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***Nota al grupo:** trato aquí una especial dimensión del cambio educativo que tienen que ver con las adaptaciones y reacciones que suscita en los centros la introducción de las nuevas tecnologías. Me he dado cuenta de que quizá sea una de las situaciones que más pone a prueba las inercias o potencialidades de las diferentes culturas profesionales de los docentes, y, sin embargo, no lo hemos comentado nunca. Seguramente por ello, el material relevante examinado en las entrevistas hasta ahora es escaso a este respecto. Espero que, si lo aquí dicho tiene realmente importancia, podáis estar al loro en el marcaje o realización de ulteriores entrevistas.*

GROWING UP DIGITAL... TEACHERS, TOO?

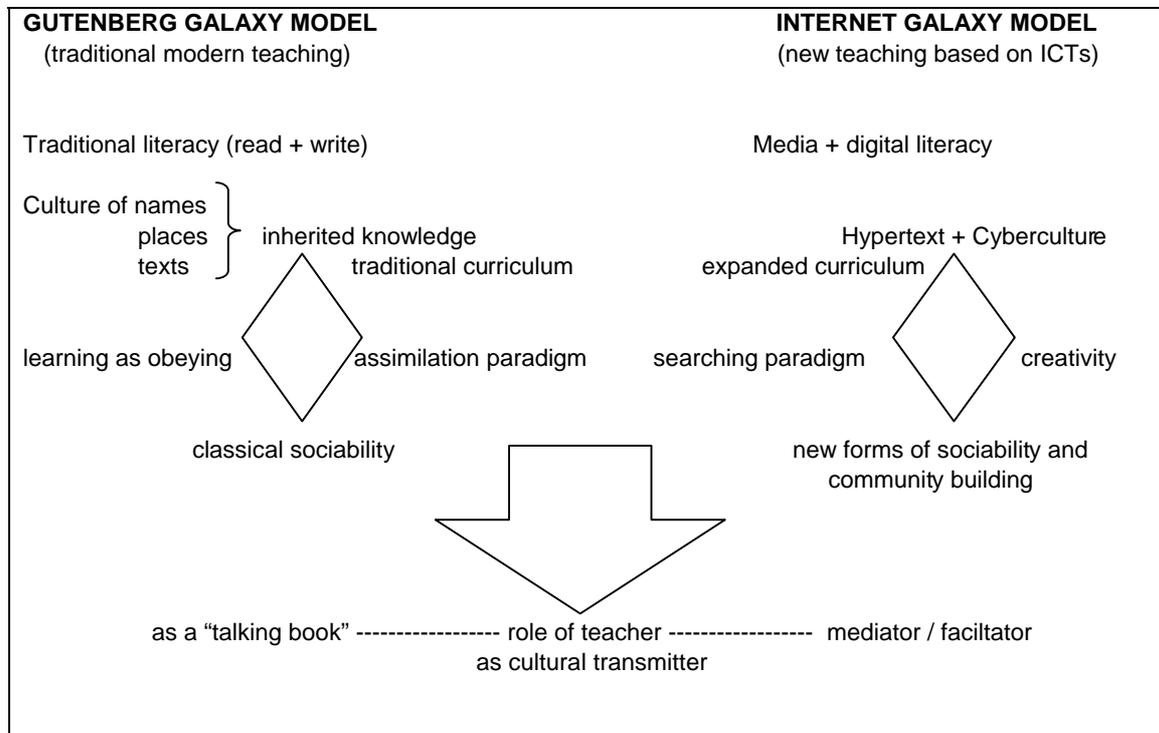
Today's youth are the first generation to grow up surrounded by digital media. Their exposure to digital technology in many facets of their day-to-day existence is having a profound impact on their personalities, including their attitudes and approach to learning. How are teachers reacting to this change? This paper attempts to explore the relationship between technological and educational change focusing on the role of teachers' attitudes towards ICTs. The main idea underlying my presentation is that although technological change is to be considered a main source of social (and educational) change, we cannot simply relate one to the other without paying attention to the micro cultural link between them; that is, we cannot see the relationship from a too simple deterministic perspective not having in mind the way in which people actually engage with and perceive technology, and, more particularly, as is here the case, not considering how technology meets teachers' affective needs and professional culture. In brief, modernizing schools and adapting them to the new learning environment posed by new ICTs is something else than buying computers and has to be related to teachers' motivation and willingness to reshape their classroom practice.

