

New technologies require education to renew itself

Novas tecnologias exigem a renovação da educação

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Abstract: The growing importance of information and knowledge in the business world means that computer-based electronic spaces will become the central space of the global accumulation of capital and dealings with that capital. These electronic spaces are also spaces where knowledge can be created and stored collectively and whose resources are freely accessible. They generate a new context of experience and provide us with new schemata in which we perceive the world and ourselves. These possibilities change the conditions for the constitution of subjectivity and the forming of socialness. The interlinking of technical and social developments affects the basic relationship between the subject and the world. And that is where education has a responsibility to become involved. What types of subject does education have to deal with nowadays and what task does it face in relation to this subject? To find answers to these questions, we need to take a look at what it means to grow up and live in a digital world, to use new technologies, to influence them and be influenced by them.

Key words: new technologies, learning spaces, Education.

Resumo: A crescente importância da informação e do conhecimento no mundo dos negócios significa que espaços eletrônicos baseados em computador tornar-se-ão espaços centrais na acumulação global de capital e no manejo deste capital. Esses espaços eletrônicos também são espaços onde o conhecimento pode ser criado e acumulado coletivamente, estando os recursos gratuitamente acessíveis. Eles geram um novo contexto de experiência e proveem novos esquemas para perceber o mundo e a nós mesmos. Essas possibilidades mudam as condições para a constituição da subjetividade e para a formação do nosso ser social. A interconexão do desenvolvimento técnico e social afeta a relação básica entre o sujeito e o mundo. E aqui a educação tem a responsabilidade de envolver-se. Com que tipos de sujeitos a educação precisa lidar hoje e que tarefas ela precisa enfrentar com relação a este sujeito? Para encontrar respostas a essas perguntas é preciso olhar para o que significa crescer e viver num mundo digital, usar novas tecnologias, influenciar as mesmas e ser influenciado por elas.

Palavras-chave: novas tecnologias, espaços de aprendizagem, Educação.

When we talk about being under a lot of pressure, we talk about ourselves as though we were a power station or a bridge whose capacity and maximum load have been exceeded (cf. Freyer, 1996, p. 237). When we say that we have stored something in the wrong place/way, we are behaving as though we had computer files in our heads. The terminology of technology is encroaching on non-technical reality to an ever greater extent. Sociologist Hans Freyer talks about the “increasing dominance of technical categories in the everyday life of industrial society” (Freyer, 1970, p. 156), a process that has snowballed in much the same way as technological development. Nowadays we are no longer confronted with individual machines but with a technical complex. The machine as a single technical artefact has been superseded by networked technical systems which form “the material [and immaterial, added by the author] basis of our lives – or more exactly the social plasma of which we are a part” (Snow, *in* Freyer, 1970, 153). The computer as a net medium has opened up completely new opportunities for the spreading of technical structures which impact on every aspect of our everyday lives. Computer technology has created a kind of universal technology which no longer only provides specific patterns for predefined purposes but which also stands for a concentrated technical force which can be employed for many purposes (cf. Freyer, 1996, p. 247). Computer technology can be used for word processing, communication and searching for information as well as for games or for controlling production and organisation processes. The new machine is one with very many faces, a technical instrument with many uses which has also created a major new space where activities of all types take place at a micro and macro level.

The growing importance of information and knowledge in the business world means that computer-based electronic spaces will become the central space of the global accumulation of capital and dealings with that capital (Sassen, 1997, p. 231). Informational business (Castells, 2001, p. 107) is organized along the information and communication highways. Computer-based spaces are characterized by power, concentration and competition but simultaneously by openness and decentralization. They do not only offer space to business interests but are also used by groups of civil society. They are places where knowledge can be created and stored collectively and whose resources are freely accessible. Just think of Wikipedia, a collectively produced encyclopaedia which is continuously growing and at last count had 23.7 million articles (Wikipedia, n.d.[a]) in 285 languages (Wikipedia, n.d.[b]).

