The Digital Divide Metaphor: Understanding Paths to IT Literacy

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Abstract

Not having access or having a disadvantaged access to information, in an information-based society may be considered as a handicap (Compaine, 2001). In the last two decades scholars have gradually refined the conceptualization of digital divide, moving from a dichotomous model mainly based on access to a multidimensional model accounting for differences in usage levels and perspectives. While models became more complex, research continued to mainly focus on deepening the understanding of demographic and socioeconomic differences between adopters and non-adopters. In doing so, the process of basic IT skills acquisition has been largely overlooked. This paper presents a metaphorical interpretation of the process of IT skills acquisition derived from empirical evidence. The analysis highlights the presence of three distinct IT skills acquisition approaches, as well as the key role of self-learning. These preliminary results represent a useful starting point for the design of more effective and sophisticated inclusion policies.

1. Introduction

In his recent best seller "The World Is Flat" The *New York Times* columnist Thomas Friedman argued that in the year 2000 the world entered a new era of globalization. According to this author, the previous globalization phases were spearheaded by countries and companies going global, the latest phase, instead, is and will be built around individuals globalizing. This view of the world, by stressing the key role played by individuals as dynamic agents in information-based economies, adds an interesting perspective to the framing of digital divide.

This perspective shifts the "public policy problem" of the digital divide from a matter of pure social inequality to a strategic issue in a global race for competitiveness. At present, the different globalization patterns individuals may pursue are still vague and surely require further investigation. Nevertheless, it seems reasonable that worldwide access to people and information/knowledge may be considered two key ingredients to globalization processes. From a policy standpoint, the stress put in the *i2010 European Strategic Plan* on the importance of a single information space for the creation of an inclusive information society seems to support this thesis. In this view, the use of information and communications technologies (ICT) is seen to underpin the social and economic progression of nation-states throughout the first stages of the twenty-first century (Selwyn, 2003). The ability to use ICT and work with information may therefore be defined as "the indispensable grammar of modern life" and a fundamental aspect of citizenship in the prevailing information age (Wills, 1999).

The aim of this paper is to investigate how people learn to use the "grammar of modern life" in order to provide policy makers with new and more refined information for the creation of effective and sophisticated inclusion policies. Warschauer (2003, p.47) argues, "Access to ICT for the promotion of social inclusion cannot rest on providing devices or conduits alone. Rather, it must engage a range of resources, all developed and promoted with an eye toward enhancing the social, economic, and political power of the targeted clients and communities."

The article is structured in seven sections including these introductory comments. The second section briefly reviews the literature on digital divide highlighting its scholarship evolution as well as areas that need further investigation. Section three presents the research design and methods used in this paper. Section four provides evidence of the importance of IT skills for Internet access and use and presents a preliminary foundation for the classification of Internet users (including non-users). The fifth section lays out a digital divide metaphor and argues its

usefulness on the basis of the empirical evidence presented in this paper. Section six provides a socioeconomic description of users' types, while the last section includes some concluding remarks and a discussion of important policy implications.

2. Digital Divide and IT Skills

The digital divide is often characterized as some type of relationship between information and communication technologies (ICTs) and groups of individuals, who are situated within a complex arrangement of social, environmental, political, and economic issues. ICTs include any communication device (such as a computer hooked up to the Internet, radio, satellite systems, cellular phones, etc.) used to communicate with and access information. The term IT skills is a varied concept, ranging from skills describing information-retrieval and searching activities to skills regarding the synthesis of information and productive use of information in daily activities. An extensive information literacy literature review was done by Virkus in 2003 and the following comments on IT skills draws heavily from that research.

The following section outlines the viewpoints and assumptions taken by different authors. While scholars investigate many different types of technology, connectivity and uses, the last fifteen years of research yielded three main approaches to understanding the digital divide: access divide, multi-dimensional digital divide, and multi-perspective digital divide. During that time, IT skills and information literacy research focused on two main approaches (Virkus 2003). The most common was identifying discrete skills and attitudes that can be learned by individuals and measured (Hepworth, 2000b, 2000c). The other focus was more of a behavioral-constructivist approach, which emphasized how an individual experiences and makes sense of his/her world in an information society (Bruce 1997).

2.1. The Digital Divide and IT Skills as a Simple Dichotomous Phenomenon

One of the first, and most simplistic accounts of the digital divide expresses a separation between the information "haves" and "have nots." This viewpoint implies that the "haves" have access to computers and the Internet and the "have nots" do not. Scholars argue that a gap exists solely because of an 'access to technology problem' and tend to frame the access divide as an inherent delay in the diffusion of technology among different geographic areas and social groups (Adriani et al 2003, Compaine 2001). One assumption is that "once online, there is no gap" (Walsh *et al.* 2001 p. 281). In addition, it is assumed everyone uses the Internet for the same purposes (Walsh *et al.* 2001). Based on these assumptions, access to the Internet and use of the Internet are often equated (DiMaggio & Hargittai 2001). From this view, the only important determinant of Internet use is access. IT skills are rarely mentioned and their effects are commonly not tested.

