

TOWARDS AN INCLUSIVE BROADBAND SOCIETY: AN EMPIRICAL STUDY ON DIGITAL NATIVES AND DIGITAL IMMIGRANTS IN FINLAND

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Abstract

Providing information access and enhancing users' competences have often been regarded as the two most relevant aspects to realize an inclusive Information Society. According to the conceptual framework of communication capabilities, the presence of access and competences is not sufficient if it is not supported by motivation. Understanding motivational aspects related to the use of ICT is challenging, especially when investigated in two different groups of users such as digital natives and digital immigrants. Through a questionnaire, the study investigates how these groups perceive and experience ICT and discusses the implications from the perspective of inclusion and empowerment. Results confirm the profound differences between the two generations, highlighting digital natives' "need for speed" and digital immigrants' more moderate position, which is in some cases even negatively biased. The study claims that it is not sufficient to consider the needs of the two groups in the context of education systems and ICT design; it is also necessary to direct relevant efforts towards the creation of inter-generational bridges between digital natives and digital immigrants, for instance through communitarian experiences similar to Finnish Communication Camps. Without such awareness, the risk is to realize a balkanised Information Society rather than an inclusive one.

Keywords

Communication capability, inclusion, digital native, digital immigrant, Communication Camps, Finland.

1 INTRODUCTION

One of the central aspects of contemporary Information Societies concerns the dependence of all its processes on Information and Communication Technologies (ICT). For this reason, ICT tools such as the Internet and the mobile phone represent essential instruments for managing work, social life and leisure activities. Lack of access, competences or motivation in using ICT in the everyday life represents a serious obstacle in the realization of an inclusive society because it prevents users from participating to and benefiting from the opportunities of an information society. Although motivation is an essential driver for human action, it has seldom been included in the declaration of principles [20] or strategies aiming at reducing the gap between users and non-users; user empowerment is typically associated to the idea of digital literacy [4,6] regarded as "*the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers*" [4, pag.2]. For Viherä and Nurmela [19], having access to an information network and knowing how to use ICT does not imply that the user will actually adopt the tools and enjoy them. Indeed, without exploring the facets of motivation by answering to the question "why do you like/dislike, use/non use" through empirical studies, all the benefits and opportunities may remain only potential.

The study is a contribution in this direction and adopts the conceptual framework of *communication capability*, which has introduced by Finnish futurist Viherä [18,19]. Such approach is suitable because it considers citizens' access, competences and motivation as equally important factors for realizing an inclusive information society. As the full potential of communication capabilities can be realized only in a social environment, access, skills and motivation represent the basic dimensions of social interaction. In the communication process, three basic types of problems, or incompatibilities, can occur, namely lack of access, competence or motivation (Fig.1). If both users have access to digital networks, but they cannot interact because the tools/applications are not interoperable then there is no compatible access. The process of digital convergence is an important step towards the reduction of this form of incompatibility because it enables device-independent communication based on converging networks. If the incompatibility concerns competences (technical, social or cultural), it prevents from interpreting the message despite of compatible access and motivation. A typical scenario of this type is about a user receiving a message in another language and cannot understand the meaning. The third and last form of incompatibility is about lack of motivation in being an active member of the community.

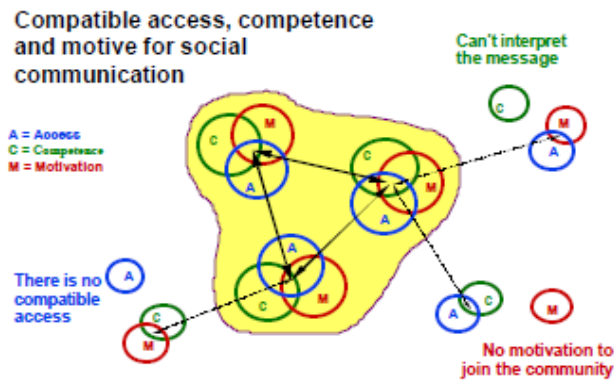


Figure 1: Communication problems from the perspective of communication capability (Viherä, 1999)

