

Internet in the feminine: Using feminine strategies in hacker culture

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Abstract

A number of feminist movements have historically accused technology of being part of the patriarchal structure. Indeed, different studies demonstrate that access to the design and development of technology has an uneven gender distribution. However, Internet is a cultural production and, according to Castells, hacker culture is an essential component of the cultural underpinning of the Internet. This new culture comprises several characteristics that are closely tied to the values which are historically considered to be “typically feminine”, such as creativity, cooperation and informality. Castells argues that technology is a fundamental dimension of social change and that the type of technology a society develops and disseminates is, to a great extent, a model of its material structure. Therefore, cyberfeminists see this new technology as the possibility for women to access the technology itself, to use it and be part of its design. Is the Internet an opportunity to eradicate the gender digital divide?

Key words: Internet, technology, hackers, gender, digital divide, free culture

1. Introduction

Studies show that access to the development and study of technology by gender is still profoundly unequal. Despite this, sociologists like Manuel Castells hold that hacker culture is the underpinning of the Internet as a cultural product.

The purpose of this article is to take a theoretical approach to defend the fact that this new culture has characteristics that turn into something closer to the values that have historically been considered “feminine”, such as creativity, cooperation and informality, and that the Internet may therefore be an opportunity to put an end to or to diminish the gender digital divide.

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2. The second digital divide: Gender

The new information and communication technologies (ICTs) are a fundamental factor in the information society, and as such they have a major economic and social impact (Montagnier, 2007). ICTs are a means of empowerment for individuals and social groups since they offer the instantaneous capacity to access and share information and to organise resources more cheaply and quickly than ever before (Castaño, 2008). Yet despite this, there are still millions of people in the world who do not have access to these technologies.

This unequal access to ICTs (and especially the Internet) caused by physical or socioeconomic barriers is called the *digital divide*. The digital divide is also correlated with factors like race and ethnicity, age, geographic location... and gender. Still, some scholars believe that this first divide, which mainly considers physical access to the web, is beginning to subside (Katz and Rice, 2002).

But physical access to the Internet is not the only thing that causes a divide or fracture. The differences in an individual's ability to make use of the potential of the new technologies are called the *second digital divide*, and this reflects what Van Dijk (1999) notes as the absence of elementary digital experiences caused by the lack of interest, anxiety, the lack of appeal of ICTs and a lack of digital skills as the outcome of the user's insufficient *friendliness* or inadequate education or social support.

As an extension of the second digital divide, Paul Gilster (1997) created the concept of digital literacy to define the replacement of television, telephones and newspapers by the new technologies and to refer to individuals' ability to adapt to the new digital environment. Today, in a broader sense, digital literacy describes and measures the kinds of skills that vary among different groups of people depending on certain contextual and structural variables.

Lately, beyond the concept of digital literacy, the term *digital fluency* is being used (Castaño, 2008). Digital fluency is a dynamic process through which students use and transform different signs and design new meanings. It implies movement, unlike literacy, which is a static concept (Sáinz, Castaño and Artal, 2008).

As we have seen, apart from the (rising) number of users who have access to the Internet, the quality of this use is very important in discerning the digital divide. In 2006, the Organisation for Economic Cooperation and Development distinguished between ICT users and experts, and it established three categories (Castaño, 2008):

- *Basic users*: They competently use the generic tools needed for the information society, electronic administration and jobs (document managers, spreadsheets, email, etc.).

- *Advanced users*: They use specific programming tools from specific sectors, even though ICTs are not the purpose of their work but instead just a tool.

- *ICT experts*: They are able to create and maintain systems, such that ICTs are a fundamental part of their jobs.

According to Van Welsum and Montagnier (2007), just as the number of basic users is rising, the number of ICT experts in the United States is no more than 7% in the most advanced categories – computer and electronic engineers – and 50% in the less relevant categories – database administrators, operations analysts.

The table below shows the figures on higher education based on Eurostat data (2007):

