RESEARCH ARTICLE

Hacking the learning: possible pathways for a feminist pedagogy of free software in activist experiences in Argentina

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The article seeks to provide new perspectives on the gender gap that characterizes free software, from the review of a series of experiences that have been taking place in Argentina in recent years, which aim at building bridges between free software and feminism. The empirical corpus selected for this work is built upon a series of interviews with free software activists and records of participant observation in events promoted by the communities of which the interviewees are part. A close look at their experiences allows us to recognize a set of commonalities that converge in a process in which they rewrite and resignify the principles that have historically been assigned to 'hacker learning'. In this way, I argue that these experiences enable new meanings and practices that configure scenarios for a feminist pedagogy of free software.

Keywords: free software; feminism; activism; feminist pedagogy

Introduction

Women and sexual minorities have been and still are underrepresented in free software[1], and over the past two decades, this gender gap has been explored and interpreted from different points of view. In previous works I have investigated and analyzed the mechanisms by which the masculinized conformation of communities is reinforced in the local context, identifying a set of enrooted practices that, with a supposed basis in the premises of freedom, equal opportunities and autonomy, reinforce heterosexist patterns in peer relationships, in intra and inter-community communication and in the distribution of tasks (Ortmann, 2015, 2017a, 2018, 2020). Here I examine a series of experiences that have been taking place in Argentina in recent years, which seek to build bridges between free software and feminism. These initiatives reflect a socio-political view of technologies and, from this perspective, advance a feminist transformation and appropriation of free software.

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[1] Although the acronym FLOSS is often used globally to name 'Free Libre Open Source Software', 'free software' and 'open source' do not have the same meaning and, as movements, do not pursue the same goals. For this reason, respecting the particularities of the context of this reasearch project and the way the subjects define their activism, in this work I use 'free software' denomination.

The paper is organized in five parts. In the first place, I briefly introduce the key aspects of free software movement in America Latina in the contemporary context. The second part is aimed at presenting the research framework, describing the problem and the methodology. Thirdly, I display the results, focusing on the ways the participants learn and redefine the traditional ways of making and conceiving free software. The fourth part includes a preliminary set of principles for a feminist pedagogy of free software. Lastly, I present the conclusion.

Key notes on free software movement in Latin America

In a Western context mobilized by social struggles of various kinds that had been going on during the previous decades, free software had its beginnings in the United States in the early 1980s, as a response to the intellectual property logic and market strategies that were gaining ground in the academic world (Vallejos, 2019). The definition of the four essential freedoms[2] and the launching of the GNU Project[3] were the first expressions of this initiative which, initially conceived from and for an IT niche, quickly expanded globally and acquired different nuances in the light of the issues and activisms of each region (Zuñiga, 2006; Ortmann, 2017b; Laborda and Guardia, 2019).

Currently in Latin America, the tensions between the ideals of democratization, self-management and sovereignty, and the logic of privatization of knowledge and technologies, are found in different dimensions that are constitutive of free software (Vallejos, 2019). In this introduction, I take two of those dimensions to formulate the research problem and to frame the analysis of the field research.

The first dimension refers to the recognition of free software as a contemporary social movement. Reporting on a survey of the state of free software in Latin America, Lena Zuñiga (2006) highlights that, even with the diversity of interests, purposes and modalities that this

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[2] The four essential freedoms are a set of requirements that computer programs must meet in order to be considered free software. Freedom 0: It can be used for any purpose, even for commercial purposes. Freedom 1: You can study how it is built, modify it and adapt it to your needs. Freedom 2: You can copy and distribute copies. Freedom 3: You can improve and publish the new version, so as to extend the benefits of those improvements to the whole community. Source: https://www.gnu.org/philosophy/free-sw.html#four-freedoms - Retrieved at: February 2021.

[3] GNU is a Unix-like operating system, which means that it is a collection of many programs: applications, libraries, development tools and even games. The development of GNU, started in January 1984, is known as the GNU Project. Source: https://www.gnu.org/ - Retrieved at: February 2021.

field of activism brings together, its participants coincide in pointing out its character as a social movement in that it constitutes a collective strategy that seeks to transform the conditions under which knowledge is accessed, used and shared.

The second aspect that defines it, and that is mostly assumed in the regional context, has to do with belonging to a community as a core form of organization for the design, production and dissemination of free software (Zuñiga, 2006), though the term 'community' may have different connotations. It refers to the universe of people who use and promote free software as well as each specific group that develops projects and defines its own form of organization in relation to tasks, roles and modes of participation. The common identity factor in all the cases is the sense of belonging: perceiving oneself as an integral part of a global movement (Ortmann, 2017b: 171).