No technology is extrinsic to social and cultural life for the simple reason that every type of technology is the product of a specific culture and, as such, has an effect on cultural developments. This is particularly true for the new forms of information and communication technology which can be used to handle mental processes and are thus capable of touching almost every aspect of our lives (Schachtner, 2005a, p. 54). They generate a new context of experience and provide us with new schemata in which we perceive the world and ourselves. They create new possibilities for communicating, acting, networking and learning, which is why ICTs are also called new media. These possibilities change the conditions for the constitution of subjectivity and the forming of socialness. The interlinking of technical and social developments affects the basic relationship between the subject and the world.

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What types of subject does education have to deal with nowadays and what tasks does it face in relation to this subject? To find answers to these questions, we need to take a look at what it means to grow up and live in a digital world, to use new technologies, to influence them and be influenced by them. I will attempt to provide some of these answers.

Information and communication technologies as learning spaces, instances of socialization and “interaction partners”

ICTs are becoming instrumental to human development in the form of learning spaces, instances of socialization and new interaction partners. They create new life-worlds in the form of virtual spaces and, as material technical artefacts, a new “you” (second person singular).

Virtual space as a life-world

When I call virtual spaces new life-worlds, I am falling back on Schütz and Luckmann, who define “life-world” as an immaterial world of values and norms which is created intersubjectively (Schütz and Luckmann, 1975, p. 23). Our life-world creates the framework in which we orientate our thoughts and behaviour. The new electronic spaces demand new values. In virtual game worlds and learning worlds, the subjects are often confronted with a range of rules and guidelines; in contrast, network actors are just as frequently required to actually create their own life-world online. Both existing values and norms as well as the task of creating a common basis for new values and norms are necessary for

subjectivity to unfold. I would like to explain and illustrate this theory with the help of virtual learning worlds, game worlds, communication worlds and social worlds.

Knowledge and learning worlds

The “virtual classroom” and “virtual university” are new words which refer to the constitution of virtual space as knowledge and learning worlds. Increasingly, new technologies are being used to create additional educational spaces or to replace existing offline ones. Justifications given for this include the fact that knowledge rapidly goes out of date nowadays and that the online medium is more suited to including new knowledge than a printed textbook is, that learning online can be adapted to the individual rhythm of the student (as things can be learnt at any time) or that there are not enough rooms offline with the increasing number of students.

As far back as 1998, I was introduced to a learning project in a school in Porto Alegre, Brazil, which is still very relevant to us today; on the one hand because it was based on educational principles (which is certainly not self-evident for all types of computer-aided learning) and on the other hand because it provided for a mixture of online and offline learning, something which is promoted as blended learning today. The project was called “Amora Piaget” and was based on the assumption formulated by Jean Piaget that children develop as active and curious human beings by encountering and structuring the world and, in doing so, they change the world and themselves (Piaget, 1983, p. 19). In the project, this encounter began with the eleven-year-old pupils formulating research questions like “Why is it daytime here when it’s nighttime in

Tokyo?” or “How come people don’t fall off the earth?”. The children got together in small research teams and looked for answers in all the sources available to them: libraries, television, internet. They presented the results in a computer file that was sent to Argentinian children who had also worked on mini research projects. The children from Brazil and Argentina commented on and discussed each other’s research results. There were many learning effects in this project: the children learnt to deal with a new form of cultural technology, they were in charge of their own learning processes and practised working in teams as well as building up intercultural communication. A visible sign of intercultural communication was their joint logo showing a computer mouse with the

flags of Brazil and Argentina on its back (Figure 1).

Alongside explicit learning projects like the one just mentioned, the entire internet is naturally accessible as an enormous knowledge and learning space with its databases, newsletters, search engines and discussion forums. Learners have countless possibilities to create a hypertext combining many different nuggets of knowledge on a topic which interests them. Hypertexts are individually created texts which can be changed at any point and which are geared to the individual needs of the learning subject. Knowledge in virtual space cannot be described as a static pyramid; rather it takes on the form of a dynamic network. It develops into a reading-writing continuum in which the roles of the