Table 1: Higher education and computer skills

Tertiary education and computer skills

	Share of those aged 25-59 having graduated from tertiary education, Q2 2006		Computer skills**, Q2 2006							
			Women aged 16-74, in %				Men aged 16-74, in %			
	Women	Men	None	Low	Medium	High	None	Low	Medium	High
EU27	23.8	23.1	:	:	:	:	:	:	:	:
EU25	24.3	23.7	44	15	26	15	38	11	22	29
Belgium	33.5	30.9	45	16	24	15	36	13	22	29
Bulgaria	27.1	16.9	69	12	14	5	70	10	12	8
Czech Republic	12.6	14.7	49	16	25	10	47	15	19	19
Denmark	38.9	32.6	18	18	39	25	14	10	24	52
Germany	20.8	28.0	29	20	35	16	21	14	28	37
Estonia	39.0	28.3	49	10	22	19	47	9	13	31
Ireland	33.9	28.5	58	14	12	16	58	13	7	22
Greece	22.3	22.8	60	13	14	13	53	15	13	19
Spain	30.6	28.9	49	12	22	17	43	9	19	29
France	28.2	24.7	49	11	25	15	41	9	22	28
Italy	14.3	12.3	64	8	17	11	54	7	16	23
Cyprus	31.1	32.1	56	8	20	16	53	10	15	22
Latvia	27.8	15.1	53	17	22	8	51	15	18	16
Lithuania	32.0	24.3	53	12	24	11	54	11	15	20
Luxembourg*	25.4	29.4	37	14	28	21	17	9	23	51
Hungary	19.7	16.3	43	11	25	21	44	9	17	30
Malta	13.0	12.1	53	10	17	20	50	8	21	21
Netherlands	29.0	32.2	30	27	41	2	19	15	54	12
Austria	15.8	20.4	38	15	27	20	27	9	22	42
Poland	20.7	15.7	55	18	19	8	53	15	17	15
Portugal	16.6	11.6	61	8	15	16	55	8	12	25
Romania	11.9	12.5	:	:	:	:	:	:	:	:
Slovenia	25.5	18.8	47	11	22	20	37	10	17	36
Slovakia	13.9	15.0	37	20	34	9	34	16	25	25
Finland	41.8	30.0	29	18	34	19	25	13	24	38
Sweden	36.7	26.1	22	23	38	17	18	12	28	42
United Kingdom	30.6	31.0	38	15	28	19	30	9	26	35

* Data for those having graduated from tertiary education refer to Q2 2005

** Skills surveyed included the ability to:

- copy or move a file or folder;
- use copy and paste tools to duplicate or move information within a document;
- use basic arithmetic formula (add, subtract, multiply, divide) in a spreadsheet;
- compress files;
- connect and install new devices, e.g. a printer or a modem
- write a computer program using a specialised programming language.

In the survey, persons who ticked **none** of these six items were classed as having no computer skills, those who ticked 1 or 2 of these skills were classed as having **low level** basic computer skills, those ticking 3 or 4 were classed **medium level**, and those ticking 5 or all items were classed **high level**.

: Data not available

Source: Eurostat (2007).

First of all, we can see that the percentage of men and women in the European Union who have earned “tertiary education” (higher education) is very similar, with a slight advantage of female university graduates (23.8%) than male graduates (23.1%). Even in countries like Sweden and Estonia, the difference between the two sexes is as high as 10 to 11 points, with the balance in favour of women.

Despite this, if we compare these figures with the following columns in Table 1, which show people’s computer skills, we can see that more men have a high level of computer skills than women in each European Union country. If we take Sweden as an example, where we have seen that there are far more women with higher education (36.7%) than men (26.1%), computer skills show an inversion of this trend, since 42% of the men have high-level skills compared to just 17% of the women. A lack of access to higher education is clearly not the reason why the women’s computer skills are not as high.

According to the figures, we could conclude that “technology is masculine”.¹ Regardless of whether or not it is, what is clear is that men develop technology: technical degrees are “traditionally male” degrees, as some authors (Elejabeitia and López Sáez, 2003) call degrees in which women account for fewer than 30% of the students.

More than men or women’s “innate” or biological vocation for certain activities, the causes of this situation should instead be sought in the differences in the way males and females are socialised, as noted by Sáinz and González (2008). Sáinz (2006) holds that a combination of sociocultural factors (such as the structural variables of social class and rural/urban setting, along with gender roles and stereotypes and social influence over the choice of technical degrees) and psycho-social factors (attitudes, skills, interests, expectations of success, etc.) is what determines whether boys and girls choose technical degrees or not. For example, gender roles and stereotypes mark the choice of technical studies as “masculine”, so women who choose this pathway are socially sanctioned by being stigmatised as “not very feminine” (Sáinz and González, 2008). Even in the use of technology among the new generations, the study by Thornham (2011) shows how adolescents explicitly associate the lack of technological skills or technological incompetence with gender.

Women’s lack of access to the development of technology would thus signal a much more subtle digital divide than the one that refers solely to access to and basic use of the new technologies. This alternative divide would not only maintain the traditional male dominance in technology but would also block women’s access to better jobs (higher pay, with more responsibility and more leadership).

3. Internet as a cultural production in the information age

As is well known, the Internet was developed as a project initially financed by the United States Department of Defence, specifically by the Advanced Research Projects Agency (ARPA), which commissioned the top researchers at the leading American universities to develop a technology which would prevent serious

¹ The relationship between feminism and technology is examined in Wajeman (2004).

information losses in the event of enemy attacks (Abbate, 1999). The first network, the precursor of the Internet, was thus called ARPANET (Advanced Research Projects Agency Network), and it connected such far-flung universities as Massachusetts Institute of Technology (MIT), Harvard, Illinois, Utah, Stanford and the University of California at Los Angeles, among others. In this way, the researchers could contact each other and share their advances using the technology itself.