Thus, a more complex and articulated view makes it possible to understand free software not only as an initiative for development, improvement and distribution of computer programs, but also as a social movement that incorporates diverse agents, with heterogeneous knowledge and interests. In other words, speaking of free software goes far beyond a type of program or operating system: it has generated a social movement, a system of values and an ethical view of technology that, with freedom as its horizon, aims to guarantee democratic access to knowledge and promote cooperation as a privileged form of information circulation (Ortmann, 2017b).

Research framework

State of the arts and problem

The ethical and philosophical premises that support free software – freedom, sovereignty, autonomy, horizontality – as well as the pragmatic features – the potential to satisfy different types of demands and needs, adaptation to different contexts and work modalities, flexibility and openness in the organizational structures – make it possible to anticipate a heterogeneity in the profile of its members. However, since its beginnings it has been characterized by a scarce participation of women and identities other than cisgender men. In this regard, Yuwei Lin states that:

> Although FLOSS has dramatically changed the way software is produced, distributed, supported, and used, and has a visible social impact enabling a richer digital inclusion,

most of the gender problems existing in the software industry have been duplicated in the FLOSS field. (2006: 1287)

The first global statistics were released towards the end of 2002 in a report of the results of a survey conducted by the University of Maastricht at the beginning of that year, which showed that only 1.1% of free software community members surveyed were women. Furthermore, the profile of the participants was highly uniform, not only in terms of gender, but also in terms of class and age. The data collected in the study showed a relatively young average age – around 23 years – with a solid professional background in the IT sector and a high level of education (Ghosh et al, 2002). Despite the methodological limitations of the study – for example, the voluntary response and the heteronormative way in which it measures the sex-gender variable – it constituted a first approach to the problem, as well as a significant insight into what was happening in practice.

Subsequently, other similar studies were conducted; some focused on specific communities, others were more open and general. Even with these nuances and modalities, women and sexual minorities continued to be a small percentage of participants (Arjona-Reina et al, 2014; Izquierdo et al, 2017; Terrell et al, 2017). For example, the research carried out in Latin America, cited in the previous section, points out:

> (…) a fairly marked uniformity: middle class, good connectivity, young, male and highly educated are the most numerous segment. The vast majority belong to the field of informatics and computer science and indicate English as a second language. (Zuñiga, 2006: 27)

Also, in her work on the limits of the rhetoric of 'open' and 'free' from a gender perspective, Dawn Nafus states that:

> There is no evidence that women's participation level has changed from Ghosh's study. What has changed is the growth in large commercial entreprises that contributed to F/LOSS as part of paid labor. The present study saw no indication that this changed women's exclusion. Despite more women working in commercial organizations as a whole, it appeared that within these firms it was the men who were the participants in F/LOSS. This low female participation rate is particularly surprising for a community in which anybody can participate. (2012: 670)

Along with the dissemination of these quantitative surveys, a growing body of qualitative works has addressed the forms of organization and performance of free software

communities, revealing that they constitute adverse places for anyone not identified with hegemonic masculinity (Schroder, 2009; Haché, Cruels & Vergés, 2011; Nafus, 2012; Moon, 2013). In this sense, the studies that analyze the gender gap have focused mainly on the revision of masculinized patterns. Among them, the center-periphery relationship between programming and other activities has been pointed out as one of the main factors that contribute to the highly mazculinized conformation: not only are there few women and sexual minorities, but they also perform tasks that are invisible and undervalued (Krieger, Leach & Nafus, 2006; Lin, 2006; Salas, 2006; Ortmann, 2015).

> FLOSS community members reward the producing code rather than the producing software and thereby put most emphasis on a particular skill set while other activities such as interface design or documentation are understood as less 'technical' and therefore less prestigious. The latter set of skills is often associated with women, which again puts them in a disadvantaged position within the FLOSS community. (Meiszner, Glott & Sowe, 2007)

Attempts to reverse and transform this scenario have adopted different modalities and strategies. In Argentina in recent years, a series of initiatives – still isolated and incipient – have advanced not only in the identification and modification of sexist features, but also in the implementation of projects that articulate feminism and free software. Thus, the main question that guides the development of this paper is to investigate the trajectories of the protagonists of these experiences, in order to know the ways in which they have approached free software, have appropriated it and have been able to design lines of action that articulate both fields of activism.