I will concentrate first on a brief outline of the main features of the current technological change concerning education. Second, I will show the gap between the new learning environment posed by these changes and the way many teachers are experiencing ICT as a generational marker and a threat to their professional pride.

The ICTs challenge to traditional schooling

The age in which we are living is characterized by a rapid innovation in the development of information and communication technologies. As far as both information and communication are basic components of the cultural transmission process underlying any kind of social life, social institutions specially concerned with this process are especially affected. Education is here the case. This is why we need an initial reflection on the impact of informational society in the transformation of the very sense of cultural transmission traditionally embedded in modern schooling as the traditional setting of teaching and learning. The main features of the transformation are summarized in Figure 1.

Figure 1.



For more than 200 years, modern mass-schooling has been the major socializing institution charged with preparing young people for future. Although people has always learned from many sources, most of current parents and teachers have grown with the idea that the school was the real place to learn. In a "learning" or "informational" society, things are not so any longer for, as we will see, individuals require a fundamentally different type of "knowledgeability" and socialization has become a much more complex process. It is essential, then, to rethink the process of learning, going beyond the traditional approach based on the text-based acquisition of pre-existing knowledge and to recontextualize learning by theorizing the ways new information and communication technologies are transforming knowledge, culture and patterns of socialization. In seeking a theoretical framework in which to grasp these transformations from a sociological point of view, we can take knowledge, culture and socialization, then, as the three main dimensions of the impact of technological change on cultural transmission. Changes emerging in each one of these areas involve transformations which make up the new learning environment challenging traditional modern schooling.

Changes affecting knowledge are quantitative and qualitative. Quantitative change is a result of the increase and diversification of the technological base of the means of producing and seeking information. Available sources of information go far beyond traditional curriculum and make up what is known as the hypertext. Hypertext is the new form of presentation of relevant knowledge flowing through the avenues of cyberspace and mass media. But this quantitative transformation (let's call it the expanded curriculum or cybercurriculum) involves a qualitative one. Hypertext is not just a broader context of information, but a different one. Within this new context, knowledge becomes out-of-date faster than ever before; that is to say, it has an unknown rate of obsolescence. Our individual capacity of knowledge assimilation is surpassed then by the huge amount of available knowledge and by the huge speed of its transformation. The challenge of hypertext does not consist in trying to get as much information as possible (the assimilation paradigm), but in trying to get the abilities to seek for and choose the significant one (the searching paradigm). Concerning our point here, it is to be noted that in this new paradigm, the role of the teacher loses its centrality, or at least changes its very sense as cultural transmitter. Teacher is to be a facilitator rather than an instructor; a guide rather than a talking book, a "dictator of knowledge" or an oracle.

Just as knowledge provides information about the world, culture provides a map of it, and, as a cultural summary, curriculum provides a standardized form of that map. The expansion and dynamization of relevant knowledge mentioned above has an effect then on the way we represent the world we live in.

The combination of Internet and new media has brought to us what has been described as “cyberworld”. Marcos Novak (1991:225) was one of the first in defining it as a “completely spacialized visualization of all information in global information processing systems”. But since then “cyberworld” or “cyberculture” are still being defined. This is the way I would like to cope here with some academic perspectives, stressing the rearticulation of the sense of place and identities related to cyber transformations of place and the rapid alternations of identity in virtual reality. Cyberculturalists have noted the Internet’s ability to free us from physical spaces propelling us into either freer virtual spaces or bottomless abysses of placelessness. This is, for example, what Sherry Turkle (1995: 12, 174) foregrounds when aiming at “cyberspace’s ability to give people the chance to express multiple ... aspects of the self” making “possible the creation of an identity so fluid and multiple that it strains the limits of the notion” of identity. As a consequence, via virtual living, “our very rootedness to place is attenuated” (178).