While the simple access divide viewpoint neglects the importance of IT skills, a review of the IT skills literature reveals a spirited debate about information literacy and IT skills was in progress as early as the late 1980s. Virkus (2003) reviewed the literature and reported that Heeks (1989) identified two distinct viewpoints, one that sought greater precision in the terminology of IT skills and the other warned against precision. In addition, Virkus (2003) reports that "Hopkins (1987) found that there was an unresolved dichotomy and confusion between the notion of information skills as (a) the retrieval and location of information, and (b) the analysis and synthesis of information; the distinction between the two is not clearly articulated in the literature." Therefore, research continued to progress toward more and more complex ways of understanding the phenomenon.

2.2. The Digital Divide and IT Skills as a Multi-Dimensional Phenomenon

A competing digital divide viewpoint has challenged the simple access dichotomy. Servon (2002) and Norris (2001) assume access to be a basic building block (i.e., almost a "given").

DiMaggio and Hargittai (2001) take this position stating, “As the technology penetrates into every crevice of society, the pressing question will be not ‘who can find a network connection at home, work, or in a library or community center from which to log on?’ but instead, ‘What are people doing, and what are they able to do, when they go on-line?’” as important factors in understanding the digital divide. More recently, Ferro *et al* (2005) added a dimension to this picture by highlighting the presence and the interrelation of demand and supply related divides. Generally, this view advocates for public policy intervention and does not see the market as being able to close the gap over time with respect to access (Chin 2004, Cole *et al.* 2004, Mossberger *et al* 2003) information literacy, employment opportunities, or community redevelopment. Warschauer (2003) argues that there are many similarities between literacy and ICT access, which need to be more closely examined.

Virkus (2003) chronicles the evolution of the IT skills literature demonstrating that authors have challenged the simple idea that IT Skills are unidimensional. He reports, Mutch (1996) argues that “the term ‘information literacy’ carries overtones of a very tightly defined skill set or competence rather than the broader and more complex set of attitudes, approaches and skill sets...”. In addition, he writes that an OECD report emphasized the following, “The ability to seek and exchange information using databases and networks is not simply dependent on access to technology, but requires possession of the necessary technical skills. In addition, it calls for basic competence in being able to choose, classify and critically evaluate the information that becomes accessible." (OECD 2000, p. 102).

Therefore, from the multi-dimensional divide view, IT skills are important and frequently included in digital divide theoretical and statistical models. However, even within this more comprehensive view, IT skills acquisition patterns are rarely explained.

2.3. The Digital Divide and IT Skills as a Multi-Perspective Phenomenon

Recently, activists, scholars and practitioners are questioning whether the concept of the digital divide, as represented in early studies, actually provides an accurate portrayal of reality. Some scholars have begun re-theorizing technology's relationship with race, gender and culture (Castells 2001,Kennedy *et al*. 2003, Warf 2001). In this view point, scholars reject that any one group of individuals inherently use technologies differently than the majority, but "recognize that individuals and communities employ technologies for very specific goals, linked often to their histories and social locations" (Hines *et al.* 2001, p. 5). These scholars argue, "barriers to access [and use] operate on many levels and therefore solutions must take multiple approaches" (Hines *et al.* 2001, p. 5). Scholars suggest it is necessary to understand the different dimensions of the digital divide, as well as to critique the dominant discourse on how and why the different dimensions affect inequality. Focusing solely on the most privileged group members (in any dimension – age, gender, race, income, location, world) marginalizes the experiences of those who are multiply burdened (Crenshaw, 1989). In this view, the needs and problems of those who are most disadvantaged should be the starting point for any discussion about technology and circumstances are to be evaluated based on how the intersections of race, gender, class, worldview etc. come together (Servon 2002).

Scholars of this view see the digital divide needing policies that are tailored to specific issues and problems. Warschauer (2003, p. 221) states, "Once social problems or goals are identified, programs should be based on a systemic approach that recognizes the primacy of social structure and promotes the capacity of individuals or organizations for ongoing social change through innovation of those structures using technology". Scholars call for re-defining and re-framing the concept of the digital divide in public discourse and that policy solutions need to be developed based on this conceptual redirection. The level and acquisition patterns of IT skills could be seen as one of these important characteristics.

IT skills and literacy researchers who question the main assumptions surrounding common place IT skill notions found in the simple dichotomy and the multi-dimensional viewpoints, suggest the idea of literacy is complex. For example, Waschauer (2003, p. 46) writes, (1) literacy is not just one type of literacy, but many, (2) the meaning and value varies in particular social contexts, (3) literacy capabilities exist in gradations and not as a dichotomy of literate versus illiterate, (4) literacy alone does not guarantee an automatic benefit outside of its particular function, (5) literacy is a social practice involving artifacts, content, skills, and social support, (6) acquisition of literacy is not only about education but also power.

Heretofore, some scholars have studied the importance of IT skills for Internet access and Internet use, but little or no provision has been made for the process of basic IT skills acquisition. We believe that the understanding of this process is key for the design of effective inclusion policies. That is why the analysis will be aimed not only at testing the importance of IT skills for Internet access and use, but also at casting some light on the different patterns of IT skills acquisition.