From the perspective of communication capabilities, minimizing all the three forms of incompatibility can be regarded as the objective of an inclusive information society. Motivation is probably the most difficult element of the communication capability to explore, as it is related to the satisfaction of the inner needs of existence [18]. The solution to this challenge is possible only through the involvement and cooperation of all stakeholders, including institutions, organizations, businesses, civil society and private citizens. Education and technology design are two important areas for the development of communication capabilities: the former area has been traditionally promoted by the public sector and is about investments in lifelong learning combining formal and informal education experiences. The latter regards the creation, development and diffusion of ICT applications and services which are usable, useful and affordable by everyone. Although the public sector has an important role in this area as well, technical advances are typically realized by businesses. Important results have been achieved in the last years: for instance, access to Internet and mobile networks has become relatively cheaper, faster and more secure, and also user interfaces are more usable in the past. Such results contributed to reduce the number of non-users, convincing them to adopt digital technologies. This group of users, which includes young adults, adults and senior citizens, has been defined as *digital immigrants* [13] because their practices, earlier connected to the use of non-digital technologies, have at a later point of their lives, migrated to digital technologies. For instance, the adults who used to write letters and adopted the email belong to this group. Instead, *digital natives* refer to those individuals who have always been computer and mobile phone users: according to Prensky [13], digital natives are the “*native speakers of the digital language of computers, video-games and the Internet*”. The author also presents evidence on the differences that exist between digital natives and digital immigrants drawing from various disciplines such as neurobiology, social psychology and education. Scientific studies, as well as national and international statistics also reveal significant differences on patterns of ICT use between different younger and older generations [10]. If digital natives and digital immigrants really perceive and experience ICT in a profoundly different manner, do such characteristics represent barriers to cooperation and mutual enrichment? Which strategies should be followed to maximize the “compatibility” of the communication capabilities of such groups?

Answering to these questions is essential for the realization of an inclusive Information Society. Compared to the public sector, which is generally promoting inclusive policies and actions for education and participation, the private sector requires a much deeper transformation and reconsideration of its strategies. For instance the ICT industry has focused technology and service development on young user segments and for long time neglected older generations of ICT users, who have been forced to speak the language of “digital natives”. Such approach has represented a high barrier for digital immigrants, whose needs and lifestyles have now to be acknowledged in light of the global process of population ageing. Through ICT empowerment, age might not be perceived only as a cost, but also as an added value for the development of a sustainable information society. Without taking into account the viewpoint of digital immigrants, the risk is to minimize the motivation of user groups that are already making an effort in trying to develop their communication capabilities. As a result, digital immigrants might be marginalized because not being able to recognize and realize the value of ICT in their everyday life.

In this paper, my aim is to contribute to a deeper understanding of the digital natives’ and digital immigrants’ motivational aspects behind the use of various types of applications for social communication, or social ICT. The paper is structured as follows: in the second section I describe the methodological approach and the dataset; then, I present the results of the analysis comparing digital natives’ and digital immigrants’ perspectives on social ICT; and finally I discuss the results from the perspective of an inclusive information society.

2 DATA AND METHOD

2.1 Communication Camps

The dataset was collected during the Communication Camp 2005 that took place in Heinola (Finland) from 7th to 14th of June 2005. Communication camps are a Finnish social innovation that has been supporting the grass-roots development of the Finnish information society since its first edition in 1987. Communication camps are a highly immersive informal learning experience that presents some peculiar aspects: firstly, as traditional summer camps, it takes place in a natural environment rather than in an urban setting; secondly, it brings together a number of campers, typically from fifty to eighty, from all ages. In 2005, the youngest active participant was aged 9 and the oldest 65. Thirdly, digital natives and digital immigrants together take part as group to all activities: planning, writing, printing and distributing the camp newspaper; running the information point; preparing food for the whole camp; operating the camp radio-station; planning, filming, editing and broadcasting videos and the evening camp news. At the end of the camp, each participant has learnt all activities because groups are assigned a different task each day; the only exception is represented by the last day in which groups do no longer exist and campers can spend more time in their favourite activity. Fourthly, the camp has a quite flat and self-organizing type of social structure: campers' roles are not based on age or social position, but on previous experiences at the camp. Regular campers are those who are participating for their first or second time to the camp; "core campers" are the more experienced campers (3 to 5 participations) who take a more active role in coordinating and supporting camp activities; "resources" are the individuals with most experience, including the founders, who supervise camp activities and contribute to spread the values and develop the spirit of the camp community. In Communication Camps, many resources conduct also future research on the possible developments of the Finnish information society. Indeed, camps are regarded as a laboratory for social innovation and as a miniature model of an ideal information society where active citizens creatively cooperate and follow their paths of personal development supported by ICT. For each activity, groups have a balanced mix of regular and core campers, with resources being always available for advices and guidance. Finally, state-of-the-art technology supports and shapes all processes of the camp in a natural manner, becoming embedded and integral part of all camp activities.