Methods

The study of the problem is framed in a qualitative research approach, within the free software communities in Argentina. The empirical corpus is constructed through interviews conducted with twelve people – ten cisgender women and two transgender men – who actively participate in the free software movement in Argentina and through records of participant observation in events promoted by the communities of which the interviewees are part.

The selection of the sample, intentional and non-probabilistic, is based mainly on three criteria (Chart 1): a) the fact that the activists recognize themselves as part of a community, that is, that they develop their practices within the framework of a collective strategy; b) they

manifest an identity different from that of cisgender men, which, as previously stated, is the majority identity in these areas, and c) they participate or have participated as an active member in free software activities (such as talks, workshops, events, etc.) that transversalize gender/feminist issues, either as explicit content or as an implicit perspective in the call, in the selection of speakers, in the use of language, etc. The definition of these three criteria responds to the aim of making visible minority identities in this field, their trajectories and the links they weave between free software and feminism.
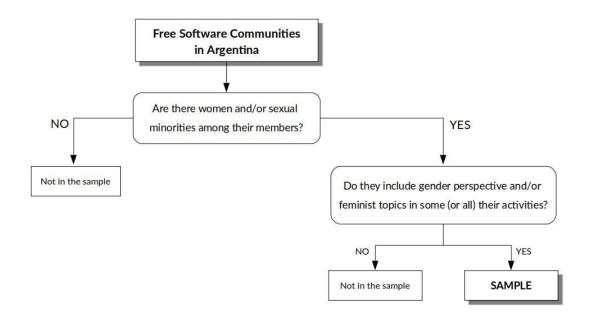

Chart 1. Sample selection process.

The interview instrument was prepared in a semi-structured way, with the purpose of identifying both recurrent and particular aspects in the gender meanings that characterize – mark, delimit, enable, restrict – the construction of particpants' own and their peers' trajectory in free software. The elaboration produced a script with the list of questions or topics that I was interested in addressing, but the order and structure are flexible to adapt to the nuances of each particular conversation. The interviews were conducted in the period 2018-19, in some cases remotely and in other cases in person at the place where the communities of which the interviewees are part gather.

In the presentation of the results, transcribed and translated excerpts of the interviews are included. To preserve the anonymity of participants and collaborators, each interviewee is identified with a number that corresponds to the order in which the interview was conducted.

Hacking the learning

In the early days of free software, the group of computer scientists who played a leading role in the disputes over intellectual property and the free circulation of knowledge came from a tradition of programmers who had defined themselves as hackers[4] since the 1960s (Adell & Bernabé, 2007). This denomination was incorporated into the free software jargon, partly as a legacy of those who promoted the first initiatives, but also to emphasize that, unlike the proprietary programs and operating systems developed by corporations, the free software movement depends on the contributions of enthusiasts who are governed by other logics (Himanen, 2001).

In this way, the history of free software was built around the activity carried out by hackers, which is characterized by self-taught training, horizontal organization and networking, very different to the verticalist models typical of companies. These aspects have been investigated and systematized from different perspectives: as a development model that works in a similar way to a bazaar (Raymond, 1997); as an open model of knowledge production that resembles the scientific academy (Himanen, 2001); as a set of practices for the cooperative and distributed creation of source code (Kelty, 2008); as an open participatory learning ecosystem (Meiszner, Glott & Sowe, 2007; Cronin, 2017). A first reading of these models seems to suggest that what is learned and what is done/produced is limited to the source code, i.e. it highlights the centrality of programming as an essential activity and the hacker as the standard figure that carries it out.

However, the incipient dialogues between feminism and free software, such as those that take place in the experiences investigated here, offer clues to redefine hacker learning, recognizing other knowledge and trajectories, and seeking to deconstruct the patterns of exclusion, hierarchization and invisibilization that characterize the traditional discourse in this field. A close look at their experiences allows us to recognize a set of common features that rewrite and resignify the principles that have historically been assigned to 'hacker learning'.

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[4] A collectively constructed and agreed-upon meaning describes a hacker as: 'A person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn only the minimum necessary'. Also, a hacker has 'the belief that information-sharing is a powerful positive good, and that it is an ethical duty of hackers to share their expertise by writing open-source code and facilitating access to information and to computing resources wherever possible'. Source: Hacker and Hacker Ethics entries at The Jargon File (version 4.4.7). Available at: http://catb.org/jargon/html - Retrieved at: June 2021.