3. Methodology

The empirical analysis presented in this paper is based on a survey to 2206 Italians who live in the region of Piedmont. The sample used for the purpose of this paper was created from a database provided by the Italian National Statistical Institute (ISTAT) whose data refer to the last periodical census carried out in 2001. The entire data set was collected via Computer Aided Telephone Interviews (CATI) by the ICT Observatory of the Piedmont's Regional Government in November 2005. Thus, people without a fixed line are not represented in the sample. The stratified sample was created using a differentiated probability approach in order to over-represent segments with a higher variance in terms of technology adoption and usage (i.e., young *versus* older people). The variables adopted for the stratification of the sample were: age, gender,

and size of town of residence. Following the guidelines provided by the European Statistical Institute, people less than 16 years old were excluded from the sample. Respondents were asked questions about computer ownership, Internet access and Internet use. Relevant individual demographics and household characteristics were also collected. The main analytical tools used for the analysis and interpretation of data are multiple linear regression models, hierarchical cluster analysis and cross tabulations.

The article will also take advantage of a metaphor as a literary tool for the production of a clear, simple and synthetic representation of an articulated and complex problem. The final objective of the exercise is twofold. First, to provide an easy and concise communication of the complexity inherent in the analysis. Second, to propose a simplified but faithful representation of reality to be used as a test bed for conceptual speculations and practical discussions about possible inclusion policies.

4. Analysis and Discussion

The next sub-sections have two main purposes. The first applies two of the three approaches presented in the digital divide literature review section to the phenomenon of Internet access and Internet use: (1) access divide model and (2) multi-dimensional divide model. It provides evidence of the importance of some factors as determinants of Internet access, as well as evidence of the importance of Internet access as a determinant of the extent of Internet use. The second section, instead, proposes that Internet users can be classified according to their learning patterns and usage levels. Using this classification we argue that the divide is widening and policy makers should pay attention to this problem, particularly IT skills acquisition. Together these two subsections highlight the importance of Internet access and Internet use and suggest some areas for future exploration.

4.1. Internet Access, Internet Use, and IT Skills

Using regression analysis, this section provides empirical evidence on the importance of IT skills on Internet access and Internet use. Table 1 presents the results of an access divide model and a multi-dimensional divide model using the number of devices for Internet access as the dependent variable. Income is positively associated with Internet access, which is not surprising, since people need money to buy the necessary devices to access the Internet.

Age is significantly associated with Internet access, but in the access divide model the relationship is negative and in the multi-dimensional model it is positive. That is, as a general trend, older people tend to have a smaller number of devices to access the Internet. However, once controlling for PC use, IT skills, household size, and occupation, older people seem to have a greater number of devices. This seems to suggest that once older people accept technology and have the necessary skills, they tend to have more devices to access and use the Internet. This might be because they have the time and money necessary to buy these new devices. In addition, education and attitude towards computers are positively associated with Internet access. Therefore, people with more formal education and with a positive attitude towards computers and related technologies tend to have more devices to access the Internet. Finally, being female is negatively associated with Internet access measured as the number of devices to access the Internet.

Several variables related to the multi-dimensional divide model were found to be important determinants. Speaking English is positively associated with Internet access. Having a PC at home and individual use of a PC are positively associated with Internet access. Basic IT skills are positively associated with Internet access. Finally, employment status is a significant determinant of Internet access. Overall, there was an improvement in adjusted R-square from 0.403 to 0.575.

Table 1. Determinants of Internet Access (Number of Devices)

Independent Variables	**Access Divide Model**	**Multi-Dimensional Divide Model**
Constant	-0.343** (-2.232)	-0.217 (-1.537)
Income	<0.001*** (7.675)	<0.001*** (3.813)
Age	-0.009*** (-10.483)	0.002* (1.776)
Education	0.174*** (8.139)	0.033* (1.700)
Attitude towards Computers	0.093*** (9.705)	0.038*** (4.450)
Nationality (Italian = 1)	0.164 (1.603)	0.028 (0.319)
Location (Town = 1)	0.079 (1.290)	0.031 (0.593)
Location (Village = 1)	0.049 (0.803)	0.013 (0.240)
Gender (Female = 1)	-0.109*** (-3.860)	-0.047* (-1.916)
Other Language (English)		0.120*** (3.966)
PC at Home		0.105*** (3.191)
PC Use		0.630*** (16.756)
IT Skills		0.083*** (2.685)
Household Size		0.003 (0.235)
Occupation (Employee = 1)		-0.258*** (-4.744)
Occupation (Self Employed = 1)		-0.264*** (-4.070)
Occupation (Unemployed = 1)		-0.231*** (-3.101)
Occupation (Other = 1)		-0.338*** (-5.132)
R-square	0.407	0.580
Adjusted R-square	0.403	0.575
F-statistic	115.712***	108.750***

Note: T-statistics are in parentheses under coefficient values. Those coefficients followed by * are significant at the 10 percent level, those followed by ** are significant at the 5 percent level, and those followed by *** are significant at the 1 percent level.