2.2 Questionnaire

As a data collection method, a structured questionnaire was prepared and presented at the beginning of the camp through a video-clip that explained the purposes of the study and a few basic instructions. The questionnaire was available in two languages, Finnish and English, since some of the participants were non-Finnish, and was available both online and in paper version. The questions were designed to be easy to understand also by very young people, since most of the camp participants' age was between 10 and 15 years. Although the questionnaire included additional questions on campers' sociability, the focus of this paper is on the analysis of the last question, which was an open-ended one.

The goal of the open-ended question was to investigate the motivational aspects behind the user of a number of personal communication media, both digital and non-digital. Indeed, it was asked to briefly state the advantages or disadvantages, reasons of use or non-use, like or dislike related to letters, postcards, phone-calls, short messaging service (SMS), instant messaging (IM), emails, mailing-lists, Internet forums, blogs and online social networking sites (SNS). It is worth to observe that the data was collected in 2005, when blogs and especially SNS were not as popular as today. Although the number of non-users of such applications is higher than for other types of social ICT, it is surprising that a significant number of campers, both digital natives and digital immigrants, was already at that time aware of such tools and provided interesting observations on their usefulness and characteristics.

2.3 Digital native – digital immigrant classification

A total of fifty-two questionnaires were returned by the communication campers: twenty-five of them (48%) were filled by digital natives, while the remaining twenty-seven (52%) by digital immigrants. Within the group of digital natives, seventeen users (68%) were male, while 8 female (32%). Gender ratio was more balanced in the group of digital immigrants, which included 12 male (44%) and 15 female (56%). Considering the distribution of respondents according to their camp roles (Fig.2), more than half of the respondents (57%) were regular campers, out of which the majority (56%) was digital native. About a fifth of the respondents (22%) were core campers, while the remaining 21% were resources. In this latter group there were only digital immigrants with well developed communication capabilities, while in the former group the largest majority (72%) was a digital native who had already participated to many editions of the camp.

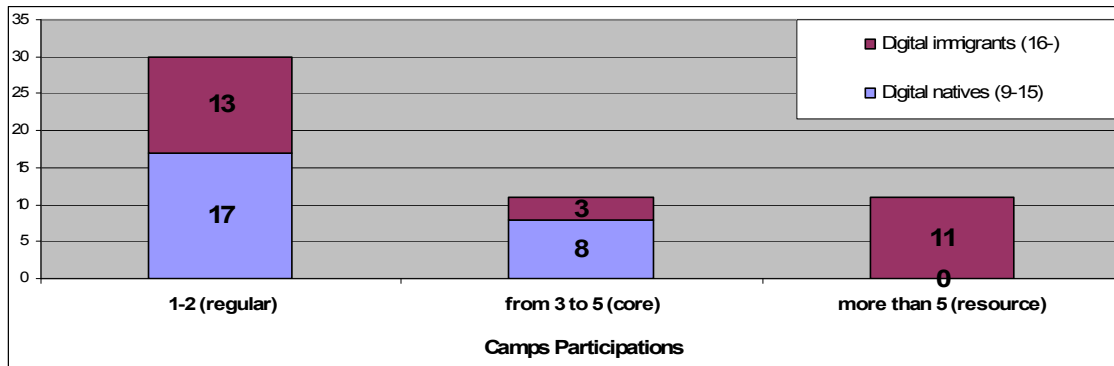


Figure 2: Distribution of respondents according to their roles at the Communication Camp

