

USE AND MISUSE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN EDUCATION IN SPAIN: Limits to Change and Cultural Production

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ABSTRACT: Our fieldwork has allowed us to verify that a variety of information and communication technologies (ICT) are used at schools in Spain. While uses of some technologies are valued positively, the potentialities and possibilities of other kinds are not taken into account when educating future citizens in the digital society. This article focuses on two aims. First, it shows that the digital divide at the social level increases educational inequality, and schools contribute to the digital divide, even though they should be the institutions that fight against it. Second, it identifies some unexpected characteristics of ICT uses in a context of rapid social change and growing immigration and their role in a more complex definition of the digital divide.

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Social and Educational Context

The Spanish economy has been recognized as one of the most dynamic in Europe in recent years; at the same time, the indicators of modernity have become unmistakably visible. The country is also located at the forefront of social change. Our fieldwork has mostly been carried out in the northwestern region of the country (Catalonia), where these characteristics have become increasingly evident since the early stage of the industrial revolution. More than half of its 7 million inhabitants have a higher than average spending capability, although social polarization is increasing partly due to the fact that the immigrant population represents more than 9% of Catalonia's total population, with an annual growth of more than 40% in the last five years (INE, 2005). The same is

reflected in education with immigrant students of diverse nationalities¹ making up 8.4% of pre-college pupils (MEC, 2006a).

Other data help us outline the educational context of the country: compulsory education is provided by public schools (70%), private schools with public funding (30%), and private elite schools (less than 1%) (MEC, 2006b). This division generally and troublingly reflects and reinforces higher levels of social stratification, which is enhanced by the flight of the local population from public to private schools. This increases social segregation and the consequent concentration of immigrants and the working class, which contributes to the marginalization of such students in public schools.

It is also important to mention the clear feminization of teaching staff, with women making up 74% of all pre-school and primary teachers, and 68% of those in compulsory education and vocational training. There is no relevant difference between public and private schools in this aspect.

ICT in the Spanish Social Context

The main data sources (INE, 2006) on new information and communication technologies (ICT) in Spain show the following situation. Concerning the introduction and use of ICT home equipment, TV, radio, and fixed telephone lines are universal, and modern electronic devices are also highly present in Spanish homes. In 2005 more than half of Spanish homes have a computer and, of these, 64% have access to the Internet. Twelve percent also have laptops. Almost 80% of homes have a cellular phone, 65% have some kind of hi-fi equipment, more than 70% have VHS, and 60% have DVD. Using ICT for leisure purposes deserves a special mention. The latest available data (AdEsE, 2005a) report on the estimated distribution of audiovisual and interactive leisure consumption as follows: sales of video games are the highest with 32% of the total billing of 790 million €; second place is occupied by the cinema box office with 27%; then videotape movies with 23%; and recorded music, which represents 18% of the whole.

Table 1 shows the ranking of the first 10 titles of video games sold in Spain in 2005. It gives us a clear idea of the platform in which they are mainly played: Play Station 2. In about a fourth of homes that report to have a video game console, more than 65% mention Play Station 2.

Table 1. Ranking according to units sold by title in Spain in 2004

Platform	Name of Game	Distributor	Type	Age
PS2	ProEvolution Soccer 5	Konami	Sport	3+
GBA	Pokemon Esmeralda	Nintendo	Graph.Adv./RP	3+
PS2	Gran Turismo 4	Sony	Race/Rally	3+
PS2	Grand Theft Auto: San Andreas	Take Two	Action/Combat	18+
PS2	ProEvolutionSoccer 4	Konami	Sport	3+
PS2	FIFA 06	Electronic Arts	Sport	3+
PC	Los Sims 2	Electronic Arts	Strategy	7+
PS2	Need for Speed: Most Wanted	Electronic Arts	Race/Rally	3+
PS2	Formula One 2005	Sony	Race/Rally	3+
PS2	Need for Speed: Underground 2	Electronic Arts	Race/Rally	3+

Source: GfK & amp; EMER Marketing Research, CORP (AdEsE, 2005a)

Data about the market of PCs and console players show a clear gender divide: men make up 69% of the total player population of PCs and/or consoles, which means nearly 6 million players, and women 35%, almost 3 million players (AdEsE, 2005b). This study examines habits and uses of video games among 604 videogame and PC players between 7 and 34 years of age. Clear differences are observed to exist between men and women in their preferences for certain types of games. Women highlight as their preference varied games, cards, puzzles, etc. --activities classified as “reflection games”—while men more often prefer games involving high adrenaline levels such as shots, fights, sports, activities classed as “adrenaline games.”

