New Media and Open and Distance Learning: New Challenges for Education in a Knowledge Society

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Abstract. The "digital society" provides not only with new technology, but also with new concepts. Information plays a central role and becomes a valuable good, but knowledge cannot be reduced to information, and one aim for educators is to contribute in a "knowledge society", not only an "information society". A knowledge society is structured in networks, enriching the traditional hierarchies; a knowledge society promotes a kind of "collective intelligence". In such a society, open and distance learning has new dimensions and faces new challenges: collaboration and individualization, dealing with time and space, dealing with presence and distance, and contributing to lifelong learning. The Stellenbosch Declaration gives the main trends for ICT in education in a knowledge society, according to six major issues: digital solidarity, learners and lifelong learning, decision-making strategies, networking, research, teachers.

Key words: open learning, distance learning, knowledge society, ICT in education.

1. Motivation

New media, open and distance learning, and information and communication technologies are much more than techniques and tools. They include new ways for accessing knowledge, new ways for co-operating with others. In the context of a "knowledge society", a society in which knowledge has become a valuable good, necessary for human development, education is one of the most important investments for the future, and new media and open and distance learning raise new challenges for education.

Even if the computer is now one of the most familiar objects we have with us, the core concept of the "digital society" we live in is no longer only technology. The computer is a technical tool, which enables us to do a huge variety of different activities, but the main issues come from the development and merging of two domains: Information technology, which processes digitized information, and communication technology, which transports digitized information. Different kinds of information can be put in a digital form: text, images, pictures, movies, sound, voice, music ... And once it has been digitized, it can be transported and processed as a digitized object, i.e., as a sequence of "0" and "1". It makes technology evolve, and tools get closer and closer to each other: Computer, telephone, fax, camera, television, CD player or DVD player, PDA, MP3 player, etc., are different tools for processing digitized information, and they can be related to each other.

Two concepts are central: the merging of different information processing technologies, which leads to the concept of "multimedia", and the possibility of transporting information, which leads to the concept of communication technologies, and enables us to communicate and collaborate with others at a distance.

2. Information and Knowledge

In such a context, a fundamental element is "information". Digitized information can be stored, processed, transported, exchanged, bought, sold, etc. Therefore, it becomes a raw material, a good which has an economic value. We speak of the "information society": the society in which information becomes a valuable good. And then appear all the problems linked with information in society: how to deal with information, how to store it, how to make it accessible, how to improve equity in the access to "information for all". The "digital divide" is of course first a technological divide, increasing the gap between those who have modern technologies and those who don't have, but it is mainly an inequity in accessing information. When information and communication technology (ICT) develops so quickly, providing permanently new tools, new techniques, how can we ensure that it will be accessible and usable by everyone in the world? The increase of inequity in accessing information has economical consequences, and has become a major problem in the "information society". In Geneva (2003) and in Tunis (2005), the World Summit on the Information Society tried to address these questions. The creation of the "Digital Solidarity Fund" is an attempt to solve such a question.

But as educators, fully involved in the digital society, we must be aware that the fundamental element of education is not "information", but "knowledge". Knowledge and information must not be confused. Information is made of facts, comments, opinions, expressed through words, images, sounds, etc. It can be stored and circulated. Knowledge is the output of the reconstruction of information by a person, according to his/her history and context. Information can be transmitted, but knowledge must be acquired and constructed. Learning is the acquisition and construction of knowledge, and of course it needs processing information.

Because of the development of information and communication technologies, education must take its place in the information society. But because information and knowledge are not the same, education must take into consideration the concept of a "knowledge society". Knowledge is strongly influenced by the development of ICT. Knowledge plays a central role in the social and economical aspects of societies. Knowledge is improperly often considered as a good which could be sold, bought, exchanged, and more and more professions need an increased amount of knowledge. Knowledge is not only a set of data. It also has to do with competences, abilities, capacities. According to the report of the UNESCO international commission on education for the twenty-first century, acquiring knowledge means learning to know, learning to do, learning to live together with others, learning to be. Knowledge has to do with the relationship between persons. A "knowledge society" is a society in which knowledge plays a central role; it is

a human society, in which knowledge should contribute to bring development, solidarity, democracy, peace, a society in which knowledge could be a force for changing. Providing universal and equitable access to information and to knowledge is a major challenge in a knowledge society.