Although there are different opinions on who should be classified as a digital native, I included in this group all campers that were born since 1990 and labelled as digital immigrants the campers that were older than fifteen. Certainly, in this latter group the experience and opinions of users in their twenties are closer to those of digital natives than to those of older digital immigrants. On the choice of the year that represents the landmark, Prensky [13] is quite vague, even if he suggests the year 1974, in which the videogame Pong was invented, to mark the beginning of the era of digital natives. Another perspective on this issue is provided by Oblinger [11], who speaks of digital natives using the related term of “Millenials”: she indicates 1982 as the year in which the generational change took place. In my opinion, the year 1990 is more suitable than the other two dates; concerning 1974, most individuals born in that year have probably purchased their first mobile phone and became Internet users in the late Nineties, when they were in their twenties. Similarly, those who were born in 1982 accessed computer and mobile networks when they were in their late teenage. In both cases, both groups of users cannot be considered as digital natives, because they have migrated firstly from letters to emails and then to instant messaging, and from wired telephones to cordless and then mobile phones. On the contrary, those who are born since 1990 have probably always had access to an Internet connection both at home and at school. For this reason, they are probably more used to write with a keyboard than with a pen. In addition, they cannot imagine life without mobile communications because for them they are always existed.

I am aware that the choice of the year 1990 is far from being perfect, as there is little difference between the opinions of fifteen-year and sixteen-year old users. Nevertheless, this choice is the most appropriate for Finland, a country that has witnessed an early development of its information society [10]. The slower adoption of ICT in other countries should be taken into account when considering whom to classify as a digital native or as a digital immigrant. As a matter of fact, it is not possible to speak of digital natives and digital immigrants in countries that have not yet become information societies. For them, the most suitable year for marking the transition might still have to come.

2.4 Open-ended question: analysis and visualization

The answers of most open-ended questions were brief and synthetic, in some cases even cryptic. Their common feature was found in a number of core adjectives that characterized the way users perceive and experience personal communication media. In order to compare the characterizations of digital natives and digital immigrants, it was chosen to extract and rank the most significant keywords using the vector space model [16] and then to visualize the results through a tag-cloud [5].

The process of extracting the keywords was conducted in the following way: two vectors were created for each personal communication media, corresponding respectively to the group of digital natives and to that of digital immigrants. As ten different communication media were analyzed, a total of twenty vectors were used. Each vector was filled by keywords that were extracted from the answers manually by the author. In some cases, it the choice was easy, as the term could have been directly taken from the text. For instance, the keywords “fine” and “slow” would have been generated from the answer “*it is a fine way, but a little slow*”. In other cases, the procedure has been slightly more complex, as a longer phrase was converted into a single or compound term with the closest meaning. For instance, if the respondent stated “*it requires long work to write a letter*”, the keyword “demanding” would have been chosen instead of “long”. This latter procedure would have been more difficult with automatic extraction of keyword; therefore the manual approach was chosen to obtain higher reliability. The weight of the keyword in the vector was given by the number of occurrences of the keyword in the answers. In practice, each vector was represented by a textual file filled only with the keywords.

This procedure might not be useful only in conducting this kind of empirical studies, but also for enhancing the design of online and mobile social applications; the same process could be employed to initialize and update user profiles in which algorithmic techniques are used to translate user's ratings, behavioural and contextual data in terms of user needs and planned actions. Such algorithms would play an important role in the personalization of appearance and features of the user interface.

The visualization process was supported by TagCrowd¹, a free online application in which each vector was loaded, allowing the author to save the generated tag-clouds as jpeg images. In tag-clouds, a useful tool to visualize and navigate information that has become popular with the Web2.0 [12], the size of keywords is proportional to their importance, which in this case corresponds to the number of occurrences. In the generation of the tag-cloud, it was decided to visualize only the keywords that occurred at least twice. As the vector space model, also tag-clouds might have a practical application in Social ICT; for instance, they could be regarded as "visual displays for social connection" [1], playing a key role in supporting existing relationships or facilitating the establishment of new contacts by matching users on the basis of similar needs or preferences, complementary skills, compatible access etc.