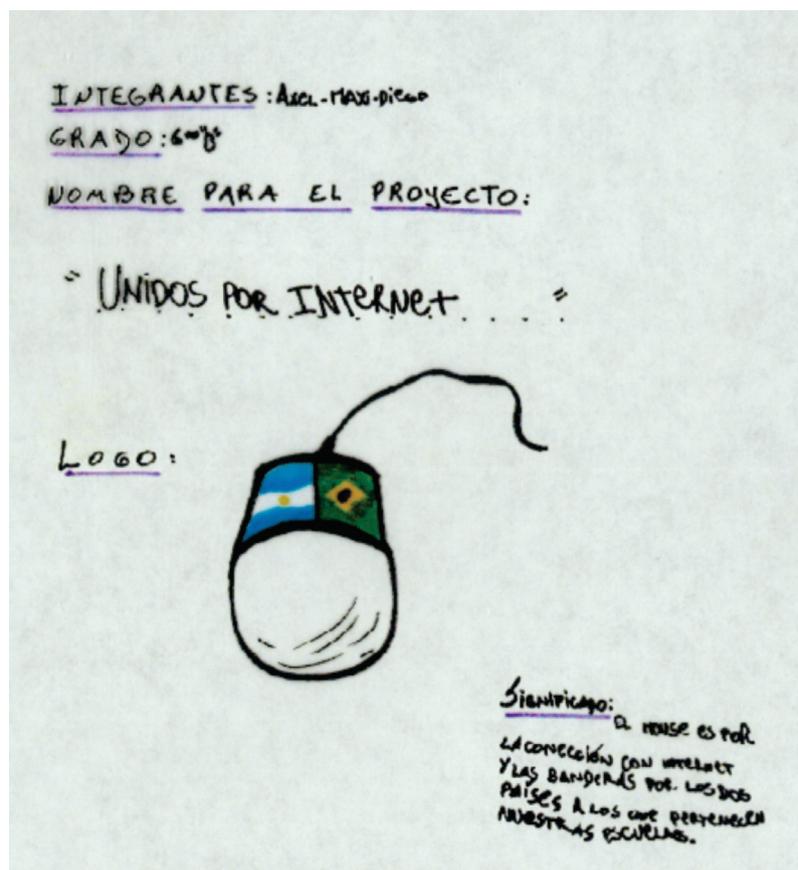


Figure 1. The joint logo as a sign of intercultural communication.

authors and readers, or producers and recipients, are blurred.

According to Pierre Lévy, the internet as a knowledge space has created a new phenomenon, namely collective intelligence. It is the product of a thinking network community but it is no longer a case of divided knowledge as it is impossible to concentrate this knowledge in one person (Lévy, 1997, p. 215). The individual users of the network are not upholders but members of the collective intelligence, which does not stop learning and inventing new things.

In virtual learning and knowledge worlds, subjects are in demand as actors and constructors who organize their own learning, cultivate their own individual strategies for researching knowledge, and who compare, discover, combine and interpret, thereby creating their own knowledge horizons with which they participate in the collective intelligence. These subjects are, however, in danger of getting lost in the complexity of this knowledge space as there are only a few instruments which help them find their way around the vast flow of information.

Communication worlds

Virtual communication worlds are another form of the newly created online life-worlds which are turning into conditions for the development of subjectivity. I would now like to give an example from my own investigation of virtual girls' and women's networks: in March/April 2003, shortly before the war in Iraq started, an intensive discussion about the war started up in several of the networks we were studying. In one of the discussions, the so-called "axis of evil" dominated the debate. What is evil? What are the origins of evil? Can a person be evil or just a specific action? were just some of the questions asked. In

a girls' network, the terms of war and peace were discussed; members asked who should be allowed to decide on war and peace and whether anybody actually has the right to make such decisions. Comments were made on an event on the stage of world politics in their endeavour to characterize, classify and evaluate it (Schachtner, 2005b, p. 175). Comments accompanying international politics are quite frequent in the internet. Beyond physical places of communication like cafés, squares, youth clubs, churches and shops, cyberspace is turning out to be a new meeting place. Political and social topics are dealt with, just like private problems. Even children develop their own discourses in specific networks for children. After the last papal elections, I came across an intensive discussion in a German-language children's network about the function of the pope in general and the choice that had been made in particular. Children talk about personal questions, needs and worries just as intensively in the net. In another German-language network for children set up for them to write about their worries, I found entries in June/July 2005 which were about experiences of abuse, illness and fear of death. The internet provides many different ways of communicating, either in real time as in chats or delayed like in news forums and mailing lists. A new and very popular form of virtual communication is blogs; they include entries which often refer to current affairs, which is why they are also called internet diaries. Access to weblogs is free, everybody can take part in the writing by commenting on other people's entries or formulating their own ideas.