In terms of age, the majority of players belong to the group 14-17 years of age (74% of players) and the second highest group includes players between 7 and 13 years of age. Internal differences exist in the groups if we distinguish between PC players and Console players (AdEsE, 2001). This latter group of players are mostly between 7 and 13, while the former (PC players) usually belong to the older age group, between 14 and 19.

About and Around the Digital Divide

The controversy about the concept of a digital divide depends on the approaches and perspectives taken by the authors that have studied it so far. Some of them focus on the phenomenon in relation to socio-economic differences between communities with and without access to the Internet, and others focus on the differences that arise from the capacity to use ICT, that is, from different levels of conventional literacy and technological skills. The latter researchers approach the digital divide from what we could consider to be digital illiteracy, understood as the low ability or competence shown by some social groups. The most representative example is the generations born before the sixties.

To sum up, the digital divide is related to the risk of exclusion, but we are also speaking about inequality and differences in new spaces - physical, productive, and relational - with the concept of net-society (Castells, 1996, 2001; Castells &

Díaz, 2001). The factors by which the digital divide is determined refer to differences of social class, region (the size of the community and the rural or urban locality), education or level of training completed, ethnic-cultural origin, gender, age, and physical disabilities. The factors should be explored and compared in depth, depending on cultural contexts.

Applying some of the main factors discussed by Gorski in *The Digital Divide in 2000: A Fact Sheet* (Gorski, 2000), we can identify the digital divide in Spain in 2005 with the following data primarily based on the use of computers and the Internet (INE, 2006).

Class: Out of the total number of people that use computers, 66% were employed, 6% unemployed, 5% non-active or caring for the home, and 4.5% retired and receiving pensions. An average 70% out of those employed or unemployed (but active) and receiving pensions had accessed the Internet in the last month, in contrast to 47% of those who are non-active or caring for the home. In addition to this, 69% of the total users of the Internet were employed, compared to 5.4% of active unemployed.

Region: Fifty-six percent of the homes located in towns of more than 100,000 inhabitants have some kind of computer and 38% have access to the Internet. Twenty-four percent of the Internet users have broadband connection. In comparison, 39% of homes located in towns and villages of less than 10,000 inhabitants have a computer, where 22% have access to the Internet and 10% of them broadband connection. More than 50% of Internet users live in towns of more than 100,000 inhabitants, while only 16.5% live in towns or villages of less than 10,000

Education: Of the people that claim to have used a computer in the last month, 8% had finished primary education, 51% had finished secondary school, 13% had high vocational training, and 27% had completed higher education.

Cultural origin: Out of more than 20 million people who have used a computer on some occasion, 96% are of Spanish nationality in contrast to 4% of foreign nationality. Eighty-two percent of the first group had used Internet in the last month, compared to 75% of the latter.

Gender: Out of the total number of people that had used a computer at some time, 85% of men had done so in the previous month, while only 78% of women had used the computer in the same period. When the “use” was connecting to the Internet, 55% of the users were men.

Age: Out of the total number of people who had used a computer at some time in the last month, 90% belonged to the age group 15-24, with usage decreasing until the lowest age group of 65 and older. At younger ages, according to our own observations and also to results of other researchers (Gil et al., 2003),

adolescent girls' discovery of chats helps balance the number of computer users and the acquisition of digital communicative skills according to gender.

Some Implications of the Digital Divide

Our fieldwork, as well as some results of previous studies presented in the INE report (2006), shows that the immigrant population uses ICT in specific ways, both in terms of space and the purpose of use.

