."(3)

Knowledge Societies, Crisis and IT

Human societies have always faced natural disasters and wars. Having more knowledge about these phenomenons, provides us with better understandig of their causes and can possibly give us new ways to solve or even avoid them.

Internet, as in so many other contexts, is both a blessing and a curse in this regard. Its vast scope and immediacy make it very useful for providing

information over wide areas, sharing information, and presenting information in multiple languages and formats (video, images, and sound). At the same time, the Internet cannot necessarily be relied on in times of crisis, as it is dependent upon the persistence of other infrastructural technologies, it is not universally accessible or usable, and still presents challenges for the secure verification and validation of information.(l) The problem here lies in the fact that the information presented on the web can be propagandistic in nature, and it can make the factual situation look otherwise.

"Many recent technologies, such as blogs, wikis, and other social networking technologies, have first found widespread use in bringing people together for entertainment, networking, and sharing information in the context of play. A blog, short for Web log, uses widely available applications to provide individuals with the ability to create a chronologically organized commentary, with the ability to integrate text and other media, and receive feedback."(1) This technology has been widely used in recent conflicts around the world such as the war in Afghanistan, the Arab Spring, etc.

There is now debating that education is the core of society development. But it doesn't just fall from the sky. It needs quilified people that will pass what they have laerned to future generations, who in return will enrich those teachings with more knowledge. We don't call ourselves The Knowledge Society for nothing.

Here I will cite parts of a very nice article written by Alison Derbenwick Miller, posted on the website www.edutopia.org on August 22, 2014, which deals with this particular issue. She writes:

"From the cell phone alarm that wakes them to the tablets used to chat with friends and complete homework, today's students are surrounded by computer technology. It is ubiquitous, and critical to daily routines. Yet few understand how

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technology works, even as it becomes ever more intrinsic to how we solve business and community challenges...

According to the U.S. Bureau of Labor Statistics, by 2020 there will be 1.4 million new computer science jobs. However, between current professionals and university students, we will only have 400,000 computer scientists trained to fill those roles...”

Then she continues by providing five steps to face these challenges.

 1. Professional Development

Teachers can register for online or in- person teacher training courses to learn how to teach a computer science curriculum or integrate basic computer science principles into existing lesson plans.

2. Career Education

Parents, teachers, and schools can educate students about the career opportunities available to those who get computer science degrees. While it could mean working for technology giants like Apple and Oracle, students can also use computer science skills to advance healthcare research or help a non-profit build a case for government funding.

3. Student Incentives

Teachers can offer students extra credit for using free online learning tools to develop basic computer science skills and create a project

4. Mentor Programs

Industry and schools can formalize a mentorship program that will encourage and support students to learn more about computer science and develop their skills inside and outside the

classroom -- via after-school programs or co-taught lessons.

5. Coding for Kids

Parents can help kids develop confidence in their problem-solving abilities and explore computer science in action in their lives and communities with age-appropriate coding apps.”

Conclusion

IT technologies are changing in lightspeed; this impacts our way of living and the way we deal with information. In other words this is why we have become a Knowledge Society. Knowledge is all around us; not that it has been abscent in the past, in the contrary, everything we have achieved we owe to what others before us have done. What differentiates us from the past is the way we approach information and knowledge.

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Today we can safely say that not everything is science fiction anymore. The knowledge landscape has no limits, of course, but every new invention should make the world a better place; at least that's what we all want and need. IT is here to help this process.

There is no doubt that issues such as AI and robotics, have always tackled our morality, and in many cases rightfuly so. This is the single most important thing than we as humans must be clear about. Technology in our Knowledge Society should make living easier; it must help humankind in ways that weren't possible in the past; we must strive for the common good. We should

not use technology to find new ways to enslave people; to make them expendable. Nothing important that humankind has achieved has been without risk and nothing has been perfect; the same can be said for every computer software. But with the blending of the power of our imagination and the flexibilty of our technology, we can trace the path to success a lot easier.

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