Communication has a central role to play in the development of identity. The communication world of the internet provides many dif-

ferent stages on which to present one's identity, something which is particularly important in view of the erosion of structures creating identity in people's lives outside the net. These stages include presenting oneself on one's own homepage, creating a character in a virtual fantasy game, and also introducing oneself in a discussion forum. The necessity to present oneself verbally is so important not least thanks to the impossibility of being physically present in virtual space. This gives people the opportunity to experiment with identities which they can "try on", like different costumes, in order to find out what effect these identities have and how they feel in this role or that and how other people react to the "design".

Identities are formed in a specific way under the influence of virtual space. As an open space which knows no geographical frontiers, this space is filled with a wide variety of positions, opinions, life models and behaviour strategies. Network actors are required to accept differences, to develop empathy and tolerance and to learn how to assert themselves while searching for common ground. Above all, they have to learn how to do without their bodies, which play a very important role in real life by commenting on the spoken word, by emphasizing or toning down individual words. The fact that they have to do without their physical presence can help actors to improve their skills of differentiated and precise communication; but it also involves the risk that they do not get enough practice at using their bodies as a medium of non-verbal communication.

Social worlds

When people meet each other time and again in the net, they develop relationships with each other.

A sixteen-year-old girl who regularly uses a German-language girls' network was asked what she gets out of the network. The answer was a heart with the inscription "a large family". As the girl explained, the heart stood for the love and friendship which she found in the network. She did not have the feeling of discussing things with strangers but with people to whom she felt close, like in a family (Figure 2).

The new social forms developing in computer-aided networks are called virtual communities. Creating a community requires network actors to develop a joint context ("Sinnzusammenhang" in German) consisting of specified topics, questions, forms of communication and rules, in other words, to create a life-world ("Lebenswelt"). Both the

establishment of a life-world and the effects of life-world structures in the net create subjectivity. Let me illustrate that by mentioning a central element of online life-worlds: the rule of "giving and taking". Whoever wants to be part of a virtual community must learn how to pass on knowledge, information and experience comprehensibly to others and to receive it in return. This requires a willingness to approach others, to understand, support, advise and also to accept them. Just how giving and taking can actually work in the net is described by one network actor as follows: "A community like ours is a bit like a family; there are newbies and there are experts, there are whiz kids and old hands, and structures where older ones help younger ones" (Schachtner and Welger, 2005,

p. 148). Virtual communities can offer a kind of home when they turn into places where reliable relationships and trust can exist. But in virtual space it is not home in the usual sense of the word, which we generally associate with settledness. Home in virtual space is a mobile concept and it is actually more accurate to talk of homes as there are various communities offering a home within a network; moreover, network actors tend to belong to and move between several networks. According to Bernhard Waldenfels, home is not only the place where you take up residence but also the place(s) in which you move (Waldenfels, 1985, p. 195). And that gives more weight to the concept of home in a network. It is not so much a question of "where from", as in traditional interpretations of home, but "where to". It does not emphasize arriving so much as setting off. People who are looking for a home in the net develop orientations which are more strongly directed to the future than the past. Of course, now is not the moment to conceal that this aspect has its own dangers. It works in favour of network users who want to be free to come and go as they please. Sudden departures are technically no problem at all in virtual spaces; a click and you're gone. Those left behind can develop a sense of "affective surplus" (Dreitzel, 1995, p. 502) which can be transferred as disappointments to new relationships and put a burden on them or even prevent them from arising.

