# Handbook of Research on Overcoming Digital Divides:
## Constructing an Equitable and Competitive Information Society

Enrico Ferro
*Istituto Superiore Mario Boella (ISMB), Italy*

Yogesh Kumar Dwivedi
*Swansea University, UK*

J. Ramon Gil-Garcia
*Centro de Investigación Docencia Económicas, Mexico*

Michael D. Williams
*Swansea University, UK*

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# Chapter 32
# From the Digital Divide to Multiple Divides:
## Technology, Society, and New Media Skills

**Francesca Comunello**
*Sapienza Università di Roma, Italy*

## ABSTRACT

*It is widely acknowledged that the label "digital divide" can be partially misleading, because it emphasizes a binary dichotomy ("haves vs. have nots") and a mere technological dimension (in terms of physical availability of devices or conduits). Behind the dichotomous model, however, lie different use and adoption strategies. People cannot be described as being either in or out. Evaluating the complex relationships between technological, social, and human factors raises a number of questions, mainly related to the role of technology in social development. Moreover, we should also reconsider what is commonly meant by information and communication technology. In this chapter, I will try to introduce a multilevel model for analyzing the digital divide, focusing on effective access and new media literacy. The focus will be shifted from technology to humans. In every ICT for development project, local context and local needs should be regarded as the key factors.*

## INTRODUCTION

The purpose of this chapter is to examine the digital divide from a sociological and media studies perspective, referring, for a better understanding of the subject, to the wider literature on the relationship between communication technology and society.

Not only common sense, but also many political and academic definitions of the "digital divide" seem to mainly consider the technological aspects of the question, without paying any attention to the complex human and social phenomena related to technology adoption and diffusion.

As we should have learned from wide international experience in the field of Information and Communication Technology for development (ICT4D), significant problems may occur when projects focus on providing hardware and software, or mere connectivity, without paying sufficient attention to the human and social factors involved.

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Therefore, we should abandon any technological deterministic perspective, without falling into sociological determinism. When considering the global divide, we should not question if the priority is to "provide food, healthcare or a Personal Computer" to developing countries. We should, instead, evaluate which technologies are most suitable to the needs of intended targets, with constant attention to the relevant context.

When considering the intra moenia divide (the "social divide", according to Norris, 2001), we should focus not only on devices or network availability, but also on individual and social use of technology, as research on (Internet) Dropouts has pointed out (Katz & Rice, 2002a).

That's what we define as "enabling technology": access to a set of technologies is not a priority in itself, especially in developing countries; it becomes a priority if it enables a wide range of Information Society services, contributing to addressing the developing countries' basic needs (e.g. eHealth, eLearning, information concerning agriculture or the job market, etc.).

Therefore, we need to widen our perspective on the global digital divide, considering not only access but also effective use of Information and Communication Technology. In this chapter, after having questioned the widespread dichotomous approach to the digital divide, and a limiting conception of technology, I will introduce the "enabling technology" perspective and I will try to propose a multilevel model for analyzing the digital divide, proceeding from mere technology availability to effective use, and focusing on advanced reception practices, technical skills, content production, and networking skills. New media literacy will play a central role in the proposed model.

## RETHINKING THE DIGITAL DIVIDE: COMMUNICATION TECHNOLOGY AND SOCIETY

Rethinking the relationship between technological, social and human factors has deep consequences on the definitions and on the theoretical framework we apply to the digital divide.

It is widely acknowledged that the label "digital divide" can be partially misleading, because it mostly emphasizes (1) a binary dichotomy ("haves vs have nots") and (2) a limiting approach to the technological dimension (mainly focusing on physical availability of devices or conduits), and to the relationships between technology and society.

The conceptual framework offered by the digital divide can also be limiting, because it appears to focus on the "gaps" that divide specific populations, i.e. on the needs affecting the so-called "have nots", mostly located in the globalSouth, perpetuating a western-centric perspective on development.

Consequently, a rising number of scholars are questioning the label "digital divide", adding in their books' titles expressions like "rethinking", "redefining", or "beyond" (Warschauer, 2003; Mossberger, Tolbert & Stansbury, 2003, etc.).

Others suggest new definitions, in order to better describe the multidimensional phenomena related to the increasing diffusion of ICTs, such as "digital inequality" (DiMaggio & Hargittai, 2001); or propose a new framework, a "more nuanced" lens, aiming to assume the unconnected's point of view, under the definition of "zones of silence" (Potter, 2006).

Moreover, the term appears to be mobile: it has often been defined as a "moving target", shifting forward every time a newer technology starts its diffusion (from a mere technological point of view, in the western world we have been dealing with first an Internet access divide, followed by a broadband divide, and are now concerned with wireless broadband technologies and Next Generation Access Networks).

But the mobility of the term also refers to the variety of topics addressed. A main distinction has to be drawn between the "global divide", i.e. the difference in ICT access between citizens of the developed and the developing world; and the "social divide" (or "intra moenia" divide), or the difference in access held by early and late adopters in a single area (where income, education, gender and age seem to be the most influencing variables, let alone personal attitude to technology and specific technological literacy). Norris also introduces the "democratic divide" emerging within the online community "between those who do, and those who do not, use the panoply of digital resources to engage, mobilize, and participate in public life" (2001, p. 4).