In contrast, routines of traditional classroom practice in modern schools are still tied to print or text culture and to the kind of Cartesian identity implied, for example, in the teaching of national history: a simplified narrative of social memory attached to a place or territory. Cyberculture (the combination of memories and identities flowing through the hypertext) is not a territory, though. A “site” is not exactly a “place”, but an articulation of virtual objects. When visiting it, distant worlds, distant people, distant landscapes or projects may come close and even become part of our own worlds. If our cultural relationship to space is not anymore what it used to be, teachers need a new cartography to establish their professional role. Even the very sense of “position” may have changed in this new context of open multiplicity as far as the up-down model of knowledge acquisition is eroded. If this is the case, the challenge here is that the geography of this cultural transformation is not a geography of places anymore. Its cartography is not a map (as the ones traditionally hung on schoolroom walls), but rather a never-ending process of orientation difficult to summarize in a textbook or to be reduced to a hard copy schedule or drawing. In the multi-dimensional and insubstantial space of cyberculture, distinctions and positions are much more “leaky” than in traditional curriculum. In this sense, the previously described turn from an

assimilation learning paradigm towards a search learning paradigm should be complemented with the turn towards a delocalized curriculum. And the challenge here is: how to understand and define one's own place, one's self and even truth in such a space of simulations, virtual commonality and ongoing changing social meanings? I don't think anyone has found the definite answer yet. But I think there is agreement enough in assuming that in a culture with increasing capacities for reinvention, the foundations of our mapping task have to be reinvented as well. The effort of facing this challenge is another key in redefining the new role of the teacher within informational society.

Very much related to the previous reflection on cyberculture is my concern with socialization as the third realm of transformation enabled by new ICTs. It is still a matter of discussion to what extent school pupils are really the "net generation" we have so often heard about in the rhetoric of the "digital generation" (Tapscott, 1998). But, nevertheless, it should be clear that young people raised with digital technology have gained access to a new form of social interaction quite strange to those of their teachers are used to. The internet doesn't provide just a new way of producing, sharing and obtaining information; information and communication technologies forged around Internet also provide new means of social interaction and community building. They provide a new form of organising social life: the network (Castells, 1996). Strictly speaking, networks have always existed, but due to the new forms of sociability enabled by ICTs, they have taken on a new and powerful life. The introduction of computer-based information and communication technologies in our daily life enables new forms of social networking, new forms of sociability and, as a consequence, new processes of socialization mainly related to new individualized expressions and new forms of horizontal communications. Far away from interpersonal or mass-media communication, Internet allows the communication of many to many. Nothing less than a new sense of freedom and of open communication are implied in this change (Harasim, Hiltz and Turoff, 1995; Foster, 1996).

It has been said that on-line communication is a threat to sociability because the abandon of face-to-face communication in real space leads to social isolation. As we will see later on, some of the sceptical visions on the impact of new technologies on the education of children (at least many of the most popular among teachers) assume this apocalyptic perspective. But research carried out in this field shows that the contrary seems to be true. On-line communication adds to other forms of communication, rather than substitutes for them. Anyway, what is the novelty of the new sociability? Its novelty