As Abbate (1999) holds, the communicative identity of the Internet was not inherent to the medium; rather it was constructed based on social choices during its creation. The practices of the very users and researchers who were working on the project gave shape to what would later become the Internet, defining its structure and purposes. Abbate believes that the history of the apparently chaotic creation of the Internet was unique in that it was characterised from the start by decentralisation, fluency, collaboration (between universities and researchers) and informality.

Manuel Castells (2001) analyses the “lessons” taught to us by the Internet as a technology from the socio-structural vantage point. The first lesson, we which have discussed, is related to the military origin of the Internet from the financial standpoint, and to the origin of the web (Internet) at universities with regard to its technological contributions. To this Castells adds the radical libertarian counterculture which views the Internet as an instrument of autonomy from the state and big business. After all, we should recall that the Internet did not emerge from large business groups or from their culture, and even today it retains a degree of autonomy from all states that is totally unimaginable with any other means of social communication.

There are two aspects that Castells tries to stress as extremely important in terms of hacker culture. First of all, from the very the Internet was developed based on an open, free-access computer architecture start. The core Internet TCP/IP protocols, created in 1973-1978, are open to anyone since their source code is open. The World Wide Web is also open, and Apache, the programme that sustains more than two-thirds of the web servers in the world today, is also open-code. Secondly, the producers of Internet technology were fundamentally its users: the researchers in academia initially produced the technology, but there have been constant modifications in the applications and technological developments by the users in a steady reciprocal feedback process, one of the sources of the Internet’s dynamism.

These unique features of the Internet shape its “personality” and give the characteristics of something uncontrollable, libertarian, etc. Castells states that this idea “is in the technology but it is because this technology has been designed, throughout its history, with this intention in mind” (2001). That is, it is an instrument of free communication because it was created by people who wanted it to be so.

For this reason, the Internet is a privileged form of action and organisation for social movements, because this is part of its essence.

In today’s climate of crisis in traditional organisations and institutions, such as political parties and unions, new social actors are emerging who are organising themselves around specific projects and objectives, campaigns which have a very specific cause (saving the whales, stopping the demolition of a

historical building, earmarking 0.7% of the GDP to development cooperation, etc.). Generally speaking, there has been a leap in organised social movements towards networked social movements based on coalitions assembled for specific projects. The Internet is an instrument of communication which empowers the flexibility and temporality of this kind of mobilisation.

What is more, through the Internet, campaigns and mobilisations can be organised worldwide, and in this way specific local actions can be connected via the web. This unique feature has been skilfully exploited by anti-globalisation movements as well as by more low-key campaigns such as the global blackout against climate change. “The Internet is the global-local connection, the new form of control and social mobilisation in our society” (Castells, 2001).

In short, the Internet does not prompt social changes per se, but it is the material and technological underpinning for the development of new forms of social interaction and social structures. The Internet has an intention, and this intention, linked to the base cultures that make it up, has now become a new culture.

3.1. Hacker culture as the underlying culture of the Internet. The hacker ethic

As we have seen so far, once again following Manuel Castells (2003), the Internet is a combination of four cultures that mutually support each other: the university research culture (which initially made the technology of the Internet possible), the hacker culture with its passion to create, the counterculture of inventing new social forms and the business culture of making money through innovation. And they all share a common denominator: the culture of freedom.

We are going to focus on the second of these cultures: hacker culture.

But before we go on, what exactly is a hacker?

The term ‘hacker’ emerged in the 1960s around the MIT computers (Lunceford, 2009). In 1969, with the creation of ARPANET, its electronic highways attracted hackers from all over the United States in a critical mass: instead of remaining in small local groups developing ephemeral local cultures, they reinvented themselves in an interconnected tribe (Raymond, 1999). Therefore, hacker culture grew at the universities connected to the Internet.

The Jargon File,² a file containing the entire glossary used in the hacker world, offers a host of definitions of the term ‘hacker’, most of them based on a love of technical things and the pleasure of resolving problems by stretching beyond the usual boundaries. In fact, one of the problems is that there is a discrepancy between hackers’ image of themselves and their public image, which is mainly constructed by the media (Sollfrank, 1999). This is due to confusion in terms. The media usually use the word ‘hacker’ when they should really be talking about crackers, people with high computer skills who commit vandalism or criminal acts via the Internet.

Hackers are also people with high computer skills, but far from committing crimes (at least in an organised fashion), they programme for pure pleasure and not for gain (Lunceford, 2009). Cornelia Sollfrank (1999) holds

² <<http://www.catb.org/jargon/>> (Retrieved 9 May 2009).

that when the term was created in the 1960s around MIT, it was positive. Some of the earliest hackers created a “hacker ethics” based on the freedom of information and respect for the privacy of others’ information.

In 1982, Richard Stallman began to create GNU (*GNU is Not Unix*), a Unix clone but in open code.