While the origins of the label "digital divide" are uncertain and still debated, as documented by Gunkel (2003), further distinctions have to be drawn: a dichotomous vision ("haves vs have nots") vs a more nuanced vision; a main focus on ICT availability vs a main focus on human usage and skills; a technological deterministic approach vs an approach considering multiple factors. Even the more specific technological side of the question has to be carefully considered: not only are we dealing with a moving target, as long as newer technologies take place at a growing speed, but there are also "older" technologies to be considered, if we adopt an "enabling technology" perspective.

Nevertheless, even after questioning the label, most of the scholars continue using it, certainly as a tribute to its popularity in the academic world, in order to keep an adequate level of consistency and comparability between different scholarly works. Moreover, the digital divide is also perceived as a shared means of communication with policy makers and activists worldwide.

Such definitional issues should not be regarded as a pure academic concern: they contribute to building the conceptual frameworks that constitute the basis of wider policies, let alone single digital divide projects.

We will try to focus on some of those topics in the following pages, fully aware that "Perhaps the greatest gap is the wisdom gap – the gap between the information revolution's inherent complexity and our capacity to comprehend it. We need a multidisciplinary and comprehensive framework for analyzing the information revolution" (Wilson, 2004, p. 36).

## Beyond Dichotomies: From "Haves" and "Have Nots" towards a More Complex Model

One of the most widespread digital divide *myths* is that it can be addressed using simple, dichotomous categories, such as "(information) haves" vs "have nots". Behind this widely used dichotomy, introduced by the much quoted National Telecommunications and Information Administration "Falling Through The Net" (NTIA, 1995), lies a simplifying framework, assuming (1) that the digital divide is a mere question of technology availability or access, without any concern for effective use; (2) that, compared to the technological *optimum*, one can only suit or not suit to the model, without any gradation ; (3) that those populations that don't suit to the (young, western, urban) proposed model are necessarily in need, without taking in any account people's motivations.

In western countries, where the Internet has become a widespread medium, influencing people's everyday life (Wellman & Haythornthwhaite, 2002), there seem to be fewer barriers to mere technology access: a vast majority of the population can have material access, if not at home then at work, at school, at someone else's house, or in public places (such as public institutions or commercial outlets). What becomes therefore crucial are the differences between people with formal access: how often they use technology, for what purposes, showing which level of new media literacy, etc. (see DiMaggio & Hargittai, 2001).

In addition, the framework offered by a binary divide "can be patronizing because it fails to value

the social resources that diverse groups bring to the table" (Warschauer, 2003, p. 7).

With special regard to the western world, the "have nots" model, claiming technology deprivation, should be integrated with the so-called "want nots" category (van Dijk, 2005). Although deprivation and lack of motivation are difficult to separate (lack of motivation could be used by the people to rationalize their deprivation status), there is empirical evidence that "motivational access" plays a central role in technology adoption.

Behind the dichotomous model, moreover, lies an articulated variety of use and adoption strategies. People cannot be described as being either in or out: some nonusers were previously connected, others can have formal access to technology without using it, some people assumed to be users can in fact be very random users (some global digital divide work, for instance, defines as user everybody having used the Internet in the past six months). The most appropriate way to describe use and adoption strategies is to draw "a *spectrum of access*, ranging from those with full access using the best available technology in a mass market in the developed countries (broadband, these days) to the truly unconnected" (van Dijk, 2005, p. 32). According to van Dijk (2005), present or potential nonusers can be divided into at least four categories: (1) intermittent users, (2) dropouts, (3) net evaders, (4) the truly unconnected.

Intermittent users are people that have gone offline for long periods of time in the past (but are actual users again), mainly due to technical problems, house moving or losing access to the place they used to connect from (job, school, etc.).

Dropouts are people who have used the Internet, typically for a short period of time, but no longer do so. They have had access to technology, and may still be owners of the device, but stopped using it. They would therefore be mentioned on the "haves" side, if considering mere technology adoption, but are to be defined as nonusers. According Katz & Rice (2002a), the number of American dropouts is large: about 10% of Internet users. More than intermittent users (who went back to usage, and whose intermittency depends mainly on material conditions), the dropout phenomenon reveals the importance of motivation. While the loss of material access is listed by respondents as the most important cause of disconnection, other relevant causes are "cost", "too hard or complex", "not interesting", "too much time". Not surprisingly, "access" was the main motivation in the first surveys (1995 and 1997), afterwards losing its influence in favor of "too hard or complex" (Katz & Rice, 2002a, pp. 75-78). Thus, while the Internet is increasingly penetrating in western societies[1], material access appears to be less influencing (because affordable for a vast majority of the population, even if not necessarily at home), while more immaterial variables, mainly skills and motivation, gain growing importance.

The so-called Net evaders confirm this trend: they normally belong to the "haves", living in households with Internet connection, and are nonusers as a "distinct lifestyle choice" (Lenhart et al., 2003, p. 20). They might be parents who leave the use of the Internet to the children, or top managers having their subordinates use it.

Only the fourth proposed category describes the Truly unconnected, people with no Internet access that show a "difficult-to-unravel mixture of have-not and want-not causes", distinguished by "the lack of social networks that would encourage them to go online" (van Dijk, 2005, p. 35).

