Collective intelligence and capacity building

In a networked society

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Abstract: The Information Society has new and specific characteristics. Information is digitalised, and therefore interactive, processable, transportable, accessible in new ways. Information is changing more quickly than before, and we see new types of information appear. The Information Society is a networked society, a society where collective capabilities are more and more needed, in addition to individual ones. Capacity building in the Information Society is not just an extension of the usual capacity building. New competences, new capabilities are necessary. These are not only technological competences, but more profound competences linked with new concepts. Not only competences linked to new knowledge, but competences linked to new ways to access knowledge. In particular three aspects of capacity building in the Information Society will be analysed: Accessing and processing knowledge in a networked world; Collective intelligence and collective capacity, and New citizenship in the Information Society. New capabilities cannot be acquired through the old ways of education: capacity building needs new contents and methods.

Key words: capacity building, collective intelligence, competences, education, ethics, information society, knowledge, network

THE INFORMATION SOCIETY

The changes in information and communication technologies have been huge during the last two decades. It is not only a matter of technology, computers and computer science, but a profound change has taken place in society. Information is digitalized, in huge quantities of “0’s” and “1’s”. The processing and transportation of digitalized information involve similar processes and tools. This has led to a merging of information and communication technologies which we call “ICT”, Information and Communication Technologies. Digitalised information has many new characteristics: it is fast moving (and much less stable than it was before), it is interactive (one can act on it very easily, in a “to and fro” way, one can change information), it takes new forms, such as multimedia (combining different forms of media: texts, images, sounds, movies, etc.) and hypermedia (linking media through hyperlinks). These new characteristics have profound consequences:

- Information cannot simply be acquired, stored, passed on and taught as before. Digitalised information is now accessible in new ways, stored in new conditions and in very big quantities; distribution of information can be done in different ways and at very wide scales.
- Information has become an economic good, which has its own value, which can be produced, sold, bought and exchanged.

This is why one speaks of the “Information Society”: a society in which information is one of the major goods, a society that is widely based on information, a society in which economical power can be attained through information.

Changes have of course also affected education. Information is one of the major ingredients of education, but education cannot be satisfied with just information: education has mainly to deal with knowledge.

THE KNOWLEDGE SOCIETY

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 “1’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.

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; see for instance the “Seven complex lessons in education for the future” by Morin (2001). 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, but also accessible from a huge variety of sources, varying in certainty and accuracy, at any place at any time. In conclusion: knowledge societies create new knowledge and new ways of storing and accessing knowledge.

A NETWORKED SOCIETY

A major characteristic of “ICT societies” and knowledge societies is that these are networked. We were used to pyramidal or hierarchical structures in the way our systems are organised, in the way we access information in a book through the library directory or the table of contents, in the way we communicate with people. Information and communication technologies lead to networked structures, that for example in the Internet are particularly clear. A network is a set of nodes, linked by edges. Nodes can be of many types (often creating some confusion): information, knowledge, people, institution, etc. Edges link the nodes and can usually be followed by just a “click”. New links can appear continuously, enriching the network and making it more complex. It is typical for a network that there are many different ways to go from one node to another (while in a pyramidal structure, there may be only one way). If I am not satisfied by one way, I can choose another. Networks disturb hierarchies, particularly in schools and in education. In a network there may be sub-networks, introducing new kinds of hierarchies. Communication is not only “one to one” or “one to all”, it becomes “all to all”: a networked communication.

The networked structure of society affects all domains of social life, having positive and negative consequences. Economy is affected, social life, leisure and politics are affected. And education is affected. Educational systems in a networked society cannot stay as they were; they must take into account the new communication facilities, the networked structure, the new

ways of dealing with space and time. Teaching and learning in a networked society is different and uses new tools, new resources, new pedagogies. The teaching profession in a networked society has new dimensions and has to fulfil new expectations from society; a new kind of competence is needed.

COLLECTIVE INTELLIGENCE AND COLLABORATIVE WORK

Knowledge societies and networked societies need new and enhanced forms of intelligence, in particular collective intelligence. We are used to individual intelligence. Our educational systems are designed to develop individual intelligence and individual capabilities of each student. But development of communication and networks creates a need for collective intelligence. Just think of ants: as an individual an ant is a very simple animal, with almost no intelligence. But collectively ants can find the shortest way from one point to another, can carry heavy loads, can build bridges, can regulate the temperature in the ant-hill. This is not done in a hierarchical way, but through collective intelligence which uses indirect communication through the environment by the means of pheromones. The collective intelligence of ants is not the sum of their individual intelligences; it stems from their communication ability and their relationship to the environment.

Similarly information and communication technologies and networks allow human beings to develop collective intelligence that is much more than the sum of individual intelligence. Virtual communities are examples of such collective intelligence. The semantic web is a future means to express collective intelligence of humanity: networked humanity. Exchange and cooperation through networks and ICT contribute to the development of our collective intelligence, and therefore our capability for learning. Collective intelligence makes possible new actions, new developments, new competences.

However, collective intelligence is not something new. Mankind has been using collective intelligence for a long time (to build pyramids or cathedrals, to design systems, to discover nature and to develop science and technology, etc.). But because of ICTs and networks collective intelligence turns into a major dimension in knowledge societies. Collaborative work in knowledge societies is not just another tool, but is fundamentally linked to the networked society and to collective intelligence. Education has to take this into account: develop collective intelligence of students, in the classroom and in other kinds of communities, real or virtual; develop the

capacity for collaborative work, use collaborative work as a mean to develop collective intelligence.

