Digital Natives in a Knowledge Society: New Challenges for Education and for Teachers

Bernard Cornu
CNED, France
IFIP TC3 Chairman
UNESCO IITE Governing Board Chairman
bernard.cornu@cned.fr

Knowledge, education and learning are strongly linked with society and its evolution. One cannot teach or learn nowadays the same way as a century ago. More particularly, the quick and deep changes brought by ICT (Information and Communication Technologies) have a strong influence on knowledge, teaching, learning. But pupils themselves are changing and evolving decade after decade. And education must permanently adapt to the new generations of pupils. In terms of information, communication, computers, and technology, youngsters have new abilities, new approaches, new concepts. Certainly education has to take this into account, particularly at a time when pupils seem to be more competent than teachers in technological abilities! But the new generation of today and tomorrow cannot be described only through technology. We have to take into account other parameters.

Let us remember that there were many evolutions in the past generations. Just after the World Wars, the 'baby-boom' generation was the generation of fun, consumption, and social achievement, in the context of reconstruction and economical development. Everyone was intended to find a place in society. Of course, all expectations and hopes were not met! Then came what some people call the 'generation X' (1960–1989), which lived between the decline of the colonial Empires and the Fall of the Berlin Wall. This generation was confronted to the economical crisis and the increase in unemployment. Deep moral transformations occurred. It is also a generation for which individualism was developing. The balance between professional life and private life became more and more important. And of course it was the generation of the technological revolution (the 'TV generation').

The generation of today is often called the 'generation Y'. It is the generation of digital natives. Digital activity is like a mother tongue for them. We

consider it mostly as the generation of the technological acceleration, of the Internet and its networks. But we must have in mind that this generation has many other features, which are important. It is the generation of massive unemployment, the generation marked by globalization. The moral transformations of the sixties are now accepted and integrated by the majority. The 'generation Y' did not know the World without AIDS. The issues of ecological awareness, of the future of the planet are among strong concerns for them. It is also the generation of growing independence and a certain future insecurity. And the ephemeral has become the major concept. The 'generation Y' has now reached the adult age, and they start being employed. This brings huge changes in companies: a new relationship to hierarchy, to time constraints, to processes, to control; a new vision of task sharing; distance working; multitasking, etc. And this generation has a strong need to give a meaning to what they do.

In terms of technology, the 'generation Y' has a lot of new and impressive competences. Plenty of them have a kind of intuitive mastery of informatics and computers, of electronic devices, of mobile equipment. They don't need to read the user manual, and they don't ask for lessons how to use a computer (only teachers ask for such courses!). The way they play videogames and electronic games from their early childhood, the way they write 'sms' involve specific abilities. This generation is the generation of 'Web 2.0': interactivity, community, communication, collaboration. This gives them a new vision of time and space: I can communicate with any person, at any time, in any place, I can access lots of information. Permanent accessibility to people is now considered as normal. Immediacy and mobility are two keywords of this generation. They are used to a multiplicity of communication modes, they are permanently connected, even over-connected, in a kind of digital hyperactivity. Multitasking makes it difficult for them to concentrate on one activity for a long time.

Digital natives are facing three major challenges: new knowledge, networks, collective intelligence.

New knowledge

No longer traditional and well-established knowledge is enough to understand the world and to address the major problems of our societies. Basic knowledge of the 'generation Y' cannot be reduced to 'read, write, count', knowledge cannot be reduced to the addition of traditional school subjects. There is a tremendous accumulation of knowledge, and knowledge is getting more complex. For instance, a French philosopher, Edgar Morin, in his book *Seven Complex Lessons in Education for the Future* proposed seven new forms of knowledge to be taught in order to meet the needs of our century:

1. Detecting error and illusion: teach the weaknesses of knowledge – what is human knowledge?

2. The principles of pertinent knowledge: consider the objects of knowledge in their context, in their complexity, in their whole.
3. Teaching the human condition: the unity and the complexity of human nature.
4. Earth identity: teach the history of the planetary era, teach the solidarity between all parts of the world.
5. Confronting uncertainties: teach the uncertainties in physics, biology, history, etc.
6. Understanding each other: teach mutual understanding between human beings; and teach what misunderstanding is.
7. Ethics for the human genre: teach the ethics of humanity preparing citizens of the world.