Table 2. Determinants of Internet Use (Extent of Use)

Independent Variables	**Access Divide Model**	**Access Divide Model (Extended)**	**Multi-Dimensional Divide Model**
Constant	0.376***	-0.824*	-0..229
	(6.545)	(-1.650)	(-0.434)
Internet Access	2.929***	1.842***	1.347***
	(35.882)	(16.408)	(7.183)
Income		<0.001***	<0.001
		(2.881)	(1.555)
Age		-0.023***	-0.013***
		(-7.644)	(-3.194)
Education		0.550***	0.369***
		(7.801)	(5.035)
Attitude towards Computers		0.253***	0.221***
		(7.906)	(6.999)
Nationality (Italian = 1)		0.276	0.175
		(0.831)	(0.543)
Location (Town = 1)		0.050	0.057
		(0.249)	(0.294)
Location (Village = 1)		-0.012	0.031
		(-0.060)	(0.162)
Gender (Female = 1)		-0.554***	-0.449***
		(-5.980)	(-4.926)
Other Language (English)			0.539***
			(4.785)
PC at Home			-0.271*
			(-1.659)
IT Skills			0.238**
			(2.059)
Household Size			-0.060
			(-1.354)
Occupation (Employee = 1)			-0.256
			(-1.254)
Occupation (Self Employed = 1)			-0.391
			(-1.603)
Occupation (Unemployed = 1)			-0.440
			(-1.579)
Occupation (Other = 1)			-0.667***
			(-2.702)
R-square	0.371	0.532	0.566
Adjusted R-square	0.371	0.528	0.560
F-statistic	1287.531***	168.124***	113.923***

Note: T-statistics are in parentheses under coefficient values. Those coefficients followed by * are significant at the 10 percent level, those followed by ** are significant at the 5 percent level, and those followed by *** are significant at the 1 percent level.

Table 2 presents the results of three models using the extent of Internet use as the dependent variable. The extent of use is operationalized as the number of activities an individual performs

using the Internet. The first regression model is based purely in the access divide view and therefore considers Internet access as the only relevant factor affecting Internet use directly. The second model includes the factors mentioned in the access divide view, but tests direct relationships from all of them to Internet use. Finally, the third model incorporates additional variables related to the multi-dimensional divide view, including IT skills.

Overall, there is an improvement in adjusted R-square, which went from 0.371 in the access divide model to 0.560 in the multi-dimensional divide model. Internet access is positively associated with Internet use in all specifications. Income is positively associated with Internet use in the extended access divide model, but becomes not statistically significant once controlling for other variables. Age is negatively associated with Internet use. Education and attitude towards computers are positively associated with Internet use. Being female is negatively associated with Internet use.

Similar to Internet access, there were several variables related to the multi-dimensional divide that were significantly associated to Internet use. For example, speaking English was positively associated with Internet use. Having a PC at home was negatively associated with Internet use. Finally, basic IT skills were positively associated with the extent of Internet use.

In summary, it seems clear that basic IT skills are an important determinant of Internet access and Internet use and are positively associated with both. That is, basic IT skills significantly increase the likelihood of greater Internet access and Internet use. Since, not everybody has the same levels of skills, for research and practical purposes, it is important to understand the differences and similarities among Internet users. The following section provides the empirical foundation for a preliminary classification of Internet users (including non-users).

4.2. IT Skills Acquisition and Internet Use

The aim of this section is to set the stage for the digital divide metaphor by providing it with a robust empirical foundation. Hierarchical cluster analysis and cross tabulations were used to shed some light on a number of aspects pertaining Internet usage levels, purpose of use and acquisition of basic IT skills.

4.2.1 Internet Usage Levels

The first cluster analysis was conducted taking into account different types of Internet usage. Interviewees were asked if they used the Internet and what applications they utilized.

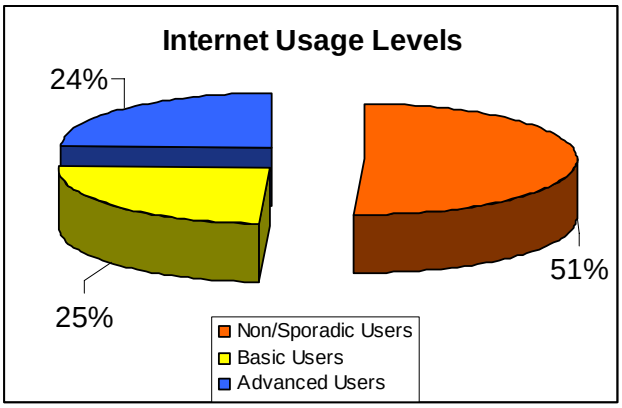

Exhibit 1 - Basis: All Respondents

The analysis highlighted the presence of three clusters. The first one was labeled as none/sporadic users (51%) since it was characterized ‘as a lack of’ or ‘very limited use’ of the Internet. The second group was labeled as basic users (25%) since it showed more regular usage mainly based on information search and email exchange. Finally, the last cluster was defined as advanced users (24%) and was characterized by the use of a much wider range of Internet applications (i.e. videoconferencing, VoIP, e-shopping, blogging and auctions).

These results provide a first indication about the presence of a plurality of approaches towards technology that result in different usage levels. Nevertheless they do not provide any insights as

to what the determinants of this difference are. For this reason, a second cluster analysis was conducted to subsequently cross the results of both analyses.