Horrigan (2007) proposes an updated typology of ICT users: Omnivores, Connectors, Lackluster Veterans, Productivity Enhancers, Mobile Centrics, Connected but Hassled, Inexperienced Experimenters, Light but Satisfied, Indifferent, Off the Network.

Access can be explained relying on specific resources. Material resources appear as prerequisites, while (lack of) time is a generally underrated factor, often mentioned as a reason by many nonusers. Social resources also appear to be crucial, as long as "people become aware of the importance and applications of the new media via

social contacts with family, friends, colleagues, teachers, neighbors and acquaintances" (van Dijk, 2005, p. 37). Mental resources, both cognitive and emotional, also play a role in determining access behavior: while cognitive resources refer to knowledge and skills, emotional resources can explain people's attitude towards technology.

Motivation, more than mere material constraints, appears therefore a key factor in explaining new media access: evidently, a strong motivation can lead people to find opportunities to access technology, even outside their households, while the lack of motivation is possibly leading to what has been called Net evasion. This shifts the focus from technology to humans.

*The people with a lack of motivation to gain access to computers and networks should not be accused of being backward. Instead, the finger should be pointed at the current flaws of the technology concerned: lack of user friendliness, usefulness, attractiveness, affordability, and safety (van Dijk, 2005, p. 43).*

Most of the digital divide work, and particularly quantitative reports by international agencies, defines the digital divide as a mere matter of technology access, measuring it by the number of devices (PCs, mobile phones, etc.) or conduits (Internet connection, broadband, etc.). Thus, shifting the attention to humans, to their motivations and their knowledge, draws a more complex and nuanced picture, as I try to show in the following pages.

*The fundamental digital divide is not measured by the number of connections to the Internet, but by the consequences of both connection and lack of connection. Because the Internet (...) is not just a technology. It is the technological tool and organizational form that distributes information power, knowledge generation, and networking capacity in all realms of activity (Castells, 2001, p. 269).*

## Digital Divide: Technology and Society

When questioning the digital divide, evaluating the complex relationships between the technological, the social, and the human factors raises a number of questions, mainly related to the role of technology in social development.

According to Warschauer (2003), many failures in technology projects worldwide depend on their focus: they focus on the physical infrastructure (hardware, software, connectivity), without paying sufficient attention to the social and human systems involved. "The digital divide framework (…) overemphasizes the importance of the physical presence of computers and connectivity, to the exclusion of other factors that allow people to use ICT for meaningful ends" (Warschauer, 2003, p. 7).

Technology-driven policies, ignoring any social or human consideration, follow a widespread conceptual framework, often becoming a *myth*, that considers technology as a sort of *magical tool*, fostering development and well-being for humankind. Such a utopian point of view has a long history, having been particularly popular during the French Revolution, when the connection between distance communication tools (Chappe's Optical Telegraph, at the time), social development, democracy, and universal peace was explicitly stated by Philosophers and Politicians[2].

More recently, the use of mass media in developing countries has raised expectations among the international community, as exemplified by the United Nations Educational, Scientific and Cultural Organization New World Information and Communication Order (UNESCO NWICO), but ended up not achieving the expected results.

ICTs seem to be even more powerful. According to Lyut (2004)

*At the highest levels of government and intergovernmental organizations, this newest form of information technology is viewed as a ticket to*

*everlasting peace, progress, and prosperity. Despite the faltering of the "tech" bubble in 2000, hopes remain that the application of information technology will solve many of the problems now confronting the planet.*

As Warschauer (2003) points out, "the notion of a digital divide – even in its broadest sense – implies a chain of causality: the lack of access (however defined) to computers and the Internet harms life chances" (p. 7). As reductionistic as it may appear, the conceptual framework based on such direct causality is widespread, both on the negative side (the lack of access harms life) and on the positive side (the diffusion of technology will solve major problems).

From a broader perspective, the question is whether – and to what extent – ICT is having effects on the social and human environment. The debate on the effects of communication technology has a long history. Communication scholars have long been studying the effect on everyday life of broadcast media (radio, tv, etc) and of interpersonal communication media. Early research was mainly focused on short-term effects, proposing the idea that the mass media are so powerful that they can inject their messages into an undifferentiated audience (the so-called "hypodermic needle"). Subsequent empirical work has shown this early phase to be nothing more than "folk belief": a large amount of empirical data has led to the assumption that personal and social variables can strongly influence the way people use the media, and dramatically reduce their power and the strength of their effects. Recent research is now focusing on long term, cultural effects, on active audiences and on the complex way they negotiate meanings. Instead of studying mass media "effects", researchers are now turning to the way in which audience members generate their own meanings starting from media consumption (see McQuail, 2000[4]; DeFleur & Ball-Rockeach, 1989).

Recently, social scientists have added pc, mobile phones, and the Internet to the mix of technologies whose effects they are studying. According to Kraut & Brynin (2006), there are four main approaches to identify "what researchers mean by the phrase social impact of Information Technology": Technology as a tool, Technology that shifts goals, Personal welfare outcomes, Social impact (pp. 5-6). As highlighted in relation to mass media effects, "people shape the impact technology has to their lives by choosing which technology to use and how to use it" (Kraut & Brynin, 2006, p. 8) and appropriate it to serve their needs.