Game worlds

Some of the most fascinating life-worlds online for children and adolescents are electronic game worlds. Starting in the 1990s, computer games have established themselves as very popular leisure-

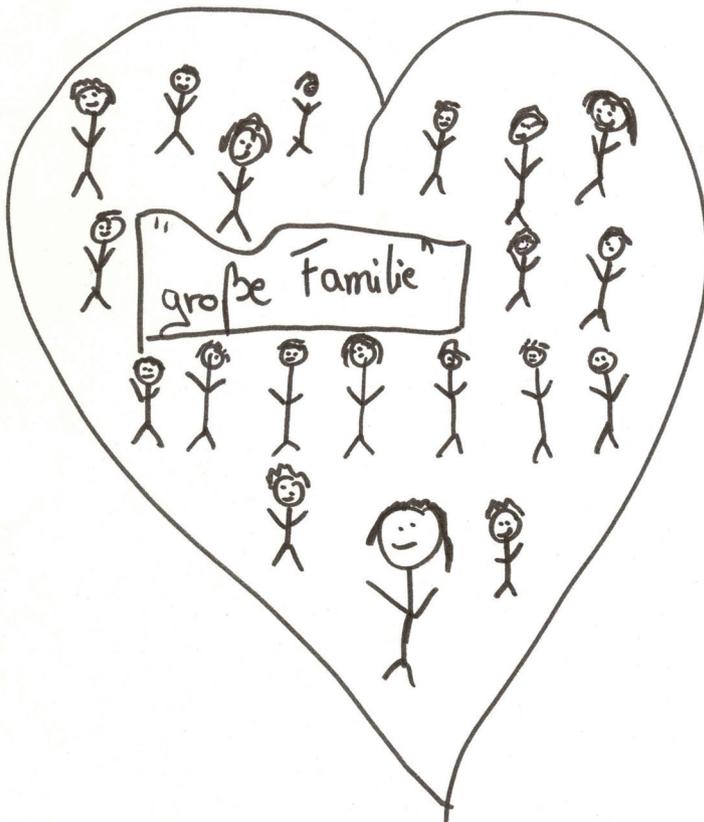


Figure 2. The digital network as a large family (14-year-old female online actor).

time activities (Fritz, 1995, p. 12). There are two types of game: brain games and action games. Brain games, like strategy games, require well-planned, well thought-through behaviour, rapid decisions and comprehension of complex game situations, while action games, like fighting games, require high levels of concentration, rapid reactions, a good sense of spatial orientation and resistance to stress (Fritz, 1995, p. 21ff.). The episodes in the games represent a life-world with specific values, models of behaviour and suggested identities. Time and again, fears are expressed that computer games encourage a propensity to aggression and violence as violence and aggression are central elements in these games. These fears are based on the assumption that scenes from the games are imitated outside the game world, starting out from a deterministic relationship between the game and the player. This assumption contrasts with an interactive approach according to which children and adolescents are only stimulated by those elements of a game which suit them, depending on their own questions, issues and problems.

Friedrich Schiller (1905), a German poet, once said: “[...] humans only play when in the full meaning of the word they are human and they are only completely human when they play”. Like hardly any other activity, playing allows people to act out the whole potential of skills that they possess. Play is a voluntary activity, it is free, is in fact freedom (Huizinga, 1938, p. 12) and that is why it encourages creativity to such a great extent. That does not, of course, rule out the possibility that destructive potential can also be developed while playing, particularly

when children and adolescents live in unsatisfactory social conditions and the violent solutions offered to them in computer games appear to be the only way out.

Robots and intelligent objects: Machines as interaction partners

The new life-worlds on the computer screen in the form of learning, communication, social and game worlds are reflected to a growing extent in technical artefacts which are available as new interaction partners (Schachtner, 2003, p. 165ff.).

Have you ever heard of Kismet? Kismet has a voice and facial expressions and can move its head and eyes. Kismet is the first expressive robot, a product developed by the Media Lab at MIT (Massachusetts Institute of Technology). When you smile at it, it smiles back; when you look disappointed, it looks disappointed too. That is what it has learnt to do. Cynthia Breazeal, its creator, developed it for the purpose of social interaction with humans. With the help of a human caretaker, the robot is learning to express feelings. Very similar to Kismet, “My Real Baby” is an intelligent doll which is already available on the market. The baby doll giggles when she is tickled and cries when she is hungry. She learns how to behave in communication with her human partner. The director of the interactive games research group at MIT, where the baby doll was developed, believes that this product is an educational opportunity for children to rehearse social skills (*Süddeutsche Zeitung*, 10/10/2000).