The home is the place where most people—men and women, and immigrants and non-immigrants—say that they have used computers and the Internet in the previous three months. However, the great importance of cyber-cafes should be pointed out for the immigrant population as a preferred place for using computers and connecting to the Internet (40% of use) in contrast to the rest of the sectors and groups, for whom this space is significantly less important. In fact, we have observed that cyber-cafes are spaces where transnational family relationships are maintained and developed. Ethnographic examples include male migrant children and adults who have maintained weekly contacts for more than 10 years with wives and mothers - illiterate in the traditional sense - through videoconferences in the cyber-cafes (*Fills de dos Mons*, November 2, 2003) as well as migrant women who stay in contact with other female relatives back home.

The influence of ICT uses among the immigrant population with respect to cultural practices in their countries of origin has not been explored yet in relation to the position these countries may occupy on the map of the digital divide. However, the previous examples tell us about the global dimension of local practice among migrant populations. Table 2 gives us an overview of a sample of dimensions of the situation of the home countries of immigrant students in Spain mentioned at the beginning of this paper.

Table 2. Internet users, penetration, and growth between 2000 and 2005 for the first 10 countries of origin of immigrant students in Catalonia in 2002-03

	Population (Est. 2005)	Users in 2000	Users recent data	Penetration	Growth (2000-2005)
Morocco	29,828,879	100	3,500,000	11.7 %	3,400.0 %
	Population -2006	Users in 2000	Users recent data	Penetration	Growth (2000-2005)
Pakistan	163,985,373	133.9	7,500,000	4.6 %	5,501.2 %
Philippines	85,712,221	2,000,000	7,820,000	9.1 %	291.0 %
China	1,306,724,067	22,500,000	111,000,000	8.5 %	393.3 %
	Population (Est. 2005)	Users in 2000	Users recent data	Penetration	Growth (2000-2005)
Argentina	37,584,554	2,500,000	7,500,000	20.0 %	200.0 %
Colombia	45,926,625	878	3,585,688	7.8 %	308.4 %
Ecuador	12,090,804	180	624.6	5.2 %	247.0 %

Peru	28,032,047	2,500,000	4,570,000	16.3 %	82.8 %
	Population (Est. 2005)	Users in 2000	Users recent data	Penetration	Growth (2000-2005)
Dominican Rep.	8,978,654	55	800	8.9 %	1,354.5 %
	Population (Est. 2004)	Users in 2000	Users recent data	Penetration	Growth (2000-2004)
Spain	41,895,600	5,387,800	14,445,289	34.5 %	168.1 %
France	59,494,800	8,500,000	22,593,841	38.0 %	165.8 %
Italy	56,153,700	13,200,000	28,610,000	50.9 %	116.7 %

NOTES: (1) Statistics of European Union were upgraded on June 30, 2004; those of Africa, America and the Caribbean region on November 30, 2005; and those of Asia on March 6, 2006. (2) Figures in detail are available in pages corresponding to each region and country. (3) The population figures are based on the current data from World Gazetteer(4) The most recent data on users correspond to the data of Nielsen//NetRatings, ITU, NICs, ISPs and other local sources. (5) Figures on growth were determined by comparing the current number of users with the number of users in 2000, taken from the statistics of ITU. (6) The table is constructed by the author with data from <http://www.exitoelexportador.com/stats.htm#arriba>.

Although these national average figures cannot reflect the existent internal social and regional diversities, differences in the ICT situation among countries are remarkable, The proportion of the population using the Internet oscillates between 5% in Pakistan and Ecuador, almost 10% in Philippines, China, Colombia and Dominican Republic, and more than 10% in Morocco, Peru and Argentina, compared to more than 30% in Spain and France and 50% in Italy. But the most outstanding fact is the significant growth experienced by the penetration of the Internet in countries like Pakistan, Morocco, and Dominican Republic, with increases of 5,500%, 3,400% and 1,300% respectively from 2000 to 2005, compared to an increase of about 160% for countries like Spain and France in the same period (ExitoExportador, 2006).