In a knowledge society, "new media" and "open and distance learning" provide new possibilities for accessing and sharing knowledge. New media include all the forms in which information can be found, processed and transported. It means of course the technological aspect (CD, DVD, USB key, online media, mobile media, etc.), but also the way it is organized (texts, images, sounds, hyperlinks, hypermedia, web pages, etc.). It is not only a way of storing and distributing knowledge; it has an influence on knowledge itself, it changes knowledge. Open and distance learning offers a possibility to get free from some constraints of time and space. It enables to be involved in learning activities at a distance, and to master differently the constraints of time: synchronous and asynchronous activities. But furthermore, open and distance learning gives the opportunity of new ways of collaborative work, of new ways of interactive learning activities.

3. A Networked Society for Collective Intelligence

A knowledge society has some characteristics that we must take into account. Two of them are of particular interest: A knowledge society is a networked society; a knowledge society needs and supports collective intelligence.

Traditionally, societies are organized in a hierarchical way, according to a pyramidal scheme. Most of our institutions, and particularly educational systems, are organized that way: accessing a person or accessing information (in a book for instance) is done through a hierarchical system (like a flow chart or a directory or the catalogue of a library). The Information Society, particularly with the development of the Internet, has brought a more complex organization, with "networks". In a network, nodes (objects, persons, information, web pages, etc.) are linked by edges (like for instance "one click"). A network is a very complex structure (cf. the "world wide web"). It is highly evolutive and interactive (one can permanently add or cancel links between nodes). In a network, there are several possible paths form one node to another, and if I am not satisfied with some way to access some person or information, I can use another path; this is not possible in a "hierarchical" organization. A network can include sub-networks. A networked structure brings changes in communication: we are moving from "one to one" communication and from "one to all" communication to "all to all" communication; we are moving from hierarchical communication to networked communication. A network is not without hierarchies: there may be new kinds of hierarchies in sub-networks. A major challenge is to be able to circulate in a network. Education has to take into account the networked form of accessing knowledge. In a networked society, there are new forms of knowledge and new ways for accessing knowledge. This changes teaching, learning, pedagogy, etc. It changes the space and the time for teaching and learning. Being a teacher in a networked society requires new competences: it is a major role for the teacher to help pupils circulate in

the knowledge networks, to find appropriate paths in complex networks, to validate the knowledge found, to find appropriate knowledge. Therefore, teacher education must take into account the networked characteristics of the knowledge society.

A traditional and essential role for education and schools is to develop pupils' individual intelligence and capacities. But the knowledge society needs and reinforces the development of a kind of "collective intelligence". Collective intelligence is not the addition of individual intelligences. It is a form of intelligence which develops inside a group, in a collective way, through communication between each member of the group and the "environment". Collective intelligence does not function in a hierarchical way, nor as a simple "sharing" of tasks. It is essentially the intelligence of a group, for collective competences and capacities, for collective learning, for collaboration, for collective memory. Collaborative work is a form of activity in the context of a collective intelligence. New resources such as "wikipedia" can be considered as first attempts of developing a collective intelligence. Education has to develop not only the individual intelligence and capacities of pupils, but also the collective intelligence and capacities; this is a new task for teachers, which requires new competences, and which must be taken into account in teacher education. The classroom is the first place where collective intelligence can be built and used. Teachers must work in the context of a collective intelligence and competence: they have to develop collective intelligence of pupils, to develop the capacity for collaborative work, to use collaborative work.

New media and Open and Distance Learning are strongly linked with networks and with collective intelligence. This is why they lead to new challenges for a knowledge society. A knowledge society permanently evolves, and we have to build the knowledge society we want; this is a major task and challenge for education, for all educators.

4. Distance Education

Distance education has a long history. For a long time, distance education institutions offer courses through postal mail, for pupils and students who cannot attend a school. But ICT suddenly increases the possibilities, resources and tools for distance education.

In a knowledge society, distance education is no longer only a replacement for those who cannot attend school, because they are ill, or far away. It has become a core component of education. A knowledge society needs competences linked to distance education, such as being able to learn at a distance, to learn through distant resources, to learn through digitized systems, to learn through collaborative distant tools such as learning environments and learning platforms. More and more, presential education also offers distance activities as a complement to presential courses.