The effect of technology on the social sphere can be described in terms of *technological determinism*, meaning that technology is designed as the condition (hard determinism) or as a factor that may facilitate social change (soft determinism). Despite the critiques, technological determinism still plays an important role in the rhetoric of computers and the Internet, with special regard to ICT for development related topics. "The reports, texts, and discussions of the digital divide do not question this prevailing technological determinism, but exploit it" (Gunkel, 2003, p. 12).

Instead of a unidimensional causal chain, where technology has the power to foster social change, we need a more complex model, helping to consider adaptive behavior and domestication processes (Silverstone & Hirsch, 1992). Adopting this framework means agreeing that the acceptance of new technologies into everyday life is evolutionary, and can be defined as an active and creative process. In the case of individual appropriation of technology, social and cultural dimensions are involved: both technologies and cultures change in the process.

To draw such a multidimensional picture, many disciplinary approaches are needed, and a new research perspective has to be introduced. According to Raiti (2006),

*There are several epistemological shortcomings within information communication technologies for development (ICT4D) literature. The literature is overly optimistic, highly western, multidisciplinary, and atheoretical. It fails to draw extensively on a breadth of research in other fields such as media and communications studies (p. 1).*

## BEYOND THE DONATION RHETORIC: ENABLING TECHNOLOGIES

For a better understanding of the multiple divides we are dealing with, we should also refuse to embrace the idea that we can define the universally optimal technology equipment, to which every other situation has to be compared, independently of the context people live in and of the purposes they are willing to pursue through Information and Communication Technology. Moreover, many discussions assume that providing ICTs to larger parts of the population is good in itself. If simply focusing on providing technology to a target population, ICT for development projects run into difficulties that have been well documented (see Warschauer, 2003): most of the technology provided appears to be unable to meet the population's needs; sometimes, people don't even use it.

One of the most debated issues in ICT for development research is how investment in ICT can be justified when millions of people lack food, essential healthcare, etc. Many argue that, when resources are limited, they should be allocated to meet more basic needs, without investing in ICTs, often perceived to be just glamorous gadgets compared to food, healthcare, education.

The conflict between investing in ICTs and investing in meeting basic needs can only be solved by refusing the assumption that providing technology is a goal in itself, and focusing on how essential human needs can be better addressed using technology. In fact, there is no necessary contradiction between meeting basic human needs and investing in ICTs, as long as ICTs are seen as means to achieve important human goals.

*If ICTs are useful at all, it is as a potential instrument in meeting other human, social, cultural, economic, or political purposes (...) Information technologies should be introduced when (and only when) they constitute the most effective available way of meeting basic human needs and fulfilling fundamental human rights. Information and communication technologies can have a positive role in development. But ICTs are neither a panacea nor necessarily the first line of attack in combating poverty, misery, injustice (Keniston, 2004, pp. 21-22).*

That's what we define as "enabling technology": following Silverstone (1999), "Technologies, it must be said, are enabling (and disabling), rather than determining" (p. 21). Consequently, access to a set of technologies is not a priority in itself; it becomes a priority if (and only if) it enables a wide range of Information Society services, contributing to addressing people's basic needs, as information really can turn into a strategic asset worldwide. Most effective ICT for development projects, in fact, focus on healthcare, education, agriculture, electronic governance (for a project review, see Keniston & Kumar, 2004; Wilson, 2004).

### Not Only Personal Computers: Redefining ICT for Development

Adopting an "enabling technology" perspective also leads to reconsider what is commonly meant by ICT, when reflecting on its application to development.

Social science research and policy-making, let alone common sense, sometimes adopt too narrow a definition of ICT, exclusively focusing on Personal Computers and Internet (wired) connection. Much of the digital divide empirically-gathered data, at a micro (the family, the individual) as

well at a macro level (international comparisons), mainly describe the digital divide in terms of PCs and Internet availability, measuring the number of PCs, Internet hosts, or connections available in single households or in a geographical area.

Alternatively, commentators use too broad a definition, treating ICT as a homogeneous concept, used as an umbrella term for a wide variety of technological applications.

*Even when they are not treating ICT as a homogeneous concept, many politicians and other commentators have been extremely limited in their definition of terms – content to define ICT vaguely in terms of computer hardware and software or, latterly, exclusively in terms of access to the Internet (e.g. Norris, 2001). However, we know that people's use of technology extends far beyond the realm of the computer through technologies such as digital television, mobile telephony and games consoles (Selwyn, 2004, p. 346).*

Adopting an enabling technology perspective, however, leads us to consider a huge variety of technologies. If we shift the focus from technology itself to social use of technology (i.e. on what people can achieve through technology), we should broaden the spectrum of technologies to be involved in ICT for development projects, at least in the following three directions:

- Not only PCs: towards ubiquitous computing and "newer" technologies
- "Older" technologies
- Ad hoc technologies

The narrow definition, identifying ICT with PCs and Internet (wired) connection, is widely utilized in new media literature, much beyond the ICT for development debate. It derives from what Marinelli (2004), defines, in von Foerster's terms, a *blind spot* ("what we do not see that we do not see"): too often have we mistaken the precondition (digital convergence), for the evolution's goal. New media evolution will not lead to a single, strongly multitasking device. New media, instead, are differentiating and evolving in complex ways: the variety of devices, connection types, and interfaces we deal with in our everyday life will be multiplying rather than reducing.