relies not only on the new technological means whereby it takes place, but on the feelings and values it develops. The former is obviously important (as we saw when talking about cyberspace) because it allows to redefine completely proximity and social interaction. But the latter is even more significant when compared to the working of traditional socializing institutions. Families, churches or schools socialize on the basis of up-down behaviour modelling. Obeying is more valuable than creating or innovating. In those kinds of insubstantial communities flowing through the cyberworld the contrary is the case. Research on cyber-communities shows how people involved share a feeling of active belonging based on freedom, innovation, spontaneous cooperation and reciprocity¹. People interacting on line in virtual communities accede to a culture of creativity mainly organized on an informal basis in which prestige or recognition derives from ideas and mental activity rather than from material power or long established authority (as it normally happens in traditional socializing institutions). While vertical communication is privileged in these traditional institutions, in virtual communities recognition is gained and spread through networks of horizontal communication. Last but not least, networks related to affinities substitute for territorial places, memory and local links as central spheres for sociability.

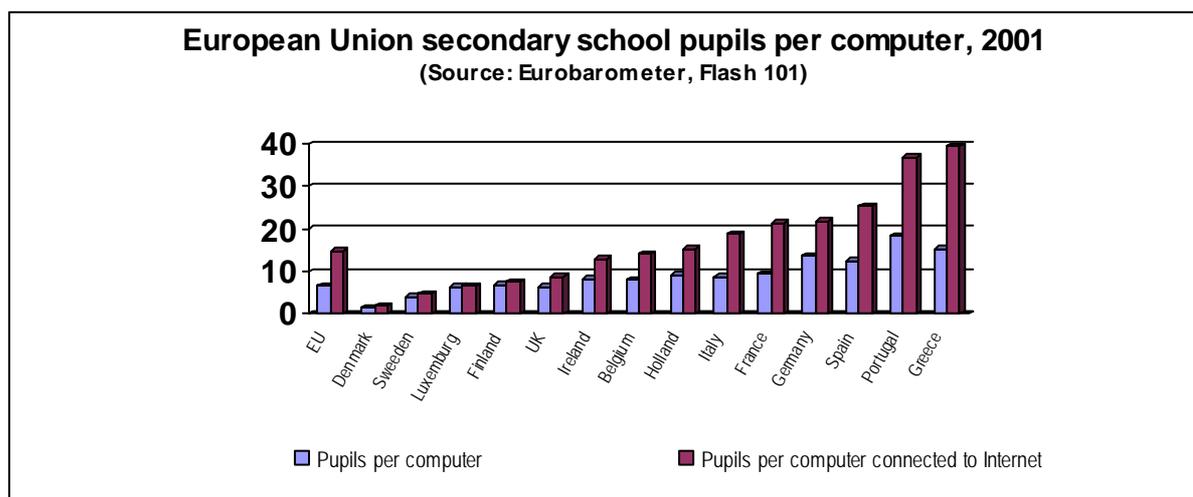
This brief outline of the main transformations affecting knowledge, culture and socialization must be enough to show how in the context of informational society individuals require a fundamentally different type of "knowledgeability" and a more flexible way of learning; how culture is now tied to a different relationship with space; and how socialization has become a much more complex process than we have traditionally thought. These transformations make up a new learning environment and, "in times of turbulent social change, redefining one's relationship with environment is crucial" (Hargreaves and Fullan, 1998: 5). Being aware of the real challenges involved in these transformations, one would expect teachers to go into some kind of reverse socialization and feel motivated to engage in the educational change demanded by informational society. But is this the case?

When computers come into the school

¹ In this new context users are not just considered as information receivers but social actors embedded in a collaborative and active belonging speaks for a truly una cooperative ethic. Kollock (1996), for example, explains the rights and norms underlying self-government in these networks more related to peer groups than to organizations with an established leadership or authority.

As said, changing schools to fit the new learning environment posed by informational society is something else than buying computers for them. Nevertheless, educational policy keeps on associating the modernization of schools with the provision of hardware. There is a reasonable ground for it in countries like Spain, whose rate of pupils per computer lies well behind the European average rate (Figure 2).

Figure2.