In addition to this more transverse and complex approach of knowledge, the new generation has to face the fact that school knowledge is no longer the only one, that school is not the only place to access knowledge. Social knowledge as informal knowledge is more and more important. And knowledge is linked with competences. Jacques Delors in his *Learning: the Treasure Within* proposed four 'pillars' for education:

- Learning to know
- Learning to do
- Learning to live together
- Learning to be

One often speaks about the 'Information society' or the 'digital society'. Actually, UNESCO proposes to speak about 'knowledge societies', in order to take into account the human dimension of the new trends and context. And in a knowledge society, knowledge has become an economical good that one can buy, sell, store, exchange, etc. For digital natives, knowledge is not exactly what it was for the previous generations!

Networks

We were traditionally used to hierarchical and pyramidal structures in our organizations and in our way of behaving. Societies, companies, and institutions have hierarchical organizational charts; information can be traditionally found through catalogues, directories, tables of content, alphabetical lists, etc. In such organizations, there is usually only one way to access a person or to access information. But ICT, and particularly the Internet, bring a totally different organization, which leads to new ways of processing and thinking. Networks are everywhere! A network can be defined as a set of points (pieces of information, persons, web pages, etc.) linked by edges or

segments (direct access, 'click' of the mouse, connection, etc.). In a network, we find totally different hierarchies. One can access a point through different ways, one can access directly people one could access before only according to the traditional hierarchy; one can permanently enrich the network by new points and new connections. 'Network thinking' is now common, and this is a new challenge for digital natives. Networks are constantly enriching (for instance, moving from the 'Web 1.0' to the 'Web 2.0', and so on). Thinking in terms of networks changes profoundly the vision of the world, the vision of human relationships. Almost everyone is now a member of many networks. 'Cloud computing', one of the recent developments in informatics, has clearly been made possible by networks.

Collective intelligence

We were mainly thinking in terms of individual competences, individual intelligence, individual memory, individual achievement, etc. Networking and collaboration by the means of ICT now make new ways of co-operating possible and develop new concepts at a collective level. Collective intelligence is the major one. Collective intelligence is not only gathering of individual intelligences in a group. It involves a kind of 'added value', a form of intelligence which cannot be reached at the individual level. Just as a simple example, think of what ants can do. Individually, they seem to be very limited animals. But collectively, they become able to achieve very complex and difficult tasks, such as regulating the temperature of their anthill, finding the shortest way from one point to a distant one, carrying heavy loads, etc. And they don't do it according to a hierarchical organization. Each of them, through pheromone exchanges with the environment, enters a kind of communication which makes such complex activities possible. One can imagine that networking may enable human beings to such collective abilities, going much further than the traditional task sharing. The networked society needs and reinforces the collective intelligence. The 'generation Y', the digital natives, are invited to take part in this collective intelligence. ICT make it possible to move towards a global network of collective intelligence. This is a great challenge!

Under such challenges, learning in the digital society takes new forms and opens new ways. Learning in the global network of collective intelligence is not learning traditional knowledge by the means of traditional pedagogy. Since knowledge is not any longer only in schools, in textbooks, in the teacher's hands, digital natives – the 'generation Y' – will have to acquire both academic and social knowledge, and to be able to manage the complementarity of such knowledge. They will have to acquire not only knowledge, but also skills, abilities, competences, mixing the acquisition of formal and non-formal skills. They will have to learn all their life long, since knowledge is evolving so rapidly that no one can acquire for the rest of his/her life all necessary knowledge and competences. Lifelong

learning requires a basic competence: to be able to learn! One of the main challenges at school is to learn how to learn. Learning occurs not only in schools, sitting in a classroom with a teacher. Many new forms of learning are now offered: distance learning, e-Learning, blended learning, etc. Being able to learn at a distance, being able to learn through e-Learning is not so obvious, even if one can think that digital natives will be more ready for such learning. It is also a task for schools to prepare pupils for e-Learning. Some years ago, distance education was mainly intended for those who cannot attend a school for different reasons. But now, distance learning is necessary for all. Everyone has to be able to work at a distance, to learn at a distance.