We live in the age of Ubiquitous computing, where a growing variety of devices is processing information and where information itself is available throughout our world. In Weiser's (1993) definition:

*Long-term the PC and workstation will wither because computing access will be everywhere: in the walls, on wrists, and in "scrap computers" (like scrap paper) lying about to be grabbed as needed. This is called "ubiquitous computing", or "ubicomp" (...) unlike virtual reality, ubiquitous computing endeavors to integrate information displays into the everyday physical world (...) ubiquitous computing envisions a world of fully connected devices, with cheap wireless networks everywhere.*

Furthermore, the digital divide appears to be a moving target, and technological innovation constantly provides newer technologies to deal with. On the other hand, however, these rapidly evolving processes also provide new answers to older questions: technological *leapfrogging,* for instance, has taken place when mobile telephony has overcome the worldwide diffusion of wireline telephony[3]. Similarly, wireless Internet access appears to offer a practicable alternative to wired connections in many disconnected or poorly connected areas (both in western and in developing countries). Cheaper and more powerful devices are emerging from Ubiquitous computing research.

On the other hand, crucial information can be provided to specific populations by older media, such as radio and television. Not focusing on technology itself, but on people's need, also means that we don't have to assume that ICT are

necessarily the best way to provide the information needed. Traditional broadcast media have been successfully employed in many developing contexts, providing healthcare information, education programs, information on agriculture and trade[4].

In some western countries, policy makers have believed that digitalization of broadcast media could be a powerful means of *digital inclusion* for those who are not already reached by PCs and the Internet. This is the case, for instance, of early digital terrestrial television introduction in Italy, where the Government financially supported its diffusion, aiming to guarantee a wider inclusion in the Information Society. Elderly people, as well as individuals with low incomes and low education, were supposed to take advantage of the interactivity and the information services (the so-called T-Government) provided by digital television[5].

Finally, a more creative use of ICTs can lead to "ad hoc" technologies: technologies, or applications, specifically designed to better meet local needs. Instead of simply providing western technology worldwide, "putting a PC in every village", technologies, user interfaces and applications can be designed starting from the specific purposes of intended beneficiaries, considering their social and cultural backgrounds.

## Technology in Context: Towards a Better Understanding of Local Needs

Introducing ad hoc technologies leads to a deeper consideration of local context. Instead of adopting homogeneous definitions of ICT, and of human needs that can be addressed through it, ICT for development projects should attentively focus on the specific contexts they are addressing.

Furthermore, even context cannot be considered as a homogeneous concept: geopolitical, social, economical, cultural contexts have to be examined; in addition, infrastructure availability (electricity, wireline telephony, internet connection) varies enormously depending on the context.

The notion of "developing countries" itself has to be considered a mere *synthetic device*, as a variety of different conditions has to be found among them. "The term does not imply homogeneity in any other respect or that other economies have reached a preferred or final stage in development" (Wilson, 2004, p. 10).

*Successful ICT projects worldwide show that technologies have to be chosen not because of their sophistication or cutting edge quality, but because of their practical utility in meeting the needs of local people. Information and communication technology projects must build on an assessment of local needs, as locally defined by local people. (Keniston, 2004, p. 23)*

Consequently, local language and local content are crucial. The dominance of the English language, or at least of very few languages worldwide, emerges not only in web site content, but also in software. Copyrighted software, indeed, doesn't allow any local adaptation by users, while Open Source or Free Software can be tailored to local languages and specific local needs. Furthermore, having access to source codes represents a powerful way for local programmers to improve their programming skills, through so-called "reverse engineering". Local content is the only way to really improve local people's lives. For grassroots content to be produced, and for software to be locally adapted, specific skills and a broader meaning of new media literacy are essential factors.

According to some research, moreover, intended users show doubtful attitudes towards technology: some of them don't believe "the ability of a cold piece of technology to deliver the information they were interested in" (Medhi, Sagar & Toyama, 2007, p. 48) while others "don't trust the phone; it always lies" (Molony, 2006, p. 67). Social capital and education appear to be key factors in fostering trust towards technology, as

well as locally relevant content and an effective user centered interface and application design.

## User Interfaces in Local Contexts

An important, but often overlooked, consideration refers to the social and cultural variability related to User Interfaces. In the western world, user-friendly Graphical User Interfaces (GUI) have played a major role in mass adoption of Personal Computers, as graphical browsers did in relation to the world wide web. Standard GUI offer windows, graphical icons, menus and pointers; the actions are normally performed through so-called *direct manipulation*. Moreover, GUI free the user from learning and retaining complex command languages and are considered to be intuitive, mainly because they are based on visual metaphors such as desktops, folders, etc.

Nevertheless, what is perceived as fully intuitive in a specific culture can be far less intuitive in different cultures. For instance, the desktop metaphor mainly works for people who are familiar with real world desktops. More sophisticatedly, cultural difference also affects the way in which people organize time and space[6]: spatial and visual metaphors appear, therefore, to be culturally variable. Writing direction, for example, appears to influence the way we perceive directionality. Using left directed arrows to mean "back", which is fully intuitive for western cultures, could appear less evident to other cultures.