4.2.2 Purpose of Internet Use

The second cluster analysis aims at understanding the purposes driving Internet use. Respondents were asked to list the main purposes for which they used the Internet. In the population considered, two groups could be singled out. A smaller one (about 20% of the population) and a larger one (about 80% of the population). Interestingly enough, the discriminating variable between these two clusters of respondents was the use of Internet for leisure.

Exhibit 2 shows a breakdown of the main four purposes by cluster. Although the data presented focus on the purpose of use and not on the level of enjoyment generated by the use of technology, it seems reasonable to assert that a portion of the population does not appear to perceive Internet technologies as a potential source of entertainment. In other words, they do not seem to derive pleasure from using these technologies.

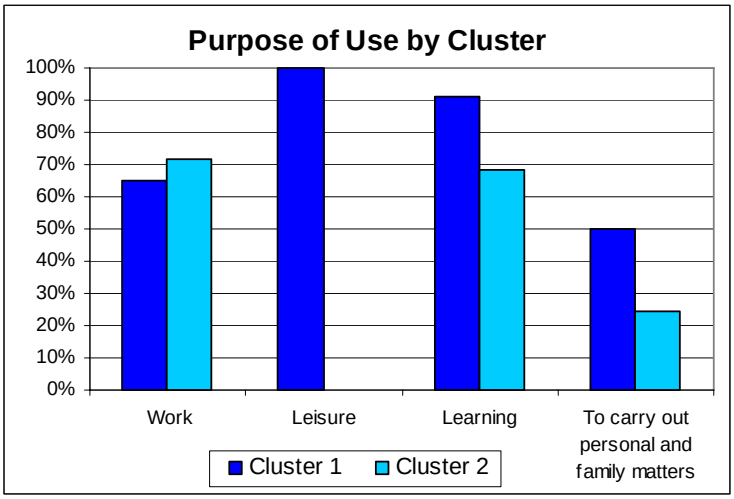

Exhibit 2 - Basis: Internet Users

By crossing the results obtained from the two cluster analyses conducted so far, some interesting results emerged. Exhibit 3 shows a clear trend may be identified between sporadic Internet use and lack of pleasure in using technology. This constitutes initial evidence of the presence of

different attitudes/approaches to technology leading to different usage level. It goes without saying that from a policy standpoint being able to understand and account for the presence of different approaches to technology represents a key ingredient for the creation of more effective inclusion measures.

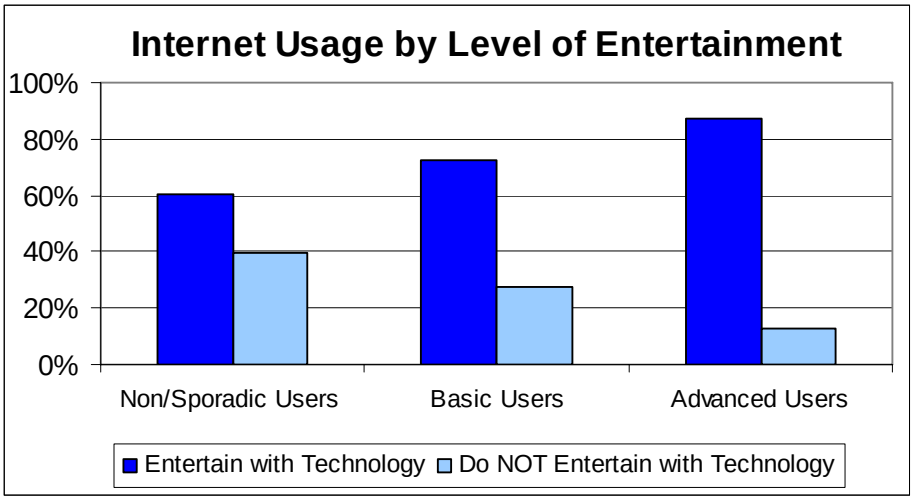

Exhibit 3 - Basis: Internet Users

4.2.3 Basic IT Skills Acquisition

The final part of the analysis focused on basic IT skills acquisition. In particular, interviewees were asked how they learned to use PCs and the Internet. From the results presented in Exhibit 4 it is possible to make two main considerations. Firstly, a good portion of IT skills acquisition appears to occur through an informal process of learning by doing. This result is suggested by the important role played by self-learning (present in nearly 60% of respondents). A similar situation may be found at European level. As a matter of fact, the data recently published on Eurostat's website on e-skills show that the percentage of individuals that obtained IT skills through formalized training in educational institutions is as low as 20%. (Eurostat 2006)

The second consideration regards the fact that basic IT skills are mainly acquired at school or in the workplace.