CAPACITY BUILDING

Knowledge societies need new kinds of competences and reinforcement of some existing ones: competences for collaborating, for communicating, for being part of a virtual community, for being part of a group with collective intelligence. Education therefore is facing a new challenge. Education has to incorporate the collective dimension in learning and teaching, to practice collaborative work and to prepare students to collaborative work in a “collective intelligence” way, to develop communication skills.

Networks and the networked society need new competences for taking part in a network, working in a network, contributing to a network, communicating in a network, accessing information and knowledge in a network, collaborate with others in a network. Again, this is a challenge for education in knowledge societies. Networked environments should be introduced in the classroom, and the classroom should be incorporated in networks. Much more, the concept of a classroom or even a school will have to evolve, using the network and collective possibilities. There is no reason for the classroom to be at a single place where pupils are together with a teacher, all at the same time. Education will have to function in other kinds of spaces and times (physical and virtual spaces, synchronous and asynchronous times...). Functioning in new spaces and times is a major competence, for which we must prepare the students.

Accessing information and knowledge is also an essential competence: finding the way to such knowledge or information, sorting through huge quantities of information, evaluating the accuracy and the reliability of such information, storing, processing, sharing information and knowledge, using and applying information and knowledge, etc. It is essential that our educational systems takes such competences in account.

The famous “four pillars” of education: “learning to know, learning to do, learning to live together, learning to be”, take a new dimension in knowledge societies, in networked societies. They provide an agenda for capacity building in knowledge societies.

CITIZENSHIP IN KNOWLEDGE SOCIETIES

Education not only has the task to transfer knowledge and make it internalised by students, but also has to prepare students as future citizens, to transfer values of society and humanity. Citizenship addresses ethical issues that must be taken into account in education. But citizenship in knowledge societies includes new dimensions, mainly due to networks and communication and to the collective dimension.

Citizenship is a matter of rights and duties. In knowledge societies, networks raise new questions about rights and duties, since communication is easier, and since information is accessible in new forms and through new ways. The respect for each person's dignity, the respect for privacy and social equity take new forms in networked societies. This should be an important issue for education. Citizenship also includes the participation of citizens in the social life. Networks enhance the possibilities for such participation, and decision-makers should take this into account.

With respect to education, ethical questions are even more prominent in the networked society: how can knowledge societies attain the goals of "Education for all", in terms of access and quality? How can knowledge societies cope with the issue of knowledge and education as merchandise? Knowledge is a public good, education is a public service, and this implies that accurate policies are necessary for education. Does education prepare consumers or citizens? How can education cope with globalisation? How can education contribute to reduction of the digital divide, between countries, but also within each country and even within each school or classroom?

Such issues must be addressed by education. There is a need for new educational policies for knowledge societies, integrating new forms of knowledge, new forms of access to knowledge, integrating the networked form of society.

Knowledge societies are for human beings, not for technology. Humanism may improve and increase in knowledge societies, if we are able to use accurately all the new available technologies, tools and resources.

Equity is one of the major issues in knowledge societies. We must keep aiming at "knowledge societies for all". This is a goal for "education for all" in knowledge societies.

CONCLUSION

Computers and computer science have created information and communication technologies with as a result a society based on technology and information. But the human dimension forces us to aim at a knowledge society, not only an information society. Knowledge societies have new characteristics, and education in knowledge societies is more complex, but more and more essential. Knowledge societies reinforce the expectations towards education, and the need for education.

Education and capacity building in knowledge societies is not only a matter of content and curricula; it is mainly a matter of methods, it needs major changes in the way education is performed. Education must address new issues such as processing information, processing, acquiring and transmitting knowledge, being able to act in a networked society, developing collective intelligence and collaborative work, opening up to new spaces and times, building new kinds of capacities, preparing citizens of the knowledge society. Such goals need profound changes in the methods of education.

But of course, the purpose is not to change everything and reject what was done before. It is not a revolution, but rather an evolution that we need. Addressing fully the new possibilities, the new tools and resources of the knowledge societies, does not mean rejecting fundamental knowledge and the traditional basis of education. We have to find the right balance in the tension between tradition and modernity, so that the knowledge society is really a society of humanism, a society for all, a society in which the well being of persons, the fundamental values, and the fundamental rights and duties of human beings are kept central. The knowledge society is a human society, not a technological society.

BIOGRAPHY

Prof. Bernard Cornu is the director of La Villa Media (the European Residence for Educational Multimedia), Grenoble, France, and a professor at the IUFM of Grenoble, France (University Institute for Teacher Education). He is a professor (applied Mathematics) at IUFM (Institut Universitaire de Formation des Maîtres - University Institute for Teacher Education) of Grenoble, France of which he has been for ten years (1990-2000) the director. Until 1994, Bernard Cornu was the chairman of the 29 IUFMs in France. He was (2000-2002) advisor for Teacher Education at the French Ministry of Education.

Bernard Cornu is also a mathematician at Grenoble University. He studied the influence of computers and informatics on mathematics and its

teaching, and also worked in didactics of mathematics. He has been the director of the Institute of Research on Mathematics Teaching (IREM) of Grenoble, and then the head at the in-service teacher training office for the Academy of Grenoble. His scientific specialism now is the integration of Information and Communication Technologies into education, and its influence on the teaching profession and on educational policies.

As a member of IFIP (International Federation for Information Processing), he has been (1995-2000) the chairman of Working Group 3.1 ("Informatics Education at the Secondary Education Level"), and he is now the secretary of the IFIP TC3 (Technical Committee for Education).

Bernard Cornu is a member of the French National Commission for UNESCO, and the vice-chair of the Education Committee. He is also the vice-chair of the Governing Board of IITE, the UNESCO Institute for Information Technologies in education, located in Moscow. He has been (1998-2002) the President of the French Commission for Mathematics Education.

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