Distance education is not only technology. Designing a distance course needs a specific pedagogical approach. It is not just transferring traditional courses to CDs or web pages. It needs to reconsider the pedagogy, the relationship between the student and the knowledge, the interaction between the student and the teacher, and the collaboration between students. It needs to reconsider the content of the course, and to organize it in a specific scenario.

Distance education is not only courses available on digital supports or on the web, it also includes services. It may be access to diverse resources, it may be evaluation, but it is mainly tutoring. The development of distance education and e-Learning has involved a huge development of tutoring, under diverse forms: e-mail, chat, etc. More interesting is not the technical aspect, but the changes it brings in the relationship between the student and the teacher.

Distance education has also enhanced collaborative work among students. It may be organized and structured. But it may also be more informal. Many distance education institutions offer their students a kind of "blog", where they can discuss freely, and the development of such relationships between students is interesting.

Distance education has a tradition of considering students as lonely individuals. But more and more collective activities are offered, on learning environments or learning platforms. The concept of a "virtual classroom" shows how new developments can be made in distance education. In a virtual classroom, students and a teacher work together, at a given time. They connect to a specific environment from their computer, and they can see each other, talk and share common resources. A session has a fixed beginning and a fixed end. Each student can be at his/her home or in any place, but they must respect certain social rules during the lesson, such as being on time and not doing anything else during the lesson. As it would happen in a traditional classroom, the teacher can give a course, demonstrate, explain. The students follow the course on their computer. A virtual blackboard is shared by the whole group: everyone can write on it, comment what others write or draw. Students can also communicate between them, in a hidden or visible way; on the opposite of what happens in a normal classroom, chatting with others does not disturb the whole class! The virtual classroom allows the teacher and the students to perform collaborative work to an extent which is not easily reachable in a normal classroom.

Distance education can also be a tool for educational systems for improving equity among pupils, making them able to access high quality courses in any subject, independently of their local conditions. More and more, distance education is used by schools for specific subjects which are not necessarily available in a presential way, or for complementing their regular programme and for supporting pupils having specific difficulties. At the world level, distance education can bring some help for making learning accessible for every child, but this needs strong policies at different levels.

5. Four Challenges

In the context of a knowledge society, new media and open and distance learning provide new concepts, new tools and new resources. This enriches education in all its dimensions, and leads to new challenges: dealing with individualization and collaboration, dealing with time in education, dealing with presence and distance, and preparing lifelong learning:

Dealing with the interaction of *individualization and collaboration*: Most educators say that ICT and distance education help for a better individualization of teaching and

learning. The individual needs of the learner can be met better; appropriate activities and appropriate pace can be offered to the learner. Evaluation is developing fast in the context of e-learning. This is not in contradiction with the increase of a more collective learning and teaching. Actually, the traditional classroom is quite individual: except in certain circumstances, pupils are not allowed to communicate, they listen "alone" to the teacher, they do some exercises alone, and the teacher deals with the class as a set of individuals. ICT makes possible a more collective way of teaching and learning, through collective activities, through co-operation, through projects which must be carried on by the pupils as a group. Adjusting the relevant balance between individualization and collective learning is a new challenge for education and for teachers.

Dealing with the complementarity of *synchronous and asynchronous learning activities*: In the traditional situation, class activities are synchronous, and homework is "asynchronous"! ICT enables the teacher to organize a more refined set of activities of the two types: synchronous when the teacher and the pupils have to work together at the same time; asynchronous when the pupils (and the teacher as well!) can -and have better- work at different times. This enriches the teaching and the learning; but it also gives the pupils the competence for working both in synchronous and asynchronous conditions.

Dealing with the complementarity of *distance and presence activities*: Teaching is made of a wide range of different pedagogical activities. Pure presential teaching mixes lessons, lecturing, exercising, project work, evaluation, etc. Pure distance teaching offers different kinds of activities: listening to a lecture, exercising, carrying on a project, accessing resources in different forms, co-operating with others, etc. Presence and distance teaching should be combined, so that each of them enriches and supports the other. This is a new pedagogical task for teachers: organizing the complementarity of presence and distance in their teaching.

Dealing with the complementarity of *initial education and lifelong learning*: mixing presence and distance education is a good approach for preparing pupils for lifelong learning. Lifelong learning is now a core component of a knowledge society, and pupils must acquire the necessary competences for lifelong learning: be prepared to be a lifelong learner, which means not only acquiring new knowledge, but also acquiring new competences.