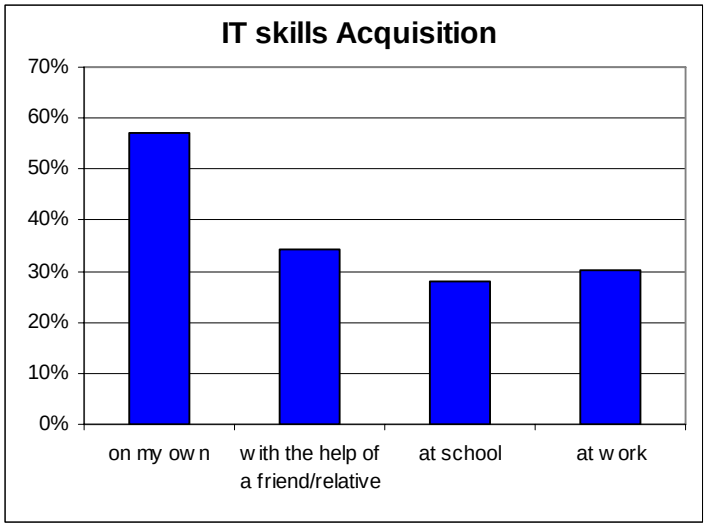

Exhibit 4 - Basis: All Respondents

By crossing the answers about skills acquisition with the results obtained from the first cluster analysis, self-learning emerged to be a common characteristics to both advanced and basic users. For sporadic users, the presence of self-learning persists but with a significantly lower importance. This suggests that the participation in formal training courses may be considered an appropriate way to overcome the initial inertia mainly for non-users.

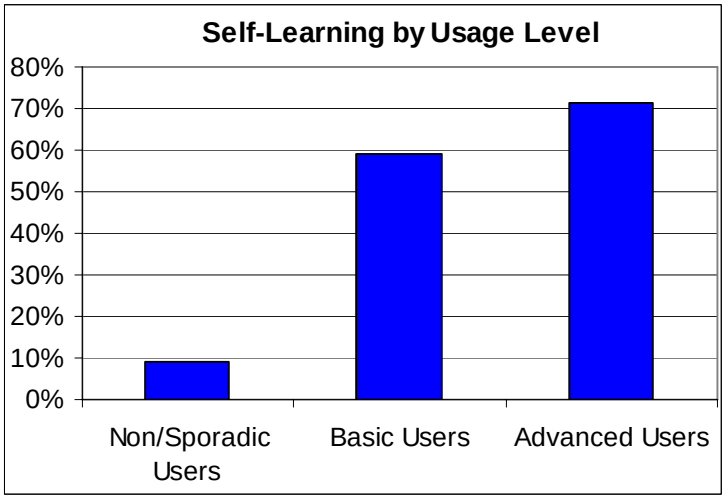

Exhibit 5 - Basis: All Respondents

The last part of the analysis was aimed at providing some insights as to how the distribution of different Internet users has been changing overtime. For this reason, the first cluster analysis on Internet usage was carried out on a different set of data collected in the previous year.

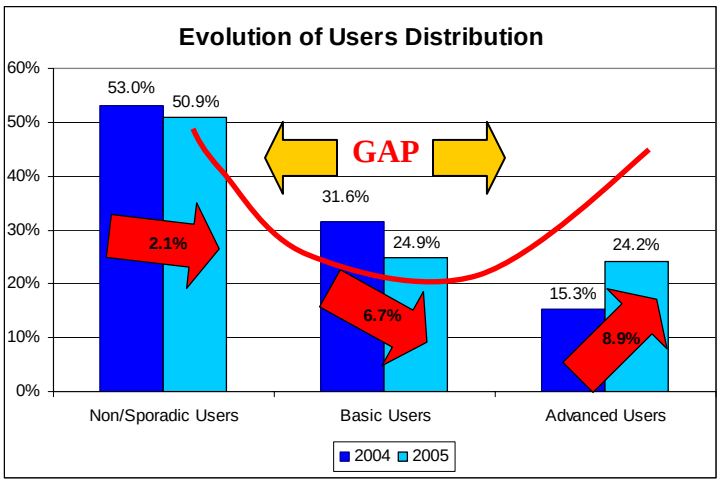

Exhibit 6 - Basis: All Respondents

The comparison of the situation present in 2004 and in 2005 generated an interesting result (See Exhibit 6). The fivefold difference in the migration rate from basic users to advanced users and the one from sporadic users to basic users is leading to the creation of a "U" shaped distribution clearly showing the widening of a digital "valley" between advanced and non-sporadic users.

These results suggest the need for a careful reflection about the creation of some concrete measures contributing to flatten the shape of the distribution. The use of the digital divide metaphor presented in the next section intends to be a first step in this direction.

5. The Digital Divide Metaphor

From the analysis carried out, the acquisition of basic IT skills emerged as mainly occurring through a process of "self-learning" (learning by doing). A process usually triggered by either an interest in technology or by a constraint/requirement posed by school or at work. For this reason we compared the acquisition of basic IT skills to the act of climbing a set of stairs, in which the first step is considerably higher than the others. Going up and down the stairs is an action that has

to be carried out alone and the people that do it may be divided in three groups: (1) athletes, (2) laid back, and (3) needy.

Athletes. They are people that climb stairs mainly because they like exercising and to keep themselves fit. These are technophiles, they are very keen on technology and usually have an innovator or early adopter behavior because of the pleasure and other benefits they extract from using technology. These benefits justify the learning costs that they have to bear to keep their skill set up to date. Athletes extensively use the Internet in both their professional as well as private daily life. To a certain extent, they should not be a concern for policy-makers since they enjoy keeping the pace with technological evolution and change and thus they do not need any kind of external incentive.