Technology is now available for new forms of learning. But a huge effort must be made concerning pedagogy. The gap between technology and pedagogy is increasing. The tendency of school systems is just to add new technologies to traditional pedagogy, to adapt traditional courses to some new technological tools, avoiding renewal of the pedagogy, avoiding integration of ICT into education (Interactive electronic blackboards – or whiteboards – are an interesting example: they put new technologies in the classroom without disturbing the traditional pedagogy, the traditional relationship between the teacher and the pupils). Research and innovation must address and ask pedagogy: how can ICT help enriching pedagogy, changing pedagogy; how can pedagogy really take all the benefits from new technologies.

Learning in a digital society brings new challenges to schools, and since pupils will now be digital natives, schools must address these challenges. But schools are not really prepared, not really ready for digital education! Generally speaking, schools are not connected to networks. The Internet is mostly out of schools, not inside! Nowadays, digital natives use computers, ICT, the Internet mostly out of school. Moreover, there is no evidence that one learns better through ICT. Of course, we all know lots of excellent examples of successes in teaching with computers, with ICT, we all know successful experiments. We know that innovative situations, innovative resources, and innovative tools give good results and develop the pupils' motivation. But fundamentally, can we prove that pupils are studying better, that ICT are really improving learning? The 'pedagogical model' of schools does not fit with ICT: the traditional school pedagogy is mainly based on transmissive learning, on non-constructivist methods, on individual learning, individual intelligence. In opposite, ICT offer the opportunity of constructivist approaches, collaborative work, collective intelligence, and collective achievement. Schools neglect the real practices of digital youngsters. Do we know exactly what they are doing, sometimes several hours per day, with their computers? Which competences, which abilities are they practicing? Which knowledge and which competences do they access daily through their computers? How schools can take this into

account? How can schools integrate the actual practice and new competences of digital natives? This is one more challenge for schools in the digital age!

Schools must adapt pedagogy to the new pupils and to the new digital tools and resources, new knowledge, new context of networks and of collective intelligence. Schools have to transform their pedagogy, to enrich pedagogy according to the new knowledge, to the networked society, to the collaborative and collective needs of pupils. New technologies are not only to be integrated in the school: they give the opportunity for a real enrichment of pedagogy. Schools have to admit and acknowledge that they are not the only learning place. They have to integrate the new forms of knowledge, the complexity of knowledge, and the new forms of competences. They have to integrate the collective dimension. They have to integrate the world of networks. For instance, when we see how quickly and widely social networks (Facebook, Twitter, etc.) are developing, we must seriously ask the question whether schools should take this into account, integrate such social networks, experiment how one can learn through social networks. And schools have to mix presence and distance, to manage time and space for learning, to prepare pupils for lifelong e-Learning.

Schools can no longer be simply the place where learned and skillful teachers deliver their knowledge to pupils. Schools have to refocus on their fundamental missions and core values: school is the main operator of the public service of education, and therefore has to carry on and put in action the values of a public service. The school is the place for equity in access to knowledge, the place for access to knowledge for all, the place for equal chances for all pupils. Even if the school is no longer the main place for knowledge acquisition, the school is the place for the mediatization of knowledge. And knowledge acquired by different means needs to be stabilized, made coherent with a wider set of knowledge, needs to be institutionalized; this is the role of schools. The school is also the place for the socialization of children, the place to prepare the integration of each pupil in society, the place to develop citizenship. In a networked society, the school should be the central place for networking. This implies that schools themselves are networked and participate in the global networks. The school should become more collective: developing collective behavior, collective abilities, collective work, and collective intelligence. The school can be the place for the construction of a collective intelligence, in which each pupil is involved. And the school is the main entry point to lifelong learning: it has to prepare pupils for learning all their life long, to be able to learn.