One of the most famous contributions to freeware is Linux. In 1991, a student at Helsinki University, Linus Torvalds, published an early version of this operating system on the Internet. He published the code and stated that any new addition that improved upon his version would be welcome. Thus, millions of users all over the world participated in creating this new operating system called Linux, based on small contributions that Torvalds himself screened, adding the ones that worked the best (Himanen, 2002). The quality remained the same, not with rigid standards but with the simple strategy of publishing every week and getting responses from thousands of users within a matter of days. To almost everyone’s surprise, this system works quite well (Raymond, 1999).

In the late 1990s, the main activities in hacker culture were the development of Linux and the spread of the Internet. Many hackers in the 1980s set up web service providers with the intention of providing the public at large with access (Raymond, 1999).

According to Raymond, the hacker mindset is not confined solely to the culture of software; instead, it is an attitude that can be applied to any art or science. In 1997, this same author published an article which would become a referent in the world of freeware: *The Cathedral and the Bazaar*. In this text, Raymond uses two metaphors to sketch out the process of constructing freeware the way hackers do compared to exclusive software. The latter would be similar to the process of constructing a cathedral, large-scale projects devised by geniuses and performed by ranks of workers who toil endlessly, in *aeternum*, without preliminary (beta) versions. In contrast, judging from the example of Linux, freeware is more like a bustling bazaar full of individuals with different interests and purposes (represented by Linux’s file repository, which could accept versions from anyone) from which a stable, coherent system would emerge.

In an interview (Engler, 2000), the hacker Barbara Thoens explained:

“It is a life attitude that means that you are curious, that you live by getting involved with [computer] systems, that you are interested in finding out what is behind things; but it is not only about computer issues. The idea is to do things by yourself. Realise that you can set up your own system, that you can make your own tools: that is one of the most important parts of hacking to me. Because to me hacking is creating, not destroying; you can learn a lot from that. Knowledge is connected with power much more than we think. To me it is very important to attain my own knowledge or have networks with other people where I can share it. It is really great to have a community with which you can exchange these ideas; I think that it can be truly subversive.”

In 2002, Pekka Himanen published the book *The Hacker Ethic and the Spirit of the Information Age*. In this book, Himanen reveals the revolutionary values that sustain hacker culture and contrasts them with the prevailing Protestant ethic in capitalism, especially in two basic factors: time and money.

The hacker ethic is a new morality which challenges the Protestant work ethic as it was outlined a century ago by Max Weber: grounded upon diligent toil, the acceptance of routine, the value of money and a concern with the results. In contrast to this, the hacker work ethic is grounded on creativity and consists of combining passion with freedom. Himanen revives the “passion” and “enthusiasm” of the multiple definitions of hackers and attributes an ethical nature to the act of sharing their skills by devising freeware and providing access to information and resources.

Throughout this argumentation, Himanen uses the simile of the Academy and the Monastery to sketch, respectively, the hacker world, which he symbolises by Plato’s Academy, and the Protestant ethic, represented by the Monastery.

To begin with, hackers establish a passionate relationship with their work, something which dates far back in the world of academia (Plato said this of philosophy). In contrast, in the Protestant ethic one assumes that the individual feels an obligation, a duty, in their work. This is not only a sense of responsibility but an attitude. Work should be performed as an end in itself as Max Weber claimed in *The Protestant Ethic and the Spirit of Capitalism* (1904-1905).

The network society does not question the Protestant ethic; Castells argues that work (meant as paid work time) is and will continue to be the core of individuals’ lives, and that it is not on the verge of extinction. In this context, the radical nature of hacker culture consists of its proposal of an alternative spirit for the network society, a spirit that ultimately questions the Protestant work ethic.

The hacker ethic is more similar to the pre-Protestant ethic than to the Protestant ethic. To hackers, the purpose of life is closer to Sunday than Friday. Hacker activity is performed with passion, yet it also requires a great deal of effort and serious work.

One unique core aspect of hackers is their relationship with time. They establish a free relationship with time – most likely because hacking is done in free time, not on office time. The Protestant ethic entails organising time around work, so life becomes a regular work time. At the core of life is the repeated regularity of work, which organises all the other uses of time.

Another revolutionary element of hacker culture compared to the Protestant ethic refers to the base of capitalism: *money*.

The new economy strengthens the position of money and reinforces the idea of ownership. In contrast, the hacker ethic stresses what is open and what is free access. Yet again the simile of the Protestant era with the Monastery appears, where knowledge is secluded and remains in the hands of the privileged few, compared to the hacker ethic and the world of Plato’s Academy, where knowledge is the core element available to the public at large. Even

knowledge is produced based on the famous Platonic dialogues; that is, knowledge is created via communication and cooperation.

The question is on which step on Maslow's pyramid does work lie for each side. According to the Protestant ethic, work is to earn a living, to survive. Therefore, it is located at the base of the pyramid. In the hacker world, work has higher motivations: one works to achieve self-realisation.