Laid Back. This category of people has the physical ability to climb the stairs; nevertheless, individuals are reluctant to do it. In other words, they have the necessary intellectual capacity to acquire IT skills on their own, but do not have sufficient incentives to do it. The reasons at the basis of this inertia may be attributed to a lack of clarity about the benefits they could gain out of it or to the fact that learning costs far exceed the potential perceived benefits. They thus adopt a minimum effort approach that results in a very basic use of the Internet (mainly information search and email exchange). These people in Rogers' diffusion theory (1962) could be classified as "early-late majority". Their adoption may be accelerated by policy makers through two levers. The first one is an incentive lever, meaning policy makers could explain to these people (through communication campaigns, conferences, etc.) what benefits could be enjoyed by climbing the stairs (i.e.: there is a cake waiting for you at the end of the stairs). The other policy that could be used is a "coercive" measure fostering the wide diffusion of IT requirements in school and in the workplace (i.e., to ask teachers to require more and more the use of PCs from students to carry out their home works).

Needy. These people, regardless of their willingness to climb the stairs, do not have the physical capacity to climb the first step (the highest) and need external help. That is, even when they may be willing to use the Internet in their daily life, they lack the basic IT skills and cultural background to win the initial inertia for starting using it in meaningful ways. What is important to stress is that the external help needed by this group of people will mainly serve to overcome the first step of the staircase. In fact, similarly to the other categories, their learning process is characterized by significant self-learning.

The policy examples in this section are just that, examples. Research needs to be done to determine the possible range of policy levers that can be used to address the issues associated with different patterns of IT skill acquisition. Further research and investigation will help to flesh out the right mix and balance of policy solutions.

6. Profiling Users Types

The aim of this section is to provide a deeper understanding of the socioeconomic characteristics of the three types of users identified. In order to do so, some descriptive statistics have been inserted in order to cross different users' types with the main socio-economic variables.

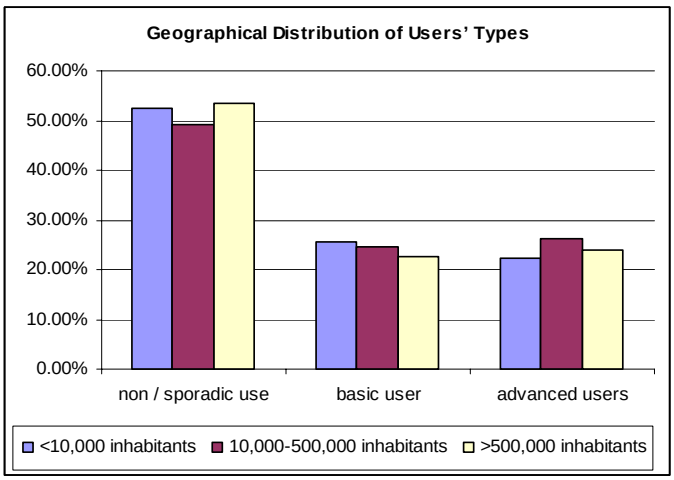

Exhibit 7 –Basis: All Respondents

In terms of geographical dispersion, the data do not show the presence of any significant difference in users' type distribution between urban and rural areas (See Exhibit 7). This represents an important piece of information for both policy makers aiming at stimulating demand for ICT related services and telecom carriers considering infrastructure investments in rural areas. Being aware of such homogeneity in distribution may allow to devise more effective policies and to make more accurate estimates of the latent demand present in areas not yet reached by broadband infrastructure.

For what concerns education and income, the graphs in Exhibit 8 show a clear positive correlation. As a matter of fact, the percentage of wealthy educated people increases with usage sophistication. At this point, it would interesting to understand what the causal relationship between the variables considered might be. In other words, whether the presence of IT skills leads to higher education levels and salaries or vice-versa.

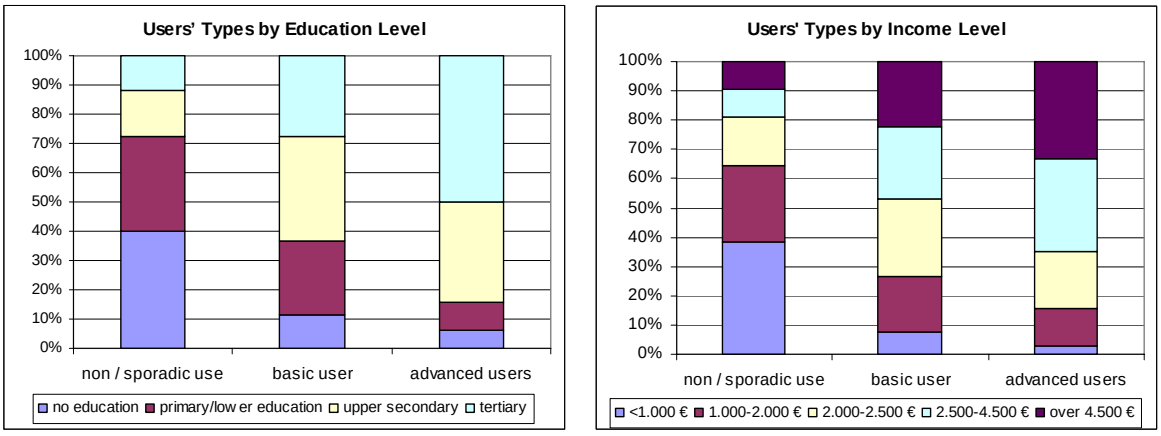

Exhibit 8 – Basis: All Respondents

Although answering this question may prove to be difficult, some preliminary indications may be found in the graph below. The chart depicts the relationship between Internet users' types and employment status.