As seen, the investment in computers is still an urgent need for southern European countries. In fact, together with the perception of an inadequate or insufficient training, the lack of technological resources is claimed by teachers as a key barrier to spread their pedagogical use (Fernández, Hinojo and Aznar, 2002). This seems also to be the case in other developed countries. In 11 out of 14 countries surveyed by an OECD report (OECD, 2004), a shortage of computers for students was cited as one of the biggest obstacles to greater ICT use.

But, what happens when computers finally enter the school? Two main phenomena can be noticed². First, computers for pupils use are locked in a room usually called the “computers room”. Principals are normally proud of its establishment

² Evidence supporting this part of the paper comes from direct observation and some in-depth interviews carried out within a major research project on “Educational organizations and professional culture” funded by the Spanish Department of Education and Science (BSO2002-02284, 2002-2005). Academic literature stressing the relationship between teachers’ disposition to innovation and positive attitudes to the use of ICTs has also been reviewed (Alonso and Gallego, 1995; Cabero, 1998; Pérez, 1998; Loscertales, 2000; Area, 2001; Fernández, Hinojo and Aznar, 2002). It is worthy to note that this area of research is mainly based on local surveys and that, following Miller and Olson (1994) advice, more case studies sensitive to the actual changes registered by teachers in their daily work are needed.

and are eager to show it to researchers as a sign of modernity. The separation of computer rooms behind secure doors is to be related to their isolation within the daily educational practice. They are not part of the daily practice of students at school and access to them is not free and spontaneous, but rather guided and organized through schedule. At least at school, then, children and young people are a “net generation” only one or two hours per week, those devoted to computer literacy as a tiny and separate portion of the curriculum. Most of the other curricular areas remain unaffected and even teachers using ICTs on their own very seldom develop innovative pedagogical practices integrating the transformative potentials of ICTs and aiming to reshape pupils’ learning. In fact, very few teachers use this computer room for their teaching practice, even if most of them have come to realize the potential gains they could obtain in so doing³. As a primary school principal said: *“I think we even have more resources than what people use... It’s a pity to have a computer room we use so seldom. As we scarcely use it in the regular time, we have an out-of-the-curriculum activity from 5 to 6 p.m. But we should jump at the chance, for example, to learn mathematics there. Wouldn’t that be interesting? Children would make contact with that world...”*

Another effect usually taking place when computers enter the school is the fragmentation of teaching staff. Actually, we have observed how, mainly as a non-intended consequence, the entering of computers favours the development of information sharing, social learning and information exchanges among peers. Spontaneous assistance and counselling is very often offered by those 8 to 10% of teachers who could be labelled as “geek staff”. Sometimes they are also charged with giving introductory courses to their colleagues. Same as informal exchanges, these formal training activities have been reported to have very positive effects in the making of the school's social capital. Teachers who used to work in isolation come together and find in ICTs training a space where to meet and share professional experiences.

³ According to an OECD report examining how schools integrate ICTs into the instructional process (OECD, 2004), compared to the 47% of their colleagues in OECD countries, only 38% of Spanish teachers use standard ICTs. Nevertheless, it should be noticed that, generally speaking, OECD’s report, even if accepting that major investment outlays over the past 20 years have brought modern ICTs into nearly all schools in the most advanced OECD countries, the extent to which computers are in day-to-day use in these schools remains disappointing. Since the early 90's new plans for teachers education in Spain include a compulsory subject on “new technologies applied to education”, but even younger teachers do not seem to have developed a very different attitude towards them. At the end of the 90's, for example, most Andalusian teachers claimed to agree with the importance of ICTs to teaching practice, but just 25% of them had made the effort of improving their skills (Cabero et al., 1998). Similar results were found by a survey carried out in a more urban and industrialized region of Northern Spain (Pérez et al., 1998).