Continuing with the simile, Plato claimed that no free person should learn something like a slave. In the network-Academy, the hacker learns from others, and by learning teaches others. This form of informal learning fosters non-hierarchical kinds of organisation which are not only ethically superior, according to hackers, but are also more effective and productive. The absence of rigid structures is one of the success factors and one of the fundamental elements in both the hacker movement and the Internet.

4. The femininity of the Internet and the feminine strategies of hacker culture

“Because of its design and conception, the web is ideal for being a feminine space par excellence. The internet was envisioned as a flat network, all the nodes are equal, there are no hierarchies, anyone can generate and spread information equally, the capacity depends more on a good strategy and knowledge of the web than on one's power in the non-virtual world. The conception of the web as flat makes it a space where women can act and interact more comfortably”. (Lourdes Muñoz in De Miguel and Boix, 2002: 25).

Could the Internet, and more specifically, hacker culture, be considered “feminised” spaces?

To answer this question, we must first identify what we mean by “feminine”. In order to do so, we must allude to gender roles and identities (Eccles et al., 2000), and we shall examine this aspect based on the philosophical conceptualisation of what is feminine since ancient times (Pérez Sedeño, 1994) and from the field of sociology (Kaufmann, 1999; Bourdieu, 2000).

As we have seen so far, hacker culture is one of the cultural underpinnings upon which the Internet is built (Castells, 2003). Therefore, some of the attributes of the hacker world are also attributes of the Internet. We have seen that some of the essential features of the Internet are its *fluency, informality, decentralisation* and *cooperation*, all the outcome of the way it was created (Abbate, 1999).

4.1. The web is liquid

Back in the ancient world, the male/female opposition was one of the main ideas that emerged at the beginnings of rational thought. This play of contrasts can be found in both Pythagoras and Ptolemy, both of which have echoes of Oriental culture (the idea of opposites is one of the cornerstones of the Oriental

philosophy of yin and yang) (Pérez Sedeño, 1994). Ptolemy believed that there were two kinds of nature: male and female. Each nature has its attributes: the male nature is dry, cold and warm. It is associated with the seasons of autumn and winter. The female nature, in contrast, is moist. It is associated with spring, which is also moist, since moisture is the symbol of creation, of reproduction, the essence of the concept of femininity. The moisture of femininity is manifested in menstruation and the breaking of waters at birth.

The web is viewed as a fluid, ethereal, liquid space, meaning that it must also be a feminine space, conceptually speaking.

4.2. *Female leadership: Informality and cooperation*

Informality, decentralisation and cooperation, important aspects of hacker and Internet culture, are essentially important features in the *female leadership style* and therefore are more closely tied to femininity than to masculinity. Alicia Kaufmann (1999) lists the aspects of feminine leadership according to Sally Helgesen (1995). According to Helgesen, women used to not be given leadership jobs because they had “counterproductive characteristics”, such as attaching too much importance to affective ties, not developing a great deal of respect for hierarchical cultures and expressing doubts as to their effectiveness.

In the new economy and given the new trends in the world of business organisation, things have changed. According to Kaufmann, the way women work and communicate has shaped a new form of leadership which more aptly addresses organisational needs. Women have a more receptive, *participative* attitude; they are more *cooperative*. They try to structure their companies in the guise of “webs” instead of a hierarchical structure; information flows in many directions.

It is fairly clear that these attitudes are feminine. The lack of organised hierarchy, informality in interactions and the importance of communication skills and cooperation are just some of the cornerstones that we have seen support the hacker movement, especially according to Himanen (2002). They are feminine strategies (socially shaped as such) which inform leadership and organisation.

4.3. *Passion*

In Kaufmann’s opinion (1999), as well, women are better equipped to take into account people’s human side, bringing their emotions to work as well, unlike men (once again according to Kaufmann), who strive to reach leadership positions using their rationality. This is because of their socialisation process, where the stress is on success: what matters is winning.

Taking the emotional side of things into account entails shifting the scale of values that moves the business world. Both emotion and passion have been examined from a variety of perspectives (philosophy: Pérez Sedeño, 1994; sociology: Bourdieu, 2000; anthropology: Moore, 1991; etc.) and are regarded as basic components of the female universe.

Once again, we see how hacker culture captures these female attributes in the guise of a *passion* for work, a vital component of hackers' definition of the work they do (Himanen, 2002; Torvalds, 2002; *Jargon File*).

4.4. *Flexible time*

The low level of time compartmentalisation in hacker culture is also closely related to the feminine. Himanen (2002) stresses that hackers' attitude is to optimise time so that there is more room for fun. According to Himanen, in the hacker version of flexible time, the different areas of life like work, family, friends and hobbies combine with much less rigidity. This is what Himanen calls the dominicalisation of Friday, in a comparison between hacker time, when every day is Sunday with its lack of strict timetables, and the Protestant ethic, which is more similar to Fridays, when the timetables are much stricter and compartmentalised between work time, rest time, meal time, etc. Himanen says that hackers want to "dominicalise" Fridays and erase the rigid boundaries marked by timetables at work as well.