In addition to cultural variability, illiteracy (referring to the skills of reading and writing) can constitute a major barrier to computer and Internet use, due to the heavy presence of text, both in user interfaces and in document content. The well-known Simputer[7], as well as other applications, try to give the illiterates access to computing devices and to the Internet, often offering at the same time reading and writing training.

According to Medhi, Sagar and Toyama (2007), a text-free user interface is defined by "liberal use of graphics and photographs for visual information, and voice for providing information normally provided via text" (p. 37). In their research, they adopt an "Ethnographic Design" approach, working extensively with members of the project's target community. As a result, they reach a UI that is fully understandable for illiterate users. In fact, there are no universal rules to reach such a result, as user response to graphical details "may depend on psychological, cultural, or religious biases" (Medhi et al., 2007, p. 40). Again, local context and local needs have to come first.

## TOWARDS A MULTILEVEL MODEL FOR ANALYZING THE DIGITAL DIVIDE[8]

The enabling technology perspective, as well as the multiple divides approach, offer complex theoretical frameworks for understanding the technological, social, and human factors that have to be considered when questioning ICT for development. In order to operationalize such theoretical frameworks, I will try to introduce a multilevel model to analyze digital divides, focusing on five main steps:

- Technology availability (or formal access)
- Real access
- Reception practices
- Technical skills and content production
- Networking skills

Technology availability (or formal access) refers to the opportunity, at a micro or a macro level, to materially access technology at reasonable prices, whether at home, at work, at school or in public places (such as public institutions or commercial outlets). It represents a prerequisite for the further steps. Evidently, without the chance of accessing technology, there is no point questioning effective use, reception practices, and technical skills.

It is important to draw a distinction between mere availability and real access, often confused by commentators: availability means that people have the opportunity to access technology (whether owning it, or through public facilities); whether they effectively use it or not depends on many factors, starting from motivation and perceived utility.

The most popular understanding of technological availability is certainly what Warschauer (2003) defines as the *device* model: ICT access can be considered in terms of ownership of a device. It is a very appealing model to policy makers and international agencies, because the diffusion of devices is relatively easy to measure. Access to a *conduit* can be added as a second element, showing slower diffusion models, "either because a delivery infrastructure must be established first (…), or because of the cost of a regular monthly fee is a disincentive to access" (Warschauer, 2003, p. 33).

With the exception of a small minority of excluded people, standard technology availability does not represent a big issue in western countries: even if technology penetration is far from being universal, a large majority of the population has the opportunity to access the Internet at reasonable prices (at work, at school, in public places, etc.). Standard connectivity to the Internet can therefore be taken for granted in western countries. Nevertheless, access to newer and more powerful technologies, e.g. broadband, not to mention Next Generation Access Networks, can have severe limitations (mainly following spatial patterns: urban vs rural areas, mountains vs lowlands, etc.; and depending on specific policies and commercial strategies)[9]. On the contrary, technology availability still constitutes a crucial issue for a wide majority of the population in the global South, where the opportunity to use *devices* or *conduits* is far to be widespread.

Once technology availability is granted, real access designates an individual's or a population's actual use of technology. Having formal access to ICT does not necessarily lead to using it, as scholarly work on nonusers in the western world has pointed out: intermittent users, dropouts and Net evaders are people having (had) at least formal access to technology, but who have stopped using it (see van Dijk, 2005). Similarly, ICT for development projects exclusively focusing on providing technologies have shown their low effectiveness: without enough motivation, an adequate consideration of local needs, and at least a basic new media literacy, it is highly unlikely that the intended beneficiaries will become effective users of technologies[10].

What really matters, for people to improve their lives, is effective and meaningful access to technology; the theoretical opportunity to access it is not enough, neither is using it without a sufficient degree of control and competence. The third level of the proposed model focuses on the skills implied in reception practices.

What seems to make the difference towards an advanced use of technology, once formal access has been granted, are people's motivations and skills. In fact, as argued by van Dijk (2005), motivations themselves are related to the perceived utility of technology use and to people's skills. To effectively use new media, indeed, a large variety of competences are involved, such as dealing with multimedia, with hypertextual reading, information processing, etc.

*Like education in general, it is not enough to give people a book, we also have to teach them how to read in order to make it useful. Similarly, it is not enough to wire all communities and declare that everyone now has equal access to the Internet. People may have technical access, but they may still continue to lack effective access in that they may not know how to extract information for their needs from the Web (Hargittai, 2002).*

The fourth step also deals with new media literacy, focusing on the skills involved in production, both referring to technical skills and to

content production skills. Technical skills refer to ICT professionals and to the broader community having an advanced technical background (as, for instance, the Open Source community). While technical skills are often mentioned as a strategic asset in Information Society, content related skills are seldom considered. Indeed, liberty of expression, grassroots information, and independent content generation would remain rhetoric, or managed only by a limited elite, if content related skills were not broadly spread. In the last few years, the growing importance of User Generated Content (UGC) is showing to what extent content related skills are becoming crucial[11].

"Networking skills" constitute the fifth level. As Rheingold (2002) says, "A new kind of digital divide ten years from now will separate those who know how to use new media to band together from those who don't" (p. xix). Networking skills refer to the vast field of Computer Mediated Communication, where interaction not only occurs "With the Net", but also between people, "Through the Net". The recent popularity of Social Network Sites such as My Space, Facebook, Linkedin, etc., shows that there is a growing interest in articulating, making visible, and managing personal or professional relationships through technology enabled environments[12].