But the point is that this inclusionary non-intended effect does not seem to be enough to motivate teachers' real engagement with technologies, and is not strong enough to counteract the exclusionary effect: the staff divide. This divide is not related to access but to attitudes. Geek teachers find ICTs as a rich and stimulating teaching resource hard to leave apart from their practice. They feel much better with the entering of computers into the school and gain a rewarding experience through the social and professional recognition supported by some colleagues and principals. ICTs offer them the chance of some kind of leadership. Just behind them, around 40-50% of the staff could be described as "half engaged": they realize the potential of ICTs and even take introductory training to learn the basic abilities, but these still represent a narrow and only occasionally useful resource in their classroom practice. Finally, almost the same proportion of teachers remain clearly unengaged and even show an attitude of resistance or scepticism towards ICTs. I will describe these as the "reluctants", although other studies have termed them "resisters" (Levin and Riffel, 1997: 109) . As we will see later on, reluctant teachers do not see ICTs as a challenge or an opportunity to improve their professional task, but rather as a threat.

Due to the social labelling practices always arising when processes of change separate and classify people according to their dispositions, those teachers at the front and at the back of the wave of change are normally described in their peer's discourse as those who "are in"/ those who "are out". The discursive marking of this divide blocks social interaction and hinders the development of a collaborative culture for needed educational changes (Poole, 1999).

Now, let's focus on the structural and microcultural grounds for this divide and concentrate on the motivation of this attitude of resistance which prevents technological change to be experienced as a source of educational change. Why do many teachers decide to stay at the back of the change and are so reluctant to engage actively with ICTs? Why do they resist the opportunity to develop new teaching competencies and create new learning experiences?

Understanding teachers' reluctance to ICTs: the logic of technological rejection

In my explanation of teachers' reluctance to engage with ICTs in their classroom practice, I will distinguish four different but interrelated sources of the attitude considered. Each one provides a ground for resistance against change, although the

relative impact of any of them may vary from one school to another depending on their size, history, average age or group constellation and patterns of social interaction of their teaching staff.

The first aspect to be considered is not directed related to attitudes, but to the organizational context where attitudes grow. At bottom, using Bourdieu's words, attitudes rely on habitus, and habitus are socially structured (Bourdieu, 1977: 214). In this sense, what is to be kept in mind is that many aspects of teaching are structured as routines because schools are bureaucratic organizations which find it hard to innovate. They were designed to pass on inherited knowledge rather than to create. Schools advance much slower than technology. As literature on educational change and schools improvement has shown enough⁴, schools dislike change, and so do many teachers (at least these described as "reluctant" teachers), especially when -- as is here the case, according to the outline presented in the first section -- these changes involve a new and challenging perception of the world, of our social place in it and of our professional role as cultural transmitters.

The following comparison raised by one of the geek teachers interviewed could be illuminating. In contrast with PCs use, video playing has been very well integrated into classroom practice. Of course, there is a material reason for it: one video set is enough for a class and you can bring it into your classroom without moving to another. But, he stressed, the main reason is perhaps that *"you may even place the TV set in front of the pupils, and it seems to take your own position... you need not change the order of the desks... you may use films or documentaries as texts... It's just like a modern blackboard"*. So, we could conclude, video playing does not interfere with the traditional logic of pedagogical action: it allows doing new things without changing the way one teaches. *"With computers and Internet, it is not that simple"* – he added, because new forms of interaction and communication are involved.

As a result, even if most teachers would accept that computers and Internet are the banner of the runaway world we're living, things don't seem to have changed so much once they close their classrooms doors. Maybe, as Castells says, Internet is the fabric of our lives; but the fabric of schooling seems to keep working without paying much attention to it. In terms of the two models confronted in Figure 1 above, maybe

⁴ Research focusing on the relationship between teachers professional knowledge and organizational development within the new informational society (see, e.g., Area, 2001) usually underlines this conflict between demands on teachers to innovate and schools normal tendency to "traditionalism" (Loscortales, 2000). See also Einser (1992) depiction of schools as "robust organizations" and Hargreaves (1994) consideration of educational organizations as guided by a "bureaucratic imperative".

the Internet Galaxy is out there, but the Gutenberg Galaxy still provides us the basic context of our daily educational life.