3 RESULTS

3.1 Non-digital applications: letters and postcards

Letters and postcards are two important non-digital communication media that were included in the open-ended question to see how differently they are perceived from digital applications. It was assumed that relevant differences would be found in the comparison between digital natives and digital immigrants. The assumption was confirmed for letters, but not for postcards suggesting that none of the digital applications, such as the MMS, can be regarded as the digital equivalent of the postcard. On the contrary, the email is perceived as the evolution of letters. Considering the differences, the most significant one concerns digital natives' "need for speed" in communicative processes: in Prensky's words, "*digital natives are used to receiving information really fast. [...] they thrive on instant gratification and frequent rewards*" [13]. Both letters and postcards do not fit well to these expectations; indeed, the answer of one of the respondents synthesizes well their position: "*a letter is terribly slow, boring and old fashioned*" (P10, male, 13 years). Digital immigrants show an opposite attitude, appreciating also "slow time" [2]. This position is clear in the words of P48 (female, 54): "*I'm too lazy to write, but it's nice to receive a letter: when I write I always need to reflect more on what I say*". Another key difference concerns digital immigrants' appreciation for the tangible and long-lasting nature of the letters: "*the benefit of the letter is that one does not need to print it and it lasts. Emails can be destroyed too easily*" (P46, f, 47). Such feature is appreciated also by younger generation of digital immigrants: for P39(f,24) "*it's very nice to find a physical object into your mailbox*". For digital natives these characteristics seem less important, as they were not mentioned by any respondent of that group. However, some digital natives enjoy the personal nature of letters, given mainly by the presence of handwriting. Such feature was also one of the most appreciated by digital immigrants, who defined them as a "*warm and human way to be in touch with someone who is far*" (P36, m, 19).



Figure 3: Digital natives' and digital immigrants' tag-cloud for letters

Postcards' and letters' characterizations were quite similar (Fig.3), with digital immigrants providing slightly more positive descriptions than digital natives, who often complained about high cost and slowness. Compared to the letter, postcards were not regarded as a real personal communication medium for several reasons: for instance, one cannot write too personal or sensitive sentences because they "*everyone can read a postcard*" (P19, f, 14). In addition, they are also considered "uninformative" because there is very little space for text (P9, m, 13). Despite of such limits, many digital natives still send postcards, especially when travelling abroad, because they are "*part of the holiday*" (P17, m, 14). Being *holiday-memories* is the most popular characterization given also by digital immigrants, who agree on postcards uninformative nature and high costs. However, they tend to like them rather than dislike: "*I like sending postcards. I always carry stamps with me*" (P50, f, 57).

¹ <http://tagcrowd.com>

3.2 Mobile applications: phone calls and SMS

Phone calls and SMS are probably the most appreciated services for personal communication by both generations, who agree on characterizing phone calls as “quick” and “easy”, but “expensive” (Fig.4) and SMS as “quick and easy” (Fig.5). The higher cost of phone calls is compensated by possibility to “hear the other person’s voice” (P21, m, 15), to “discuss in real time” (P25, f, 15), to “change things quickly” (P3, m, 11), to feel connected to somebody when “I feel a bit lonely” (P39, f, 24). Being expensive, digital natives do not use phone calls for frequent interactions: “I call only when I have something important to say” (P14, f, 13). Though appreciated by both groups, the analysis of phone calls also revealed a difference between the two generations of users: while digital natives characterized phone calls with an exceptionally low number of adjectives, digital immigrants’ descriptions were much richer and more differentiated. For instance, the social contexts of use (work, friends, family) were often explicitly mentioned by digital immigrants.



Figure 4: Digital natives’ and digital immigrants’ tag-cloud for phone calls

SMS are sent more often because “they are not as expensive as the calls” (P2, m, 11) and “it is fun to send SMS” (P3, m, 11). A frequent complaint on SMS, present only in digital natives’ descriptions, concerns how demanding and slow is the writing process. This finding is coherent with digital natives’ need for speed, which is absent in digital immigrants. The limited space for writing is by some respondents regarded as a disadvantage because “it’s easy to have misunderstandings” (P16, m, 14) and by others as an advantage because “it’s handy to tell things shortly and briefly” (P11, m, 13). Although digital immigrants are also avid texters, they also list the negative implications of text messaging, stating that “they are modifying the traditional language” (P41, m, 28) and “getting teenagers addicted” (P40, m, 25). However, digital immigrants also highlighted two positive characteristics of the SMS that were not evident in the younger generation of users, namely the discreet and unobtrusive nature of the SMS, primary alternative to the call: “if you not dare to call, text” (P37, f, 20) and “you can send a SMS when you don’t have the courage to call” (P35, f, 18). On the contrary, “if the other does not answer to a call, you have to take a big step in leaving a message to the answering machine” (P34, M, 18). Digital natives seem to be less shy than digital immigrants, probably because the latter group is used to take things seriously [13] while the former is more fun-oriented.