Furthermore, *social capital* appears:

*as an important element of individuals' and organizations' ability to access and effectively engage with ICT (...), with the size and nature of an individual's network of technological connection and relevant social contacts developing and sustaining an individual's use of ICT (Selwyn, 2004, p. 345).*

"Social isolation" was also mentioned as one of the main reasons for not being connected in van Dijk's (2005) analysis. Technology, therefore, can be used to manage, and even strengthen, individuals' social networks, while, specularly, social capital appears to be an important factor in gaining access to technology and in improving personal skills towards effective use. Finally, networking skills appear to be crucial in knowledge creation and dissemination, as well as in maintaining distance ties, particularly among diasporic communities.

## From Computer Skills to New Media Literacy

As the three final levels of the proposed model deal with different aspects of new media literacy, it is worth focusing on it, for a better understanding of the model's implications.

Literacy (in its very traditional meaning: the skills of reading and writing) still constitutes a critical topic for many developing countries. Nevertheless, as ICTs become central to modern societies, new literacy issues are emerging, extending the previous meaning to include audiovisual media and, more recently, new media. Moreover, it is widely acknowledged that, from the perspective of the global South, a multiplicity of literacies, instead of a monolithic literacy, has to be considered (Dunn & Johnson-Brown, 2007).

Warschauer (2003) composed a complete picture of the skills needed to work with computers and the Internet: computer literacy, information literacy, multimedia literacy, computer-mediated communication literacy[13]. While the term computer literacy appears to be simplifying and is discredited among commentators, information literacy covers a broader set of skills and competences in manipulating information, involving both technology-specific skills and broader resources. Information literacy refers to the wide variety of abilities people need to retrieve, access, critically evaluate and effectively use information, in a their various contexts and for different purposes (Dunn & Johnson-Brown, 2007).

Following Livingstone (2003), media literacy can be defined as "the ability to access, analyse, evaluate and create messages across a variety of contexts" (p. 3). (New) media literacy, like tra-

ditional literacy, does not only involve receiving information (which refers to the third level of the model), but also producing it (which refers to the fourth level of the model): first of all, people achieve a better understanding of a medium through direct experience of content production and second

*the internet par excellence is a medium which offers hitherto unimagined opportunities for ordinary people to create online content. To exclude this from a definition of media literacy would be to greatly under-utilise the potential of the internet for the public (Livingstone, 2003, p. 3).*

As many commentators argue, the literacy needed in new media use has still to be established, and appears to be partially co-evolving with technological and social innovation, in a constant co-production between technology and the user.

Hargittai (2002) has conducted extensive studies on how people search the Internet, finding a "great deal of variance in abilities to locate content online", not only related to critical evaluation of sources, but sometimes also due to spelling errors. Therefore, she introduces the idea that a "second-level digital divide exists relative to specific abilities to effectively use the medium".

Multimedia literacy goes beyond traditional written text-based literacy, including a variety of languages and media (both on the reception and on the production side). Computer-mediated communication literacy, involved in the fifth level of the model, has hitherto received less attention, but will acquire a growing relevance the more ICTs are used as a means of interpersonal communication and as a tool to manage social networks, both in professional and in personal contexts.

## FUTURE TRENDS

In our rapidly changing world, new gaps and new opportunities are constantly emerging from technological, economic and social evolution. The main challenge we will have to face is building a more equitable Network Society, reducing the number of excluded people, and guaranteeing social inclusion to the broadest part of the world's population.

Digital technology can play a major role in this direction, if we seriously focus on specific local needs, and if every effort is made to effectively reach the intended beneficiaries of ICT for development projects. Therefore, we should abandon every techno-centric vision, to focus on human needs; and we should also refuse a western-centric perspective on development. Local context and actual human needs should be regarded as the key factors. Therefore, further research needs to be done to better analyze the complex dynamics between local contexts and a globalized world..

Only a widespread new media literacy will effectively lead individuals and communities into the Network Society. Education (both formal and informal) appears as one of the most valuable resources for individuals and communities. Therefore, new media literacy should be better defined, in order to provide specific policy models and to design appropriate learning tools.

Finally, ICT for development projects should be more systematically analyzed, producing worldwide benchmarking and outlining best practices, on the basis of their actual results. We need a more precise insight into what actually works, under precise conditions and in specific contexts, in order to plan policies that will effectively improve people's lives.

## CONCLUSION

Rethinking the relationship between technological, social and human factors has deep consequences

on the definitions we apply to the digital divide. Therefore, redefining the digital divide should not be regarded as a pure theoretical concern: it directly contributes to building the conceptual frameworks for ICT for development projects. A deeper consideration of the technology involved, moreover, helps to draw a more complex picture, moving towards Ubiquitous computing and ad hoc technologies.

The enabling technology perspective, as well as the proposed multilevel model, can have relevant policy implications. From this point of view, shifting the emphasis from technology itself to social use of technology means to design policy instruments that focus on human needs rather than on technologies. There are no universal policy measures, to be applied worldwide, in any context and for every type of purpose. We need *user-centered* policies, able to effectively meet their beneficiaries' actual needs. Moreover, policies, as well as specific technologies, should be designed involving the intended target communities; possibly, they should be designed and managed *by* target communities themselves.