Of course, one of the things which motivates changing and giving up routines is the expectation of getting a benefit. And the point here is that many teachers simply do not seem to see any gain in applying ICTs in their classroom practice. The common discourse here is summed up as *"I don't need it"*, a too simple expression of hiding behind an utilitarian argument and a perverse conception of professional pride at the same time. Concerning the former, most teachers who feel they do not need ICTs would not deny the value of finding in the Internet a better illustration for an explanation or a more interactive approach to a certain subject, but –as one of our interviewed geeks explained, *"the effort of becoming familiar with the procedures to obtain and work with these new materials seem to be too much compared with the results they feel they gain"*.

For sure, as anyone else, teachers will not commit to change if they do not see the point of it. But this position is not just the result of a rational election arising from a balance of gains and effort. Instead of seeing ICTs as an opportunity to better their practice, many teachers consider them as a mechanism which puts into question their professional skills. In a kind of reaction reminiscent of that of traditional craftsmen when they first faced the impact of the Industrial Revolution machines, many of these teachers tend to ask *"if children are to learn by computers, what are we here for, then?"* Just as those traditional craftsmen, they seem to perceive the educational use of computers as a threat; they feel as if they were to disappear and as if all their expertise were to be thrown away⁵.

⁵ One could see here a cultural reaction to some unreliable and simplistic prophecies on the future of schooling and the erasing of teaching. Education science has also developed its own science fiction, and fiction flourishes where expectations grow. But false expectations pave the way to delusions. I'm afraid this is the case here, because much of the expectations on the impact of ICTs on schooling are rooted in a popular form of "technological utopism". Concerning education I find two types or stages of technological utopism. The first could be synthesized in Skinner's idea of the "teaching machines", an idea developed under the influence of Franklin Bobbit's pedagogy of efficiency and its efforts to control waste of time in teaching (see Terren, 1999 for a more detailed depiction of this programme). The second is related to Seymour Papert's belief that PCs were the seeds of cultural transformation and would change the mental process of people, especially of pupils. Skinner's utopism focuses on teaching; it's a "Fordist" utopia based on the scientific management of teaching tasks. Papert's utopism, worked out under the influence of Piaget, focuses on learning (or more exactly) on constructive learning; it's a cognitive utopia based on the idea that computers would enable a learning without teaching. We won't go any deeper now into the analysis of these two types of technological utopism and we can't discuss here whether they are utopias or rather dystopias! Surely, speculation seems always to be naive at these first stages or even prestages of development and, no doubt, historical perspective helps to curb the excesses of utopic forecasts. The point to keep in mind here is that popular reception of these proposals has been very sensitive to the fact that

Some of the first authors dealing with teachers' engagement to ICTs used terms like "computerphobia" or "technophobia" (Jay, 1985). I think the words are too heavy to describe the attitude we are analyzing here: nobody claims today to be against technology (just as nobody says to be against peace or against tolerance). Nevertheless, although hardly verbalised, it seems reasonable to think that there are also some kind of fears involved in teachers' reluctance towards ICTs.

On the one hand, even if trained in basic computer literacy, many teachers feel they are learning something strange, something they are not familiar with as much as their pupils are. As a consequence, they feel old; and "feeling old" is a repulsive experience which tends to be avoided. As a matter of fact, research has shown that, at least in Spain, age is the item with the strongest correlation with the use of ICTs in classroom practice. The older teachers are, the less they use them (Loscertales, 2000).