Data on gender reveal few differences about the places where computers or the Internet are used. The most common place to use the computer is at home with a difference of 5 points between genders, which could be explained by the maintenance of gender models that include unbalanced sexual division of the domestic tasks in Spanish homes and the different availability of leisure time for men and women. Other researchers (Díez, 2004) show gender differences in the preferences for typologies of video games, in the perceptions of them, and in the motivations leading to playing.

Age also emerges as a clear factor of unequal access to ICT, especially in using the Internet. Users concentrate in the age group between 15 and 44. Although most of the users state that they access the Internet from their homes, the age group 10 to 14 represents an exception, since they highlight school above the home as the most common place of access. They name homes of relatives and

friends as the third most common access location. However, the age group 15 to 24 leads the others in accessing the Internet in a cyber-cafe or a similar venue, with boys 5 points above girls of the same age group. This gives us some clues about different uses of spaces and patterns of social relationship through the net.

Class differences concerning Internet access are only mentioned in one recent research project:

Boys and girls of any social class that play with video games once or twice a week are the majority, although among those of lower classes the highest proportion is represented by those that never play. In comparison, the highest frequency is registered among middle class boys and girls, followed by those from the upper class. In detail, 18% of boys and girls from the upper class, 58% in the middle class and 25% from the lower class, play with video games every day of the week. (Feixa, García, & Recio, 2004, p. 381)

So far in Spain we do not have much more information on this; therefore it seems urgent to encourage research about the influence of these factors, which may allow us to understand the extent of the digital divide and analyze it in more detail.

Use and Misuse of ICT in the School Environment

Taking into account the information presented in the previous sections—demographic and educational context and access and use of ICT in Spain—we will now focus on analyzing how ICT is used in the school context.

At every institutional level, policy plans explicitly mention and focus the need to compensate for social inequalities related to ICT. In Europe a series of national plans of action against poverty and social exclusion through high-priority lines specifically aim at the fight against the digital divide. The Spanish Plan says that the action should "be developed to increase the possibilities of accessing new technologies by populations in situations of risk of social exclusion and by NGOs and their professionals" (Subirats, 2004).

With this general goal, teachers develop practices for students in educational institutions and classrooms. Affected by the social reality of the growing presence of students from diverse origins, the prevalence of female teaching staff, and the remarkable penetration of ICT in Spanish homes, school practices have produced diverse results with more or less success at overcoming the digital divide. We discovered in our fieldwork that school practices reinforce the digital divide by dividing the population into those who have access to a series of new information from the Internet as well as to skills learned through Internet use and those who cannot use and/or do not know about these new contents and cultural strategies, which often worsens the already unequal situation. Let us look in more detail at how schools as institutions and teachers as agents respond to this

context of differences and inequalities from the point of view of age, gender, social class, and ethnic-cultural origin of the student.

Data on the ICT equipment in Spanish schools shows that the frequency of using computers and the Internet at school for 15 year-old students in the 1999-2000 school year is as follows:

Most of the students say they “never or hardly ever” use computers (56.1%); others claim to use computers “several times a week” (25.4%) and 18.5% “once or several times a month.” As for using the Internet the great majority (80.3%) responds “never or hardly ever”, almost 13% “once or several times a month” and about 7% “several times a week. (Eurydice, 2005, p. 34)

As for the equipment, the same authors point out that Spain “shows a significant difference in favor of private schools” with a ratio of 27 students per computer in public schools in contrast to 21 students per computer in private schools. Although the authors of the research do not see in these figures clear inequality because “these countries [Spain and other European nations] are characterized by similar funding and access to private and subsidized schools and public schools” (Eurydice, 2005, p. 39), it is necessary to point out that the distribution of students in different types of schools by class and national origin is not balanced. Moreover, social selection of the students takes place through added costs in practice (such as compulsory uniforms or the obligation to attend certain extra activities). In this sense, a difference of 6 points in the ratio of students per computer may mean a greater difference in access to computers and Internet for public school students because their access depends on the school facilities to a greater extent and their technological practice cannot be ensured within the family.