Figure 5: Digital natives’ and digital immigrants’ tag-cloud for SMS

3.3 Web1.0: email, mailing lists and forums

Being invented in the Seventies, email and mailing-lists are social applications of the early Internet, which can be retroactively termed as Web1.0 to distinguish from the more recent wave of Web2.0 applications [12]. Although Internet forums appeared almost two decades after the email with the invention of the World Wide Web, they can still be considered in the same group. As one might expect, digital natives are more enthusiasts and frequent users of Web2.0 applications rather than older ones: indeed, one fifth of the respondents in this group answered “I do not use email” (Fig.6). In addition, the ones who use it enjoy email being free, but regard it as “boring and somehow gloomy” (P25, f, 15). Although many digital natives consider the email as a quick medium, some others do not agree: for the youngest respondent “the email is not quick” (P1, m, 9). While for digital natives it is common to use the email “only with the contacts that are not met regularly” (P23, f, 15), for digital immigrants the email is the most flexible personal communication tool, being good for group conversations, doing business or maintaining in contact with friends living far away.

While digital natives complain about email being text-only and not interactive, digital immigrants enjoy the possibility of “*sending very long messages*” (P50, f, 57), but also regard the email as a cold medium because less personal than the letter. In addition, digital immigrants also highlight a serious limitation of the email, spam messages, which is not mentioned by any digital native. For a respondent in this group, the email is even “*too quick. You do not always remember to be polite*” (P45, m, 34).



Figure 6: Digital natives’ and digital immigrants’ tag-cloud for email

Mailing-lists do not seem to belong to the world of digital natives, as 40% of them do not use and 24% has never heard of them. The only positive comment of digital natives on mailing-lists is about them being quick for spreading information to a group. Some others described mailing-lists as difficult, annoying, boring and useless. On the contrary, mailing-lists received a better assessment by digital immigrants, who underlined both their positive and negative aspects: 42% of the respondents in this group observed that mailing lists are about group communication and 24% of them regarded them as quick and interest-related. However, a significant number of digital immigrants (28%) also complained about information overload. For P48 (f, 54), “*users who disturb make most mailing-lists unusable*”.

Internet forums are a bit more known than mailing-lists, but 48% of digital natives either do not yet know or use them. Although “*it is easy and fine to browse many topics*” (P16, m, 14), they are perceived as risky places because full of paedophiles (P12, f, 13) and “*tasteless comments*” (P9, m, 13). The public and communitarian nature of forums is perceived as a disadvantage by some digital natives: “*disadvantage: others can see what you write*” (P20, m, 15). Internet forums seemed to be not the preferred tool also by digital immigrants, as one fifth of them is not using them. In addition, respondents in this group agreed with digital natives in considering forums as risky and useless. One user explains: “*total anonymity makes some people go wild. However, when you have a good community it is a good way to find information and support*” (P31, m, 17). According to digital immigrants, the best function of forums is to provide quick answers to a question, especially work- and hobby-related: “*I usually read technical forums, where there are most of the answers to my questions*” (P40, m, 25). Forums are not regarded as easy as other online social applications: “*there are so many messages that I have the feeling to get lost very easily*”.

3.4 Web2.0: instant messaging, blogs and social networking sites

For digital natives, the Internet corresponds to the Web2.0 because they spend most of their online time chatting with friends through instant messaging (IM), updating their personal blogs and sharing thoughts with others in online social networking sites (SNS), which are also a great place for entertainment and gossip. If for digital natives the Web2.0 is about fun and friends, for digital immigrants it is less appealing because they do not enjoy its potential due to lack of time and cannot use it as a business-tool because not fitting to traditional work models. Digital natives enjoy IM because it has all the characteristics that they expect, such as speed, interactivity and multimedia. IM is perceived as “*handy, easy and cheap, even if you need to sit in front of the computer all the time*” (P8, m, 12) and the fun it generated is also given by “*the possibility to hear and see the other persons*” (Fig.7). Digital immigrants also agree that it is a quick and cheap way to chat with friends, but also raise a number of negative aspects (Fig.3): IM can “*lead to tiredness and it is not very personal*” (P33, f, 17) and it “*is not suitable for deep communication*” (P36, m, 19). Furthermore, “*you need at least one hour there to say hi to all the connected friends*” (P41, m, 28); finally, “*questions and answers are not linear; sometimes it’s difficult to follow the discussion if there are simultaneous chats*” (P45, m, 34). In addition, while many digital natives highlighted considered IM as an easy tool, none of the digital immigrants mentioned this characteristic.