6. ICT in Education: "Make it Work"

In July 2005, the participants of the IFIP 8th WCCE (World Conference on Computers in Education), held in Stellenbosch, South Africa, designed the "Stellenbosch Declaration": "ICT in Education: Make it work". The declaration was written for all stakeholders in ICT in Education (teachers, practitioners, researchers, academics, managers, decision-makers and policy-makers), in order to improve the integration of ICT in Education as a resource for better teaching and learning and as a preparation of citizens for a knowledge society. This Declaration has been produced from the ideas provided by speakers and participants in the WCCE 2005. We can say that it represents the state of the art, in 2005, of the

main trends, concerns, domains of interest, challenges, of the educational community. The declaration has been widely disseminated all around the World. It can be found at: `www.ifip.or.at/home/TheStellenboschDeclaration.pdf`.

The declaration addresses the challenges of a knowledge society. As educators, the contributors want not only an information society, but a knowledge society, enabling all children and all people to access and acquire knowledge and to benefit from being educated. Education is a key issue in the knowledge society, and educators have a major mission. Particularly, it is the responsibility of all educators and decision-makers around the world to help developing countries take part in the developments of ICT in Education. According to the declaration, six major areas will shape a beneficial use of ICT in Education:

6.1. *Digital Solidarity*

In the field of education, ICT should help develop "Digital Solidarity". This requires strong and joint actions of all stakeholders to guarantee the right of participation in the digital society for all students in the world. The declaration recommends a "Digital Solidarity Action" that will define as the most important aim for the next five years, that every child in the world has access to a digital information and communication infrastructure. The creation of the Digital Solidarity Fund gives a good opportunity for enhancing digital solidarity actions, in the field of education, but it needs an involvement of educators, so that solidarity actions can be efficient and relevant. Digital solidarity is not only a technical issue, and it is not only the development of infrastructure and equipment. It also includes pedagogical issues, and the solidarity must also be a "pedagogical solidarity", in which all teachers and educators are invited to take part.

6.2. *Learners and Lifelong Learning*

Of course, the learner is central in education, as the main "end-user", and ICT, new media, open and distance education must be based on a "learner" approach. But in a knowledge society, every learner is a lifelong learner, and we cannot separate totally initial education and lifelong learning. The content and the methods of initial education must take into account preparation for lifelong learning. ICT is a key tool for developing lifelong learning, since lifelong learning will use all the possibilities of distance education. The development of lifelong learning needs an integration of education into the real world - ICT should be used for this purpose. Lifelong learning must be encouraged in all countries, as a tool for reducing the digital divide. The knowledge society is a lifelong learning society in which knowledge and competences evolve permanently. The pupil of today will have to learn all his/her life long, in all aspects of learning: Learning to know, learning to do, learning to live with others, learning to be. The teacher has to act in the context of lifelong learning, for preparing his/her pupils to a lifelong learning attitude and process, and for permanently developing his/her own knowledge and competences. The principle of lifelong learning for teachers does not reduce to lifelong in-service training. It incorporates and articulates pre-service and in-service training into a "continuum". Lifelong

learning includes many forms and activities; it means acquiring new forms of learning, participating in collaborative learning, being part in the "collective intelligence", being part of the "networked" society. Each dimension of the teaching profession is concerned by lifelong learning. All life long, the teaching profession is an intellectual profession, a profession of intellectual freedom, a profession of "lifelong intellectual activity".

6.3. *Decision-Making Strategies*

The way decisions are taken in the field of education, the way educational policies are designed, is sometimes surprising. Educational researchers and practitioners often complain that decisions are made without a sufficient awareness of the educational reality and of the results of educational research. In a knowledge society, the way educational policies are designed and decisions are taken is essential. In order to help decision-makers and to make decisions meet the real needs, bridging research, practice, experimentation, innovation with decision-making is essential. Educators must actively take part in the process, making their findings and their experiences available, more visible and usable for decision-makers. Decision-makers should make better use of the experience of practitioners and the findings of researchers. Designing a policy needs having a vision of education and its developments. Educators must take part in the construction of such a vision, and they must contribute to make it explicit.