With regard to the way female timetables are organised at work, Kaufmann (1999) believes that women do not consider unplanned tasks as interruptions. Working is not the main purpose of their lives, as it is with men; rather it is one of the many things they do and are.

In fact, women know better than anyone what it means to account for the different areas of their lives like work, home and especially childcare, a job which mainly befalls women even if they work outside the home. A lack of rigidity in the compartmentalisation of time is nothing new for women, who are used to working while thinking about collecting the children from school, or leaving work because they have fallen ill, or ironing while helping them to do their homework, or preparing the next day's dinner while reading reports for a meeting they have with their superiors the following day.

4.5. *The ethics of money*

Just as we have seen that the time structure of the hacker world is the same structure that has been used by women for generations, the ethics of money inherent to hacker culture is also familiar to women.

As an alternative to the Protestant idea of ownership and remunerated work (which is necessary to survive), the hacker ethic is based on the free movement of knowledge and its free-of-charge status. Work does not reflect the need to earn money but to realise oneself personally.

Throughout history, we know that women have overwhelmingly not been remunerated, with the exception of industrial workers and women who are in the job market today. And even so, these women have only been remunerated when they entered the traditionally male public sphere. The work that women were traditionally assigned, such as the care of children and the elderly or the cleaning and care of the home, are not remunerated even today. Therefore, pay has historically not been a motivation for women.

4.6. *Otherness*

“Since ancient Greece, the ideological conceptualisation of the feminine has taken shape as a difference, not with regard to the masculine – an obvious, reciprocal difference – but with regard to that which is framed as neutral in terms of the objectivisation of the human genus” (Amorós, 1994: 22). Bourdieu claims: “The strength of the male order can be seen in the fact that it does not need to be justified: the androcentric vision is imposed as neutral and does not need to be uttered in discourses whose purpose is to legitimise it” (Bourdieu, 2000: 20).

The feminine is the other, or more accurately the other *par excellence*.

According to Castells (2001), the Internet is a privileged form of action and organisation of social movements because of the way the web was organised (decentralised, informal, cooperative, etc.). Social movements know that they are movements that promote an alternative organisation of the world that which mainly stresses the differences, inequalities and injustices in today’s societies. Himanen, too, frames hacker culture as an alternative to the prevailing ethic, namely the Protestant work ethic.

What movement could be more alternative than one that advocates eradicating the inequalities of the *others*? The true alternative, therefore, must be feminine.

5. Women in the hacker world

What makes a study of female participation in the hacker world complicated is precisely gathering data on the number of hackers in the world, both male and female. Because of the very idiosyncrasy of the movement, informality, horizontality, disaggregation and the blurriness of the term, which means that hacking is closer to a way of viewing life than a specific, countable activity, there are no reliable data on the number of hackers (either male or female) in the world. In fact, in her anthropological study on hacker conferences (2010), Gabriella Coleman explains how at these gatherings female hackers encourage a list of women in the hacker world in order to know how many there are and to give them visibility.

Despite this, there are two pieces of information that may be relevant. The first is the “associations” or groups created on the Internet, and the second is data on contributions to freeware, which is regarded as the place where many hackers get their start.

The *Jargon File*, one of the documents created for newcomers to the hacker world, contains the “Portrait of J. Random Hacker”³ written by Eric Raymond. It makes the following comments with regard to gender:

“Hacking is still predominantly male. Despite this, the percentage of women is clearly superior to the low, single-digit figures common in

³ <http://www.outpost9.com/reference/jargon/jargon_50.html#SEC57> (retrieved on 9 May 2009).

the technical professions, and female hackers are generally respected and treated as equals”.

However, in studies on freeware, the figures are not so promising. According to a 2002 study on the development of freeware, it is believed that only 1.5% to 2% of the developers are women (Lin, 2005; Nafus, Leach and Krieger, 2006). However, I would like to provide additional reflections on this figure.

It is difficult to know how this information was obtained, since pseudonyms (nicks) are often used in the virtual world. It may happen that some women have a male pseudonym, which would mean that they feel more comfortable in a male role than in a female role in the environment of technical issues and computers. In fact, the study by Janet Armentor-Cota on online interactions (2011) from a gender perspective corroborates the fact that women tend to use a more masculine language in technical and academic issues because they feel more respected that way. What is more, taking this figure as a strict indicator would mean equating freeware with hackers. And this is not exactly true, since a great deal of freeware is also developed by industry, and many hackers do other jobs (regarding privacy and confidentiality on the web, cyberactivism, etc.) beyond creating freeware.

Yuwei Lin (2005) and Val Henson (2002) complain about the excessively masculine environment of freeware, which means that the few women who participate in it may feel somewhat uncomfortable. In any event, these assessments contrast with the perceptions of some female hackers. Barbara Thoens, for example, believes that male hackers are very friendly with the women in their group and make the women feel comfortable (Engler, 2000).