Figure 7: Digital natives’ and digital immigrants’ tag-cloud for IM

Concerning blogs and SNS, they were not yet very popular tools in 2005. A fourth of digital natives did not know blogs, while 32% did not use them. Digital immigrants knew what blogs were, but about a third of them reported not to use them. For what concerns SNS, 56% of digital natives did not use them but almost all respondents (92%) knew what they were. Among digital immigrants, 26% did not use SNS, while 11% had never heard of them before.

For both digital natives and digital immigrants, blogs are personal public diaries; it is “*fun to read other people’s lives*” (P14, f, 13) and it is a good way to “*let other people to know about you day, your thoughts and opinions*” (P12, f, 13). The public nature of blogs provides a motivation to write to some or not to write to others: for P23 (f, 15) “*it is a relief when other people read your stories*”, but for P25 (f, 15) “*it is not good to describe one’s private life to everybody*”. A blog “*fits well to persons like members of the Parliament who have to explain their life and work to everybody*” (P36, m, 15). In comparison to other forms of communication media, it is not the speed, cost or easiness that was emphasized, but rather the consequences of being personal and public.

Online social networks were regarded by both digital natives and digital immigrants as tools for group-communication that are mostly oriented to entertainment and fun through digital sharing. However, digital immigrants provided a richer characterization of such social platforms, considering also their negative implications, which had not been stressed by digital natives: SNS are an “*handy way to seek new friends / company of people thinking in the same way, but you have to be quite critical in judging if other people are really who they say and what to do*” (P28, f, 16). Another respondent highlight the risks of digital sharing: “*your material might end in wrong hands*” (P33, f, 17).

4 DISCUSSION

The analysis of the dataset adds evidence to Prensky’s claim of digital natives and digital immigrants perceiving and experiencing traditional and new media in a different manner [13]. More specifically, digital natives show a clear “need for speed”, appreciating phone calls, SMS and IM and perceiving slower services such as letters and postcards as out of their time. While none of the respondents characterized phone calls, SMS and IM as slow, the email was considered by some as quick and by others as slow. Contrarily to the group of digital natives, digital immigrants agreed on considering email as a quick medium. Digital immigrants appreciate more social applications that reflect their values, showing some resistance to adopt applications such as IM that are associated to fun, immediacy, multi-tasking and multimedia. Indeed, a significant number of digital immigrants describe IM as superficial, cold and useless, while digital natives recognize in IM the application that meets their expectations. However, the study also reveals that digital immigrants regard social applications with a highly critical perspective, highlighting both positive and negative aspects. Although their judgement might seem in some cases negatively biased, their position is more moderate than that of digital natives, whose opinions are more radical: indeed, they either love or hate a tool for social communication, perhaps overestimating either its positives or negatives sides. As such position might be due to their young age and lack of experience, it might become more moderate with maturity.

As our analysis focuses on the present situation, it is important to discuss the implications of the results from the perspective of an inclusive information society. Quoting the words of Viviane Reding, EU Commissioner for Information Society and Media, there is need of “*getting users on board*” [14]. I would add that it is not sufficient to provide information access and digital literacy to all: it is also necessary to understand their motivations to enable a fruitful cooperation and dialogue between digital natives and digital immigrants. If regarded as two distinct groups of users with different needs, expectations and lifestyles, the risk is of realizing a balkanized Information Society rather than an inclusive one. Is it possible to recognize and meet the needs and expectations of two different groups such as digital natives and digital immigrants with a single framework for lifelong learning and technology development? The Finnish experience of communication camps suggests that it is possible to create a cooperative environment in which personal differences are not obstacles but resources for both individual and community development. However, realizing it at a wider scale presents considerable challenges. Here, I discuss some issues that could represent a starting point for reflection in both policy-making and in interaction design, areas that are currently not evolving through a process of mutual interaction. I agreed with Sapio when he suggests that different disciplinary communities need to be brought together and develop cooperatively future directions of technology and society [17]