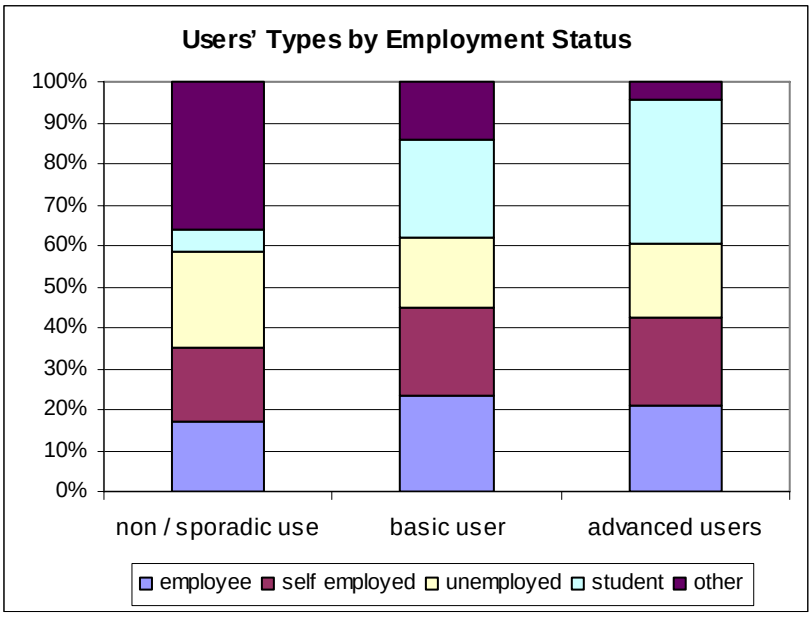

Exhibit 9 - Basis: All Respondents

A high level of computer literacy does not seem to be a sufficient condition to produce a marked increase in the chances of finding a job. As it may be noticed from the graph, the percentage of unemployed people does not vary significantly among different user types. A reduction is present between non users and basic users, but the percentage of unemployed people increases among advanced users. This is an important indication for policy makers, since it confirms the role of IT literacy as a necessary but not sufficient condition for reducing unemployment levels. Such skills should thus be considered as a catalyzer that requires complementary knowledge and skills to ignite a professional as well as personal development process.

7. Final Comments

In general terms, the research presented in this article confirms that the digital divide is a complex phenomenon transcending simple information access problems. The use of different interpretation models has shown the important role basic IT skills play by on both Internet access and use. In particular, different approaches to basic IT skills acquisition emerged and lead to diverse usage levels. In fact, about one fourth of the population considered presents advanced user behavior,

another fourth is characterized as basic users, while the remaining fifty percent make sporadic use of the Internet or do not use it. Moreover, the analysis carried out over a two-year period depicted the presence of a widening gap in terms of Internet use between none/sporadic users and advanced users. Taking into consideration that Internet use is fundamental for individual development, national and local policy makers could direct part of their efforts to offset this usage polarization. In order to do so, understanding how people approach technology and the different paths leading to the acquisition of the necessary IT skills represents a fundamental aspect.

In this respect, the digital divide metaphor proposed constitutes a useful interpretation tool. In fact, in addition to highlighting that informal and self-learning is at least as important as formal face-to-face training courses in the process of basic IT skills acquisition, it identifies three main user profiles having significantly different needs in terms of policy support.

While athletes do not have to be a concern for policy makers, greater attention should be paid to the laid back and needy categories. If the assumption is that Internet use is intrinsically beneficial, and that more mature use may be fostered among the laid back group through a "carrot and stick" approach; the question becomes 'what are the incentives?' Therefore, possible policy levers could create either the right incentives for use or make technological use a necessary complementary asset to other activities (i.e., school/work). For what concerns the needy group, instead, is the participation in formal training courses as an adequate partial solution for overcoming the first step of the staircase.

In conclusion, a careful and close management of the evolution of digital gaps by policy-makers seem to be desirable and necessary. At the same time, attention should be put toward avoiding technological deterministic approaches aimed at fostering technology adoption and use *per se*. Rather, the use of technology should be advocated as an important enabling tool supporting individuals in their main everyday activities (production, social, political, consumption, savings activities – Selwyn 2003). Hence, this should translate to public policies framing the problem

from a multitude of perspectives and fostering the diffusion of IT as well as other important complementary skills.

Future research may focus on testing the validity of the model proposed for advanced IT skills also (i.e. programming languages, statistical packages, etc.). In addition, multivariate analyses would be required to strengthen the reliability of the user types' profiles. Finally, agent based and system dynamics simulation models could be used for testing alternative policy solutions as well as understanding the role of the interaction among the different groups of users.

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