In addition, although compared to other countries in the world Spain occupies a good position concerning ICT equipment in schools with a relatively low ratio of students to computer (an average of approximately 23 students per computer), the data do not allow us to deduce anything at all about the quality of this equipment, its upgrading possibilities, or its use. Apparently, schools value some ICT elements (computers and the Internet) positively, schools are equipped with them, and students without access to these resources in their family environment can access them at school. However, the type and frequency of ICT use does not show how much effort schools make to fight against social exclusion. This is how Spanish schools **misuse** (or under-use) ICT. As Livingstone and Bober (2004) state, “...middle class teenagers, those with home access and those who have spent more years online, tend to use the internet more often, spend more time online per day and, consequently, have greater online skills and self-efficacy” (p.12).

The use of some ICT elements by students is perceived negatively by schools. The school does not recognize the value of applying them either to curriculum or social learning. For example, the cellular phone is the lowest valued device

among teachers (Molins, in progress). In fact, while over the last years it has become broadly popular, its success is often reduced by its being kidnapped into teachers' drawers as a result of ringing at unexpected and inappropriate moments in school. Only in a few occasions has it been used in educational activities: for example, short message system (SMS) was used for language and literature practices in a high school. Continuing with the irony, however, it was observed that the mobile phone was occasionally used as a kind of ball (to be thrown as far as possible) in a game devised by teachers for students to play.

According to the latest results published by the Catalan Institute of Consumption (Institut Català del Consum, 2004) in a survey carried out with 600 Catalan adolescents between 12 and 18 years, 81% have a cellular phone for individual use; that is, a large majority of adolescents and young people use this device. The possibilities of use are multiple: from waiting to receive calls, to being found, to making calls, sending messages, connecting to the Internet, returning missed calls, downloading tunes or composing them, and downloading images. Not all of these options are possible in all models, but most of the phones support them. Interestingly, the use of cellular phones is modifying ways of communication, in which new forms of written language are being created, such as SMS, to accommodate the 160-character limitation for text messaging on the phones.

Young people use cellular phones primarily to send messages to make meeting arrangements. The analysis of the message contents revealed an interesting fact: that the messages included very little information stating the place and hour to meet. The phones are also used extensively for "missed calls," which emerged due to the economic limitations of these social groups. This use was not expected by the phone companies at the beginning² and meets two needs: first, a user with credit can phone the other back with no expense for the first caller (typical example of calls to parents) and, second, a user establishes indirect contact with a friend at any time, the receiver of the SMS. This new SMS language and the need to save space has produced the emergence of dictionaries of correspondence, symbols, emoticons, and onomatopoeias to the extent that some specialists identify the situation as the generation of new colloquial modes of standard language (Torres & Payrató, 2002).

It would be unfair to minimize the development of certain motor skills acquired from fingering: writing messages develops hand-eye coordination, contributing to increased fine motor skills. This is done, for example, by increasing the use of thumbs, compared to other fingers of the hands, while carrying out other daily activities, such as ringing bells and pointing out. Recent researches show that playing electronic games – we must not forget that cellular phones are platforms that also allow games – helps improve coordination and is used to train surgeons (Rosser, April 7, 2004).

Through these examples, we can affirm that uses of cellular phones have become context-relevant learning activities for students in the sense that they

increase the development of fine motor skills by using fingers, increase self-confidence, or provide opportunities to practice independence for the future life of this generation. In addition, ownership of the phone is accompanied by the responsibility of having to negotiate the expenses caused by the device and the students are unmistakably forced to rehearse certain autonomy from the family³, which helps maturation.

As for video games, supported by different platforms, some researches point out potential advantages they can offer from the educational point of view as long as their design makes its focus of attention clear to the player, such as applying principles of constructivist learning theories in their design (Gros, 2005). We can report positive experiences of introducing video games in the classroom: for example, working mathematical and geographical concepts with FIFA 2005 (a popular soccer game) (Asensio, 2005), using simulation tools that allow the student to plan a landscape (Bovet & Chapi, 2005), devising elaborate game strategies (Gómez, 2005), and encouraging cooperative play (Gil, Vall-Ilovera & Samuel, 2005).