—Why are there so few female hackers?

—I believe that historically women were not truly committed to technical matters, and I think that’s the main reason. Women have not studied technical fields for many years. We women in Germany only earned the right to study in 1916, not so long ago, and I think a longer tradition is needed. In contrast, men have been in this field for much longer.

I know lots of girls in CCC⁴ and I think they are afraid of showing that they are so skilled at technical matters. I think that this is due to cultural traditions and prejudices.

On the other hand, if we bear in mind the number of female hacker groups or the female division of some groups, the numbers are somewhat higher. Many women organise themselves separately from their male counterparts in groups of hackers and web activists. In the most important hacker groups (with both men and women), there are women who stand out as great programmers on par with the men. Let us examine most prominent of these groups.

⁴ Chaos Computer Club, one of the elite hacker groups in Germany.

In the field of freeware, there is the noteworthy Debian Women group (<http://women.debian.org/home/>), a sub-project of the Debian Project. This is a group especially devoted to encouraging women to participate in the Debian Project, and to participate in this particular project as well. Likewise, there are similar groups in all the main freeware projects: LinuxChix (<http://www.linuxchix.org>) created by Debbie Richardson; Fedora Women (<http://fedoraproject.org/wiki/Women>); GNOME Women (<http://live.gnome.org/GnomeWomen>); Ubuntu Women (<http://ubuntu-women.org/>); Drupal Chix (<http://groups.drupal.org/drupalchix>), etc.

Many women who are cyberfeminists appropriate technology as a tool for transforming society in gender terms (Paasonen, 2011). Montserrat Boix (2003) calls this *feminist hacktivism*. One example is the Old Boys Network (<http://www.obn.org>), created by Cornelia Sollfrank. In this vein, too, we can find geek girls,⁵ a new sociological type from the end of the century, girls who work on developing software, designing websites, programming databases, devising computer systems for a company's different needs, inventing videogames, etc. Geek girls use their knowledge to investigate and deconstruct genders and roles on the web (De Miguel and Boix, 2002). GraceNet (<http://gracenet.net/>) is specifically devoted to spotlighting companies which they believe harm the image of women.

Halfway between these groups we have groups of women generically linked to the world of technology. One example is Sisters (<http://anitaborg.org/initiatives/sisters>), a group created by Anita Borg which brings together more than 3,000 women from 54 different countries who are involved in different aspects of technology. Another example is the hackers of ENIAC (Electronic Numerical Integrator and Computer) (<http://eniaprogrammers.org/>). Their website contains the following introduction:

“Sixty years ago, six young women programmed the first completely electronic computer in the world, ENIAC.

Their programme used hundreds of cables and 3,000 switches. Never brought to light, they never became part of history. Forty years later, Kathy Kleiman was told that the women who appeared in photographs with ENIAC (1946) were models posing in front of the machine”.

The ENIAC hackers wanted to do justice to the history of these early female programmers: Kay Antonelli, Jean Bartik, Betty Holberton, Marlyn Meltzer, Frances Spence and Ruth Teitelbaum, and they wanted their role to enter into the history of computing, since it could be claimed that they created software (Ricoy, 2006). The historical recovery of women in computing is also the goal of The Ada Project (<http://women.cs.cmu.edu/ada/>) named in honour of Ada Lovelace, one of the most picturesque figures in the history of technology and computing and the daughter of Lord Byron.

⁵ <http://geekfeminism.wikia.com/wiki/Geek_Feminism_Wiki> (retrieved on 20 April 2009).

In Spain we could highlight the Mujeres en Red (<http://www.nodo50.org/mujeresred/>) collective, and in Catalonia DonesTech (<http://www.donestech.net/ca/>), which is devoted to researching the female presence in technology.

6. Conclusions

—How did you begin to get interested in the subject of hacking?

—Well, the tradition I come from is leftist movements; that's my family's tradition but it's also my own history as a student. While I was studying I belonged to different groups: women's groups, anarchists... not organised groups like the traditional left, because I don't like that kind of hierarchical organisation; they were more like groups doing spontaneous actions. So I was always looking for how to connect my computer knowledge to humanistic issues. I wanted to know what computers had to do with human beings and where the problems were... and this is what the CCC works on, examining these questions. All of this is also related to my tradition of fighting against authoritarian structures in society. (Engler, 2000).

This statement by Barbara Thoens corroborates a few things. Her connection with the hacker movement reflects some of the attributes of this movement which have gradually emerged, such as *informality* and *horizontality* (“*I don't like that kind of hierarchical organisation*”), along with cooperation and the classic female role of “caring for others” (Bourdieu, 2000; Moore, 1991). This is just an example of the female attributes of the Internet and hacker culture, and therefore in theory they would make this movement more attractive and familiar to women.