But, besides this objective aspect of age, I would like to stress the significance of the subjective one. Many teachers perceive ICTs as a generational marker which inverts the logic underlying traditional teaching: age, knowledge and power structured on a vertical hierarchy. Just as many parents, many teachers are having a relationship with the on-line world very different to the one of younger people and are well behind them in the abilities involved in the use of computers and Internet. As anybody else, they tend to fear what they do not know and tend to reject ways of doing things in which they feel they lack the authority their traditional role demands. In the traditional learning environment, teachers are able to keep control on what pupils know and should know; they master the cultural contents and abilities young people lack and have experienced the patterns of social interaction their pupils are starting to build. This gives them power and legitimacy in their professional role on a hierarchical basis. But in the new, more horizontal and interactive learning provided by ICTs, many teachers tend to perceive themselves not only as "old-beginners", but also as victims. Besides that, due to the fact that (at least so far) most of the computer literacy is informal or not related to daily school activity, teachers perceive this learning environment as a competing realm and tend to project on it the same critical arguments we have long heard about television's influence on children's behaviour. Their professional pride is also related to this defence of what they tend to consider the proper education.

Finally, it is worthy to note that, however important these psychosocial variables related to teachers' feelings seem to be, they are not just a product of some kind of specific teacher psychology, but are rather context-rooted. Postmodern writers as

teachers are removed from the ideal picture of education in both forms of technological utopism.

Zygmunt Bauman (1997: 21) has described this context as a condition of increasing uncertainty because of ceaseless social change. And, as Hargreaves and Fullan (1998: 2) claim, teachers all over the world are feeling beleaguered in a world we are experiencing as more complex and uncertain; a world in which, paradoxically, the demand on the accountability of institutions is increasing. "Never before have teachers been so vulnerable and so important at the same time" (1998: xii). And, in a context of pervading criticism of the educational systems and teachers contribution, the urge to reshape practice regarding the new learning environment supported by ICTs tends to be perceived by many teachers as an external pressure making them more vulnerable to critic⁶. Thus apathy or reluctance towards technology assume the value of resistance. For those who stand aside or at the back of the technological change, the anxious feeling that engagement with ICTs entails reinforces a sense of vulnerability already latent because of the generally perceived lack of social recognition of their job.

Avoiding this association does not mean that teachers should capitulate unthinkingly to ICTs, to the interests of their corporate creators or to the false expectations of technophile prophecies considering new technologies as having intrinsic value (Bigum and Kenway, 1998). But if teachers' reluctance and disengagement to technological change is to be seen as a burden in the making of a more successful school, more strong and significant efforts must be made in order to be help teachers to see that, although not the only way of making good teaching nor guaranteeing themselves school improvement, ICTs provide new possibilities of educational change, giving them the chance of a more innovating practice and a more collaborative and interactive professional development.

Conclusions

In times of rapid technological and social change the understanding of the real dimensions of the transformations affecting cultural transmission is a must when considering how educational change is to develop. Knowledge, culture and socialization have been the three realms of transformation considered. Changes emerging in each one of them have been shown to forge a new learning environment which challenges the traditional role and authority of teachers as cultural transmitters. Evidence from Spain, a country well behind OECD's average rates of computer users

⁶ As Hargreaves and Fullan (1998: 10) put it: "The computer age is chipping away at the walls of schooling and at the autonomy and authority of teachers within them".

and pupils per computers at schools matches previous observations made in more technologically developed countries. Many teachers feel upset having to learn to teach in ways they were not taught, and many of them do not clearly see the benefits they and their pupils would gain in so doing. Teaching staff in many schools seems also to be affected by a kind of divide between those eager to accept the challenge and reshape their classroom practice with the aid of ICTs and those reluctant, indifferent or skeptical towards the benefits of the change. Fearful feelings related to age and the perception of ICTs as a generational marker seem to be the key variables explaining this attitude of resistance against change. They pose a cultural barrier to implement educational change in the direction informational society is evolving. But resistance to change can be instructive and the underlying reasons may offer a powerful source of learning. Educational policy makers, principals and in-job trainers should keep in mind that this is something complex and not to be tackled just with more computers and better programs. A complementary micro cultural effort on teachers' attitudes must be accomplished if we are to close the gap between technological change and schools.

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