Critics may point out that it is too complex a model to be practically implemented in real world projects. In fact, the proposed multilevel model tries to operationalize those theoretical frameworks, offering a practical support for policy making and project developing. More specifically, the first level (technology availability) can be addressed by the most traditional digital divide policies, providing device and conduit access at sustainable prices to growing parts of the target populations (fostering the diffusion of community technologies, as well as supporting infrastructural modernization, and sustaining the digitalization of single households).

The second level (real access) can be addressed by focusing on users' motivations: the diffusion of valuable content, specifically produced to meet people's (local) needs, and a growing attention to usability and interaction design, could increase the perceived surplus value of ICT for everyday purposes and, therefore, strengthen the users' motivation. A key element would be producing specific services and applications for underserved groups, both in industrialized countries and in the global South. Single ICT for development project, moreover, should involve specific actions aiming to motivate intended users.

To address the following levels of the proposed model, educational policies (both formal and informal) have to be implemented, both at a macro and at a micro level. New media literacy offers a complex framework: in the proposed model, it includes reception practices, active production skills and networking skills. Similarly, educational policies should try to address the wide variety of skills needed for a full participation in the Network Society. Schools and Universities should be connected, as a necessary prerequisite for young people to learn how to use ICT, while overall educational systems should adapt their curricula, rapidly integrating information literacy and new media literacy. Adults, on the other hand, should not be left behind: continuous education and training programs should be granted. At a micro level, every ICT for development project should deal with its intended users' skills, providing the needed support to individuals and communities.

The effectiveness of projects involving ICT in bridging the digital divide depends on multiple factors. Their intended beneficiaries can actually be reached only putting local contexts and local needs first. Applying the proposed model, adapting it to each project's specific context and purpose, can help reaching this goal.

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## KEY TERMS AND DEFINITIONS

**Ad Hoc Technologies:** technologies, user interfaces or applications that are specifically designed to better meet local needs, starting from the specific purposes of intended beneficiaries and considering their social and cultural backgrounds.

**Enabling Technologies:** technologies that enable a wide range of Information Society services, contributing to address people's (basic) needs.

**Networking Skills:** the skills involved in so-called computer mediated communication, like using technology for interpersonal communication, and to articulate and manage social networks.

**New Media Literacy:** the ability to use new media, both on the reception and on the active production sides.

**Real Access:** once technology availability is granted, real access designates an individual's or a population's actual use of technology.

**Technology Availability:** the opportunity, at a micro or a macro level, to materially access technology at reasonable prices, whether at home, at work, at school or in public places (such as public institutions or commercial outlets).

**Technology in Context:** the adoption of definitions of ICT, and of human needs that can be addressed through it, that focus on the specific contexts they are addressing. Geopolitical, social, economical and cultural contexts, as long as infrastructure availability, have to be considered.

## ENDNOTES

1 The surveys summarized by Katz & Rice (2002a) only refer to the US, but further studies confirm similar trends in other western countries. Internet Benchmark Italia Reports (and particularly the fourth and fifth Report, 2001 and 2002), for instance, were among the first to highlight the dropout phenomenon in the Italian context.

2 See Flichy (1991), Mattelart (2000).

3 For a critical approach to the role of mobile telephony in developing countries, see Castells Fernández-Ardèvol, Linchuan Qiu, & Sey, 2007. After reviewing some case studies, focusing on the emerging trends in mobile telephony, The authors underline that their "observations document the excessive optimism that surrounds this new magic bullet of development (…) Wireless communication is no panacea for development. But developmental projects from all corners of the planet, are embracing the potential of new technology and are using it for their own purposes according to what they are able to achieve" (p. 243)

4 Mass media can be seen as powerful modernization tools (see Morcellini, 2005, pp. 15-41).

5 Hitherto, the goal has not been achieved, mainly because the described strategy was based on a simplifying, device-centric model. The implicit assumption was that the mere introduction of a digital tool (namely, a digital decoder) could foster digital inclusion. Currently, on the contrary, the access rates to interactive tv services, let alone T-Government services, are very low, and digital terrestrial television is mainly used

as a more powerful version of traditional analog television.

[6] For early research on this topic, see Hall 1959.

[7] For further information, see http://www.simputer.org

[8] For an early version of the proposed model, see Anzera & Comunello (2005).

[9] For a recent research on challenges and opportunities of Next Generation Access Networks, see Caio (2008).

[10] One of the most cited examples of problematic ICT for development projects is "The hole in the wall", a community technology project realized by the Government of New Delhi, aiming to provide computer access to street children. As Warschauer (2002; 2003) points out, the project succeeded in providing pc access, but didn't focus on people's skills, showing little effectiveness on community life. An interesting review of effective projects, addressing cultural and social implications of ICT, can be found at http://www.stockholmchallenge.se

[11] According to Tancer (2007), currently, the percentage of *participatory visits* (i.e. video or photo uploads) in web 2.0 sites like You Tube and Flickr, are respectively about 0.18% and 0.12%, while participatory visits in Wikipedia (editing an entry) are 4.18% out of all website visits.

[12] Boyd & Ellison (2007) define social network sites as "web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site".

[13] Another useful categorization describes operational skills, information skills, and strategic skills (van Dijk, 2005, pp. 75-93).