6.4. *Networking*

As we have seen, a knowledge society is networked, and education must take into account the networked structure of the society and of access to knowledge. Networks in education offer many ways to access knowledge, offer many possibilities for networking people and developing collaborative work and enhancing the "collective intelligence". But this means that networks must be made accessible for every pupil and student, and that they must learn how to deal with networks, how to behave in a networked world. There is a need to develop networks and to involve all countries, particularly developing countries, in the education networks. The frontiers of digital networks are not the same as the usual geographical, cultural, social frontiers. It opens a wide field for taking benefit of the network structure, at all levels: in the classroom, locally, in a country, but also in other types of communities, and at the international and worldwide level. An African pupil said, in Stellenbosch: *"I am a child of Africa and a citizen of the world"*.

6.5. *Research*

More and more, the development and improvement of education needs high quality research. The development of ICT-based education and training processes is a growing reality. There is therefore a need to continue research work on the development of these technologies and their applications. A certain realignment of research priorities is necessary: Bridging the gap between technology and pedagogy; developing solid theoretical frameworks; developing an understanding of the use and the effects of ICT in education.

In the field of education, there may be different kinds of research, from fundamental and theoretical research to applied research and to innovation and action-research. Finding an appropriate balance between fundamental, applied, and development research as well as between public research and research made by the private sector, is a priority in a knowledge society. The output of research should be made widely available, as open source, for improving practice, decision-making, and resources development.

6.6. *Teachers*

Finally, the role of the teacher is central. ICT does not reduce the role of the teacher. It increases the range of tasks for a teacher, it increases the set of competences a teacher must have, it makes the human interaction more central and visible in education. In a knowledge society, the teaching profession should be a high-status profession. Technology makes the teacher focus on his/her core pedagogical mission. Being a teacher in the knowledge society requires new specific competencies: a teacher has to deal with new knowledge, new ways for accessing knowledge; with a networked world and with new types of co-operation and collaboration; with a society in which knowledge plays a crucial role; with lifelong learning. Teachers are the key agents in the education system. It is our common responsibility to help all countries to train and recruit teachers, and to involve all teachers in international networks. ICT changes teaching and learning, but technology is not the main issue. "Technology matters, but good teachers and good teaching, matter more".

7. Conclusion

We are at the very beginning of the changes in education. Technology will change again and again, resources and tools will improve constantly. The aim of education is not to be permanently technologically up-to-date, but to meet the needs of the learners in a changing society. The more technology improves, the more it is clear that central issues are human: the learner, individually and collectively, the teacher and the human relationship between the teacher and the learner. The new challenges mainly deal with society: how to make the information society be a knowledge society, how to give access to knowledge to everyone, how to develop a worldwide digital solidarity in order to reduce the "knowledge divide".

References

The Stellenbosch Declaration. www.ifip.or.at/home/TheStellenboschDeclaration.pdf

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Naujosios technologijos ir atvirasis bei nuotolinis mokymasis: nauji švietimo iššūkiai žinių visuomenėje

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Skaitmeninėje visuomenėje prieinamos ne tik naujosios technologijos, bet ir naujos koncepcijos. Informacija yra svarbiausias veiksnys ir tampa vertinga gėrybe, bet žinios negali būti sutapatinamos su informacija. Vienas svarbiausių tikslų pedagogams – prisidėti kuriant ne tik informacijos, bet ir žinių visuomenę. Žinių visuomenės struktūra pagrįsta tinklais, tokiu būdu ji praturtina tradicinę hierarchiją; žinių visuomenė skatina "kolektyvinį intelektą". Tokioje visuomenėje atvirasis ir nuotolinis mokymasis įgauna naujas dimensijas ir iškelia naujus iššūkius: bendradarbiavimas ir individualizavimas, nepriklausant nuo vietos ir laiko, nepriklausant nuo buvimo mokymo vietoje ir atstumo, sudarant sąlygas mokymuisi visą gyvenimą. Stelenbošo deklaracija pateikia pagrindines IKT švietime tendencijas žinių visuomenėje, atsižvelgiama į šešis didžiausius iššūkius: skaitmeninę lygybę, besimokančiuosius ir mokymasis visą gyvenimą, sprendimais pagrįstas strategijas, naudojimasis tinklais, mokslinius tyrimus, mokytojų ugdymą.