Teachers are main actors of schools. They are not only knowledge transmitters, but also actors of changes in schools. Teachers have new roles, teaching is becoming a new profession! Digital native pupils will change schools!

Digital natives bring new challenges for teachers. Let us quote eight of those new challenges for teachers:

1. Teachers have to take into account the digital native generation. They have to understand the new characteristics of the 'generation Y', to be aware of their new abilities, and to respect their new relationship to knowledge.

2. Teachers have to take into account the new forms of knowledge and competences, and the missions of schools. They must be aware that knowledge is not only a list of items in a curriculum: it has complex and transverse components. They must have the knowledge to address the main questions of the next century. They must be aware of the core missions of schools in the society and of the values school has to transmit.

3. Teachers must work in networks, take part in networks, consider that their role is to develop human networks for learning. Being part of a network, being able to behave in a network, to take benefit from networking demand teachers themselves experience such networked activities.

4. Teachers must work in the framework of collective intelligence and prepare pupils for collective intelligence. This means that teachers themselves must act collectively, take part in collective missions, experience collective learning, collective intelligence, develop collaborative activities. Schools now need 'collectively intelligent teachers'.

5. Teachers have to be 'e-teachers'. This means not only to be able to use digital technologies, tools and resources, but also to change the pedagogy, to integrate ICT as technologies and, more important, as tools for pedagogical enrichment.

6. Teachers have to be 'blended teachers', mixing digital activities and non-digital ones, mixing presence and distance, dealing with time and space and all the possibilities offered by ICT in the management of time and space (distance and presence, synchronic and non-synchronic).

7. Teachers have to be 'LLL-teachers'. This means that they have to prepare their pupils for lifelong learning, mainly by making them learning how to learn, making them able to learn all their life long. This implies that teachers themselves are involved in lifelong learning. Teachers have to be lifelong learners.

8. Teachers have to be actors of the changing school in a learning society. They cannot just wait for the reforms elaborated by policy makers! They must contribute to decision making, they must be aware of their political role in the educational policy.

ICT in education are not only new tools bringing evolution and changes. They raise new fundamental paradigms, new fundamental concepts, which

change profoundly our societies, which change knowledge and access to knowledge. The digital natives will bring this new context, whatever the schools do or not. This is a new challenge for schools and for teachers. Digital natives are not only new pupils, a kind of new step in the humankind, they are the main actors of the new digital society, the new citizens of the knowledge society.

UNESCO Teacher Development Policies and Programmes Including ICT

Alexander Khoroshilov
UNESCO IITE
a.khoroshilov@unesco.org

Nowadays the mankind is living in the conditions of transition to the Knowledge Society in which namely the knowledge will play the crucial role as a main resource of sustainable development. So, most of the current economic and social forces of the human society are mobilized around knowledge intensive fields, including education in which, despite the ubiquitous ICT intrusion, the human factor priority becomes the main feature, as only a human being is the principal carrier, generator and user of knowledge.

The dynamics of the Knowledge Society development depends on many factors, but one of the critical ones is the level of teachers competencies and their professionalism, because Teacher (to a very wide extent) is the main provider of general literacy and culture, as well as of knowledge and skills related to the key competencies of the Knowledge Society. So, one of the UNESCO major goals is to provide the global leadership on teachers, their status, professional training, management and administration and key policy issues. UNESCO teacher development policies and programmes including ICT applications are implemented in the framework of UNESCO global leadership on teachers through the initiatives on the following issues:

- Training and Management;
- Policies and Quality Assurance;
- Status and Working Conditions;
- Gender;
- HIV and AIDS;
- Advocacy;
- ICT.