In this way, I argue that these experiences enable new meanings, readings and practices that configure scenarios for a feminist pedagogy of free software.

In the following sections I present the results of the research in three stages. Firstly, I analyze some common features in the forms of initiation into free software reported by the activists interviewed, where some figures, who introduce and accompany them in their first steps, take on special importance. Secondly, I describe the exploration practices that free software facilitates and the sense of autonomy that these experiences offer. Thirdly, I propose a series of characteristics that define the paths that they trace, and that allow us to glimpse a feminist appropriation of free software.

Learning from others

From the beginning, the experiences analyzed differ considerably from those perceived as standard in this field: while in general terms informal or self-taught education and computer imprinting prevail (Ghosh et al, 2002; Salas, 2006; Meiszner, Glott & Sowe, 2007), the activists interviewed have solid backgrounds in formal education (with undergraduate and postgraduate degrees) and work in fields not directly linked to informatics and/or computer science, such as humanities, law, arts and social sciences.

In the same sense, their arrival at free software also occurs through uncommon paths. Unlike the way in which most participants describe their beginnings in free software, linked to their own explorations in the field of study and/or work in computer science (Ghosh et al, 2002; Salas, 2006; Meiszner, Glott & Sowe, 2007), these activists clearly identify an 'other' who approached them with the proposal and invited them to get to know what free software is:

> *I got to know free software for the first time from a friend who is an engineer, who I know from other fields, from sports activities. I needed a web page and he helped me and showed me what free software was.* [Participant N° 8]

The people whom the interviewees mentioned as their first contacts are friends, in a greater proportion, and teachers, in a smaller but equally significant proportion, who played a fundamental role in these experiences by introducing them to a new field of knowledge and providing support and technical tools for this incursion. That is to say that at the beginning of

this journey – which they will later assume as their own cause – the role of others who are already activists, defenders or promoters of free software is crucial. As Alex Haché explains:

> For people whose activism is based on the development of free technologies, it is (often) important to convince their own friends, family members, colleagues, as well as the groups to which they belong, of the importance of valuing free alternatives. Beyond the altruistic nature of their actions, they must also devise inclusive, pedagogical and innovative ways to convince. (2014: 9)

The people who initially accompany the participants constitute, in Graciela Frigerio's terms (2004), enabling figures because they provide the knowledge and conditions for a concern to become an opportunity for new learning. Two aspects of the enabling figures referred to by the interviewees are relevant to this research: first, they propose an approach to free software oriented to particular interests and needs, and second, they support a politicization of technologies.

In relation to the first, the intervention of others always appears as a situated invitation as it recognizes the specific needs of the initiator and promotes learning linked to personal interests:

> *I went to a workshop for radio, to operate radio, and there I realized that the computer is a very important tool for this activity. I bought one, I started with all the editing programs and there the guy who gave me the workshop told me about Ubuntu, he told me all about the Ubuntu philosophy and I remember that we ordered the CD*. [Participant N° 5]

> *I came across the free software proposal thanks to a friend, who saw that what concerned me and what interested me in my professional field at that time, was closely linked to what the local free software communities were doing*. [Participant N° 10]

The experiences gathered show that the interviewees' first steps were encouraged by others who recognized them as skilled subjects with visions and knowledge. It is this recognition that allows learning centered on people, their practices, interests and needs. In this sense, this approach to free software offered by the enabling figures creates the conditions for what Luz Maceira Ochoa (2008) characterizes as learning based on starting from oneself because it allows orienting and responding to concerns based on one's own experience. In the author's words, 'it means that learning develops from one's own identity, from one's own

desires and needs, from one's own daily life and life experience, because only to that extent can it be meaningful' (2008: 126).

Second, the first contact with free software offered by these enabling figures is never exclusively technical. To a greater or lesser extent, all the interviewees stated that they were introduced to the political nature of the technologies and the free software philosophy from the beginning:

> *I learned about free software from a friend. He always appears militating something that I didn't know very well what it was. And where it seduces me the most is regarding photography, and there he tells me what happens with wiki and photos. And that's where I get into it and start my own journey*. [Participant N° 7]

> *I came to free software from a talk given at the place where I was working at the time. (...) it was a group of university students, talking about how they had made their own operating system, with other logics, without a company, without all the capitalist apparatus that for me was unfailingly associated with it*. [Participant N° 9]

The inscription of learning on a political level makes it possible to anticipate a training that is not limited to providing procedures and skills in the use of an operating system or computer programs, but that encourages active involvement in a social movement that pursues the democratization of knowledge and the distribution of resources as its ultimate goal (González-Sánchez, 2007; Karanovic, 2008; Vallejos, 2019). This politicization of the technical (Barandiaran, 2003) acts not only as a central and convening factor in this new learning, but also makes it possible for the technopolitics of the movement to reproduce itself; in other words, it is possible to recognize the action of free software activists as helping to develop new activists.