Several directions of development can be identified for creating inter-generational bridges between different groups of users: first of all, there is the need of multidisciplinary research on digital natives and digital immigrants, because so far the terms have been employed only in the educational context, in which they have been conceived. In the seminal paper that originated this strand of research, Prensky [13] emphasized the need for education systems to meet the needs of the new generation of students by reconsidering both its methodology and content. The author asks whether students should learn following methods and content anchored to the tradition or if educators should approach learning in a completely new manner, concluding that it is unlikely that new learners will go backwards and accept old-fashioned teaching methods and content. Though slightly provoking, Prensky's argument is reasonable for the new generations of students, but it is not adequate the address also the needs of digital immigrant learners. Although younger generations of digital immigrants might easily adjust to change, adult and senior citizens might be much more resistant to embrace education and technologies from a completely new perspective; the consequence might simply be lower motivation in learning. To avoid this problem, it might be sufficient to teach them new content without necessarily changing the methodology. An additional motivation for considering the needs of digital immigrants as important as those of digital natives is provided by the global process of population ageing, which demands investigating ways to maintain adult learners active as long as possible.

Secondly, the discussion should not be limited to how to reform the formal domain of education systems, but it should also include the perspective of everyday learning, which is mostly informal and unplanned. In such contexts, the user, either digital native or digital immigrant, is the key responsible for the whole learning process and strategy. Outside the classroom, there are not students and teachers, but just learners who might decide to cooperate to collectively approach a problem. In addition, collaborative processes are not organized according to the characteristics of social groups, but rather they follow the structure and properties of social networks. The learner might therefore adopt an individual or social approach, applying either human or social capital to complete a task or take a decision.

A third requirement, which is related to the previous issue, concerns the need of designing ICT as an empowering tool for users and communities. In this context, empowerment is regarded as the possibility to acquire and develop communication capabilities to create and share resources in a creative and self-organizing manner. Being quite flexible tools in supporting both formal and informal process, both at interpersonal and at communitarian level, using either client-server or peer-to-peer approaches, computers and the Internet already fulfil this goal. On the contrary, although the mobile device is an excellent tool for interpersonal communication, it still provides a limited support to community interactions, as it does not scale well beyond the small social group [7]. In addition, although the revolutionary power of mobile social applications is related to the possibility of participating in ad-hoc manner in self-organizing communities [15], its enabling architecture, peer-to-peer, is still underused in service development in favour of client-server models that privilege control to self-organization. The process of digital convergence and the increasing availability of Smartphones that can access high-speed networks should be regarded as an opportunity to improve the current situation by considering alternative strategies for interaction design and service development that focus on usefulness and empowerment rather than on consumption and control of digital content [8]. Discussing whether and how the mobile device could acquire the flexibility of the Internet as a social platform is an important issue to add to the research agenda on digital convergence. In my opinion, the risk of technological divergence suggested by Fortunati [3] would undermine also the possibility of realizing an inclusive society because it would increase incompatibility on the access element of the communication capability. However, a trade-off between total convergence and divergence is also necessary: if on one hand it is not convenient to carry and use a variety of specialized objects, on the other concentrating all their functions in the mobile device would increase its complexity requiring more competences. As Fortunati [3] underlines, the loss of effectiveness in functionality and the increased functional complexity of the device might be scarcely tolerated by users. I would add that this problem would be significant especially for digital immigrants, who are more resistant to change and learning less quickly than digital natives.

Finally, it is essential to invest in the creation of stimulating environments for learning and social communication. This aspect is regarded as essential also by WSIS [20], which describes the crucial role of the public sector in policy-related issues, private sector in technological and economic development and the civil society for community development at grass-roots level. Communication camps provide a good example of social experience that develops participants' communication capabilities requiring different generations of users to develop mutual understanding and cooperate. The concept of communication camp is flexible and has been successfully applied in other contexts, such as organizations [9]: although there might be some variations in how the concept is applied, the core aspects to maintain concern the development of technical skills for using ICT tools, the promotion of social skills to cooperate with group members belonging to different generations of users and finally the emphasis on personal initiative, creativity and responsibility for completing one's own tasks.

In this manner, similar experiences could support the creation of inter-generational bridges between different generations of users which are currently separated by barriers and obstacles caused by deep incompatibility in their communication capabilities.

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