Since 2012, the shoe company, Nike, has been selling trainers which

have a built-in computer. You can use such shoes to send your children a message while they are out playing (cf. Pentland, 1999, p. 154). Or when you go into a clothes shop wearing these shoes and the sales assistant is wearing the same type of trainers, the two pairs of shoes communicate to tell the sales assistant that you want to buy a jacket in a particular style, size and colour.

We are coming into ever closer contact with machines as they become objects of our everyday lives (Schachtner, 2000, p. 44). They are turning into our interaction partners and are starting to “talk” to each other about us. They are beginning to have human features. Cyborgs are human-machine hybrids (Haraway, 1995, p. 33) which are a provocation for our human self-image. An ethical and scientific debate is going on about whether the border between man and machine is becoming fluid and how that is to be evaluated. In contrast, hardly any discussions or research has taken place on how contact with human-like machines affects personality development¹. Only in Sherry Turkle’s work (1998) are there indications as to what children think of these creatures of the digital world and how they integrate them in their everyday lives. Children think a lot about the peculiarities of intelligent robots. They describe them as machines which want to tell us something, they think that they are a bit alive or as alive as the puppet Pinocchio is, but not the same as real lads, in other words, something in between. Children may be very interested in comprehending the peculiarities of these “beings” but they do not consider it important to assign them unambiguously to a particular category. More impor-

¹ As part of the research project “Subject constructions and digital culture” (2009-2013), the universities of Klagenfurt, Hamburg-Harburg, Bremen and Muenster are investigating the extent to which the use of digital networks from a very early age influences the development of personality; research team: Christina Schachtner, Nicole Duller, Elisabeth Augustin, Birgit Writze.

tantly, their ambiguous status appears to encourage children to enjoy experimenting with and speculating about intelligent robots. “There’s no harm in playing with them when they’re half this and half that”, said one child in Turkle’s study (Turkle, 1998, p. 275).

An intermediate summary

I started off by asking “What types of subject does education have to deal with nowadays?”. I have attempted to develop an answer by discussing the conditions for the constitution of subjectivity under the influence of new technologies and in relation to the stimulation of certain dimensions of subjectivity. At this point I would like to reiterate the challenges and stimulations arising when using and dealing with new technologies for:

- technically competent subjects who use new media technology as a matter of course and who are able to integrate it in their everyday lives;
- subjects who are eager to learn and who want to understand, influence and shape the world;
- creative subjects who try out new patterns of communication and experiment with their own identity and new forms of relationships;
- mobile subjects who move about flexibly in the life-world of the internet and self-confidently saunter between virtual and real life.

All of these opportunities also conceal real dangers. The mobility and flexibility encouraged in virtual space could turn into the worship of Mammon at greater and greater speeds to the detriment of slowness and patience. The rapid alternation of online contexts could lead to a fragmentation of identity when

subjects no longer manage to hold all their sub-identities together. And finally, the new technologies which open up all opportunities could stir up the illusion of feasibility which cuts out those things which spoil this dream: the vulnerability of people, illness and death.

While dealing with new technologies the subject is given a great many new chances, but these chances also include some barbed hooks. It is in this contradictoriness that the provocation of new technologies is to be found. And where does education stand on that?

What about education?

Under the influence of new technologies, the fundamental relationship between the subject and the world has changed, but education is hardly interested in that at all. I must admit that this comment was made in relation to education in the German-speaking world and I will leave it up to you to decide to what extent my criticisms apply to education in your own country. Media education may be a subdiscipline of educational studies but it is having a hard time within the discipline. Two approaches dominate the educational discourse on new technologies, both of which obstruct the view of technology and the media: normative pedagogy and critical pedagogy (Baacke, 1997, p. 47ff.). Not least because of the manipulative use of films by the Nazi regime, so-called protective pedagogy developed after the Second World War in Germany where childhood was seen as a protected space into which nothing bad was allowed to intrude, including technology and media, due to those historical experiences. In the 1960s, in the wake of the Frankfurt School, an ideological critical perspective developed according to which the entire fabric of society is reflected in the media and

media products (Baacke, 1997, p. 48), as a result of which the media and media products serve the interests of capital and not of the subject. Both approaches include important arguments; the distanced relationship of education to the new media which arose out of these approaches is, however, fatal. The consequences of this distance are that:

- subjects are abandoned to their own experiences with the media and are given no support in their reflection on these experiences;
- subjects are not sufficiently encouraged by education to deal with new technologies in a creative manner;
- education has neglected to become creatively involved in the development of new technologies and has left it up to technicians and computer experts;
- and thus education is losing contact with its target group, namely school children.