Thus, in the experiences of the interviewees, enabling figures who call for 'something new' emerge in response to their interests and needs, while at the same time establishing a political position and a political option on the issue. While for feminist pedagogies this role has already been explored and systematized as a necessary aspect in educational processes (Webb, Allen & Walker, 2002; Korol, 2007; Maceira Ochoa, 2008), in a still preliminary way these enabling figures also seem to contribute to the paths that activists build a posteriori and that unfold at the intersection of free software and feminism.

Learning by / with themselves

In the paths traced by each of the activists interviewed from their first steps in free software, a second moment appears as a common denominator, 'a completely personal, intimate, self-paced, gradual, slow, complex process' (Maceira Ochoa, 2008: 126) through which they begin to build their own trajectories. This learning by and with themselves extends from the beginning to the present, and constitutes one of the strategies that allow them to acquire knowledge in this field.

In the first place, they identified an exploratory and playful component that brought them closer to different aspects of free software. Thus curiosity manifests itself as the main impulse that stimulated the search and enabled new learning:

> *I am very curious about the variety, I love the amount of distro and that, at the same time, they have their differences. Everything that is package management... There is so much that generates me... it stimulates me a lot. In Windows you have 8, 10, the end. The other enables you to do all this, to be able to play, to be curious, to know. It blows my mind.*
> [Participant N° 4]

> *The first thing I did was to install Linux, as it were, to try to get a good understanding of what it was all about.* [Participant N° 6]

Following Claudia Korol, in emancipatory pedagogical processes, curiosity is as important a driving force as need and desire (2007: 20). In the paths that the activists trace, certain elements of free software seem to support an authentic and singular inquiry, where particular aspirations converge in a broader collective process that, in this instance, accompanies in the background.

Besides, this form of exploration is closely linked to a playful character, where fun mobilizes a permanent learning process:

> *When I came across this whole world, the first thing I did was to challenge myself to use exclusively free software for my work, as a challenge, and it became fun. Then I started researching, downloading software, testing... I found that deeply fun and it is what I still enjoy.* [Participant N° 11]

Genuine curiosity and playful explorations – the search for entertainment – constitute, for the hacker model of learning, the main motivations that arouse the passion to learn more and the desire to continue learning (Himanen, 2001: 22). Likewise, these traits have been investigated and systematized by Haché, Cruels and Vergés (2011) as a virtuous loop, in which playing, experimenting and understanding continuously feed back into the technological learning practices of women hackers. These premises are recreated in the experiences of the activists interviewed, where desire and restlessness constitute a pedagogical scenario that demonstrate curiosity, the capacity for exploration and the self-taught learning are not exclusive domains of the activity of writing code.

Along with curiosity and entertainment, other aspect that mobilizes learning is the sense of autonomy associated with free software:

What had caught my attention and why I continued to do a little research on my own was this thing of making your own decisions, of autonomy, of making things more tailored. [Participant N° 8]

I also found the very practice of free software interesting. It makes me feel more in power of my own work, of my own creation. I feel that I am a little freer every day. [Participant N° 12]

As testimonies show, the possibilities offered by free software to use, copy, modify and adapt enable the construction of emancipatory links with technologies and with knowledge. This aspect is fundamental in view of a feminist appropriation of free software because it allows a deconstruction of the prejudices that attribute to women a lack of interest and/or capacity, and of the stereotypes that undermine self-esteem and assume women to be dependent, fearful and unsuitable in relation to technology (Dio Bleichmar, 2006; Natansohn, 2013). In these experiences, on the contrary, the dialogue between curiosity and freedom opens spaces to explore new ideas, and enhances a meaningful pedagogy (Britzman, 1999: 86).

Learning with others

A third moment shared by these experiences refers to the ways in which the activists appropriate this knowledge and recreate it in learning with others, forming a community. That is to say that the initial concerns that led enabling figures to bring them closer to free

software, then became an interest that unites them with others, with the intention of transforming the social conditions that they consider unjust and unequal.