Some interesting educational uses of ICT occurred unexpectedly when a classroom for newcomers⁴ used the *blog* that was considered too "complicated" to this group of students due to their socio-cultural composition. Other good uses are found in informal education settings: for example, in the neighborhood of the Gypsy/Roma population, the 5D⁵ game is regularly played, which means that ICT is used on a daily basis. Beyond the school activities or other activities with explicit educational purposes, it is important to highlight the experience with a civic net created in the inner city of Barcelona, especially in a neighborhood with a high concentration of immigrants and the low-income population. This creation, the result of a confluence of diverse associations, allows young people to access ICT, create web pages of institutions, and access forum spaces and training workshops. It provides computer equipment and free access connections in their neighborhood.

These uses of ICT are exceptional, not the norm. In spite of the fact that ICT is valued in the educational and civic contexts, the impact of insufficient or inappropriate use of ICT on students is worse in multicultural and working class schools than in well-funded schools because students in such poor and multicultural schools may not have sufficient access to ICT outside school. Unfortunately rejection of video games and lack of understanding, as well as misuse and bad use of the rest of ICT elements, are common. Teachers' fear and insecurity become evident as some studies reveal (Romero: 2005, Vida & Hernández, 2005), increased by the lack of training in these technologies and in their integrative and empowering potential. In fact, many of the students who use ICT question the contents and the relevance of the school education nowadays, especially in impoverished areas.

An Open Reflection

In this paper we wanted to show how bad uses of ICT in schools contribute to the increase in the digital divide among their students. Although some experiences of incorporating new technologies in the classrooms have resulted in positive learning, there is still a lot to explore about potentialities in other dimensions. Unfortunately, arguments against some ICT continue to prevail in the social majority and adult discourse in the Spanish schools, as much among the teachers as in the families. The most worrisome fact is that the value of ICT uses for self-learning and as a means for cultural production is not recognized as central to students who are social and educational agents. ICT uses are not also acknowledged as the adaptive strategy of children and young people in the context of rapid changes and new demands.

To further the interpretation of the issues presented in this paper, we intend to explore the relationship between intergenerational dominance and resistance, as in "pre-figurative societies" (Mead, 1978), and the increased intra-generational inequality caused by the digital divide. The access and the abilities of the less favored groups will be affected by the lack of recognition of children's and young people's general and specific uses developed in the contexts of their migration process and communicative, affective, and identity needs. These misuses and bad uses of ICT in schools have direct implications for social justice and they should be studied urgently because, as Gorski (2001) argues, "It is the next -- the present -- equity issue in schools and larger society with enormous social justice implications. This reframing of the digital divide can serve as a starting point for more active participation in digital divide research and action within the field of multicultural education" (online).

Endnotes

1. The last available figures about the countries of origin of foreign students indicate this ranking for the first 10 positions: Ecuador, Morocco, Colombia, Peru, Argentina, Pakistan, Italy, China, Dominican Republic, France and the Philippines (Carrasco, Ballestín, & Borison, 2005).
2. In the beginning of the introduction of cellular phones it was possible to carry out calls without having available credit on the phone cards; after a short while, the companies discovered this new use and required a minimum amount of available credit to enable seeing missed calls in order to guarantee minimum benefits.
3. "The fact that parents are those that pay for the cellular phone is especially common among adolescents from 12 to 13 years old (80%), but also in most of those between 14 and 16 (65%). From 16 years and onwards it is more common that young people pay their own phoning costs (55%)" (Institut Català del Consum, 2004, p. 30)

4. *AULA ACOLLIDA IES LA SERRETA DE RUBÍ*. A teacher of a newcomers' classroom in a high school promotes families' use of ICT by giving information in different languages with students' collaboration (see <http://spaces.msn.com/jg4744/>).
5. "Casa de Shere Rom": a 5th-dimension game experience (see www.5D.org).

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Editor's Note: References that the autor provided in Spanish will remain in its original language.

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