The limits of education have not been constructed by the new technologies: it is education itself that has set these frontiers, which do not only keep technology at arm’s length but also its own subjects. To put it quite radically: education is counting on subjects that no longer exist for they have long since integrated these new technologies into their lives.

New technologies require education to renew itself

How could education overcome these frontiers? I suggest returning to Paulo Freire, for whom borderline situations and overcoming these limit situations were important educational topics. Freire was interested in the frontiers which prevent people from leading better lives and he ascribed education a supportive role in overcoming them. Now it is education

itself which has got caught up on its own self-imposed frontiers. Taking my cue from Freire, three steps are necessary for education to overcome its limits (Freire, 1973, p. 82ff.).

(i) Education would have to identify its attitude towards new technologies as being limited and dysfunctional.

(ii) It would have to recognize this frontier not as being a division between “being” and “not-being” but as a frontier between “being” and “being-more”. In this case, “being-more” would mean fulfilling its educational task to support people in today’s technology and information society, to use the technical potential for its development and to learn how to minimize the risks which arise from this technology.

(iii) It would have to grasp the interplay between technical and social developments as an epoch-defining topic or, in other words, to recognize technical structures as formative and as structures which can be influenced.

A style of education is required which, in the sense of Paulo Freire, returns to the idea of linking action and reflection together in the way it sees itself, which, in other words, reflects on the situation in which education’s clientele find themselves in, and gets actively involved in it. Consequently, education should comply with the following demands and:

(i) analyse the socializing conditions of technical and media experiences;

(ii) formulate educational principles and models relating to the shaping of virtual spaces and technical instruments;

(iii) hone professional educational methods which guarantee the subjects’ participation in technical developments;

(iv) teach media competence, which includes:

technical competence; *political competence*, e.g. knowledge of the influence of new information and communication technologies on the potential development of countries and regions;

creative competence, e.g. skills to use ICTs creatively as a source of knowledge and as a resource for personality development with the aim of ensuring participation in society; *reflective-critical competence*, e.g. knowledge of the risks involved when using ICTs;

ethical competence, e.g. being able to apply ethical criteria to evaluate technical applications and developments in the media;

contrastive competence, e.g. the ability to integrate the use of ICTs so well in everyday life that other experience worlds, such as the natural and social environment, are not excluded.

And finally education should develop educational strategies to avoid inequalities in access to ICTs. Although ICTs are expanding worldwide at tremendous speeds, there are still regions and social settings which do not have an equal share in this development. The chances of access to the new ICTs are fewer for those regions of the world and for groups within those regions which are already socially and economically disadvantaged. In a society in which the new ICTs are turning into the central axes for the activities of global business and in which worldwide social and cultural developments draw inspiration from the flow of digital images, texts and communication, access to these technologies will become a mechanism for becoming a full member of society. Those without access will be pushed onto the sidelines. It is the responsibility of economic and

educational policies to counteract the sharp increase in social inequality, but education can also make its own contribution, both theoretically and practically.

In order to avoid or reduce social inequality, I believe that it is necessary to equip schools in poorer regions with new ICTs (witness MITs initiative of one computer for 100 US Dollars), to guarantee free access to ICTs for everybody, along the lines of the anti-hunger campaign (a pro-future campaign) and to draw up ICT projects specially for children and adolescents from poor families. I would like to see education (Schachtner, 2002, p. 111ff.) breaking with its distanced relationship with new technologies, and instead taking up the challenge which is being thrown at it by these technologies. Being reactive alone, however, is not enough: education should also set future-oriented impulses in the field of new technologies: educational, cultural, political, constructive and critical impulses.

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