Throughout this article we have argued that certain values have historically been considered feminine in a variety of disciplines (sociology, psychology and philosophy). We have also striven to these values with the hacker culture/ethic, as a different sense of time and money, cooperation, passion and feeling towards work. For this reason, we can now state that *hacker culture, one of the cultural underpinnings of the Internet, may have mainly been created by men, but it produces technology through historically feminine values.*

Based on Himanen's ethical assessment of the hacker world, hacking has been revised as a tool for building an alternative society with alternative values, not in a process of revolution or replacing what is established in society through widespread social change but through a change in individual values (the sum of which could amount to much more). That is, hacker strategies do not act by imposition but by the free adhesion of its members. And to do this, historically feminine roles are adopted, most likely unwittingly.

Throughout this article we have seen the Internet as different interconnected nodes connected horizontally, without a clear hierarchy, a fluid space of interaction and communication. This space, which has been defined as

feminine, clearly matches some of the needs of the women who defend it. The possibility of connecting remotely allows it to be used (for both personal matters and work) from home, which merges the traditionally private sphere of women (and many women are still secluded) with the public sphere. At the same time, the asynchrony in most of its uses – forums, webs, blogs, social networks, e-commerce, etc. – facilitates the balance of free time, family life, work and almost all the spheres of personal life. In fact, cyberfeminists are the most enthusiastic about the Internet in terms of women's struggles to achieve equal rights and responsibilities with men.

However, there are a few considerations.

The first consideration, and it is important to bear it in mind, is that here we do not mean to imply that the Internet is the solution to the female presence in the field of technology. Cyberfeminist optimism must be clearly relativised. The Internet in itself is a tool that helps, but it does not signal changes in the social structure and gender roles, which are much more deeply rooted. The Internet may be helpful, but it is not “the” solution.

Other considerations emerge when asking the following question: *Does hacker culture encourage the inclusion of women in technology?*

After what we have examined over the course of this article, everything would lead us to answer that it does. However, here we find a major problem: the lack of reliable data on the issue. The hacker world, by its very nature, poses hindrances to calculating the number of members it has overall. And in the specific case of women, there are no studies that have tried to ascertain the numbers, which even female hackers are curious to know (Coleman, 2010). All the figures available are partial and refer more to the world of open-source software. Hackers do not “clock in” or get paid a salary, nor are they part of a database; the concept is more open and broader, which makes things even more complicated.

What is more, the few figures available on the issue, which refer to open-source software, are disappointing: one report notes that only between 1.5% and 2% of all open-source software programmers are women. Even though reasonable doubts have been expressed about extrapolating these figures to the world of hackers, the fact is that the proportion is still low, too low. How can we explain this? An empirical study and more information on this issue are needed in order to explain it, and this would be a possible avenue of future research.

There is one factor in this field that is still crucial: *women's training in technology fields*. It is a clear fact that if more women study technology in official programmes, the proportion of female programmers in all spheres would rise, and therefore the proportion of female hackers would as well. If the “lack of interest in technical aspects” cited as a reason why women do not study technology fields (refuted by numerous studies, such as Sáinz and González, 2008) disappears because of a variety of social and educational changes, surely many more women would find the hacker world to be the ideal place to merge their technical or computer skills and other factors like solidarity, the construction of an alternative society and the quest for a less hierarchical structure. Another factor that should be borne in mind is the poor social image of hackers. As noted above, the media often confuse the term ‘hacker’ with ‘cracker’, people with special computer skills who use these skills to commit

crimes, large or small. The fact that the true meaning of 'hacker' is unknown by the majority of people and is instead associated with criminal behaviour, portrayed as "entertainment for freaks", does nothing to ease women's access to hacker culture.

One of the debates in feminism, one of whose consequences is the advent of the feminism of difference, which far from seeking equality between men and women by obligating women to become men focuses instead on embracing the good qualities of female roles, is to alert about precisely this: the danger that women reach positions of responsibility, of leadership and power, by "masculinising" themselves. Throughout this article, we have referred to studies that see the female leadership style as the best one for working in companies in the new economy and network society. This fact, a priori, becomes an opportunity for women to exert more influence in society without sacrificing their own *identity* (making it clear that this identity can be as particular and diverse as the individual women themselves).

If the figures do not become more satisfactory, however, the conclusion could be the opposite. Thus, since women have historically had to masculinise themselves in order to achieve the power that was otherwise denied to them, men can feminise themselves in order to exercise new kinds of leadership and organisation, *but in the absence of women*. After the characteristics that have been attributed to the hacker world, the female strategies it has been endowed with to form an alternative scale of values than the Protestant ethic, either women are there (in decent, considerable numbers) or we have to conclude that men have feminised and have used this alternative of femininity without including women. Men "feminising" could be one way of breaking down barriers with gender roles; however, not including women would mean once again reproducing unequal power relations between sexes, and this would entail a huge step backward.

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