The communities that the interviewees formed and/or are part of are diverse in format, structure and purpose; the flexibility of free software to adapt and respond to different needs translates into different types of organizations that in turn pursue different objectives. In this section I present those features that they have in common.

In the first place, this community learning privileges collaborative knowledge construction:

> *One of the things that I appreciate is the horizontality in the decision making process. (...)*
> *A chat among peers, deciding what is best, what is convenient, what is good for us. It*
> *does not mean that everything is rosy. But the way in which the word circulates seems*
> *valuable to me. And closely linked to that, the form of production. That each member*
> *contributes her knowledge, be it design, translation, communication, whatever. In fact, I*
> *think they are two dimensions of the same thing, aren't they? Horizontal work,*
> *collaborative work.* [Participant N° 9]

The experiences gathered shed light on how 'features that are important to the establishment and sustenance of open source communities' converge, such as the articulated work among peers. Thus, 'communities engage in collaborative discussion and construction to learn their mutual needs and negotiate to produce something meaningful for everyone' (Scharff, 2002: 2). However, in the case of the interviewees there is a substantive transformation of this dimension, because what is being 'negotiated' and 'produced' are identities, individual and collective, that seek to change the relationships and scenarios they inhabit:

> *I don't conceive of anything that is individual, I feel more comfortable with what is built*
> *as a group: I feel that it increases, I feel that it has power. And that is the place from*
> *where I stand conceptually to edit in Wikipedia, to work in my militancy group, and the*
> *groups in which I participate. Always building with the other. It seems fundamental to me*
> *as a way of life.* [Participant N° 7]

In this sense, the group dimension is fundamental in any feminist learning process. Maceira Ochoa, taking up bell hooks, explains that:

(…) the group is fundamental as a space for the politicization of identity, it is the space in which a strategy can be developed to increase the understanding of who we are, the intensity of our sense of intersubjectivity, our relationship with a collective identity, that is, where 'the personal' (understood as something merely individual) can be thought differently, taken out of spaces of ignorance, compared with other possibilities, associated with other knowledge, understood from the material reality in which the experience itself takes place, and therefore, politicized. (2008: 166)

Secondly, community learning assumes a political vision of technologies, which is expressed in the will to transform inequalities and social and political injustices and their expression in technology, especially with respect to the forms of transmission and exchange of knowledge (Haché, Cruels & Vergés, 2011: 75). Although this view has been present since their first contacts with free software, it is reinforced and becomes more explicit in the incorporation of these activists into communities of belonging (or in the creation of new communities) and the definition of their own objectives:

I care about the problem of access, I care about the problem of barriers to access that many people experience. That continues to be my main guide and guiding light in all the things that I do. Trying to see where those barriers are and how we can do to remove them or get around them or make those barriers not so problematic. [Participant N° 6]

Against any instrumental view that understands technology as a tool, a means to any end, or a neutral instrument at the service of people (Adell, 2018), the experiences of the activists interviewed show a clear perception of the interwovenness of technical, economic, political and cultural elements involved in any technological system (Wajcman, 2006).

With free software we have the possibility of giving signals, of filtering little by little... We have the seed in our hands. Let's not lose sight of that. Sometimes we put it as if it were just another screwdriver. And no, it is the seed from which we can multiply a lot. We can work, make it available, generate links. [Participant N° 4]

Highlighting the socially constructed nature of technologies also allows us to connect free software and feminism in their struggle for equality, empowerment and emancipation. In this sense,

(…) free software and feminism have a lot to do with each other, as cyberfeminist Laurence Rassel rightly points out: 'In French an operating system is called 'système d'exploitation' (system of exploitation), so owning your system of exploitation is the

minimum, and changing it is the minimum of the minimum. Also the idea of sharing and changing together. Here there are no copies, everyone has the original, this possibility of sharing things together is important'. (Haché, Cruels & Vergés, 2011: 13)

In this way, the political vision weaves a back and forth between feminism and free software, in which they feed back and enrich each other, and which is expressed in different dimensions. Among them, the interviewees recognize free software as a horizon and scenario when thinking about the digital inclusion of women and sexual minorities:

> *We have to question the approach of digital literacy programs for women, where they want us to get in technology without a critical view, without any questioning. We aren't going to be empowered by learning how to program and get to certain jobs. Feminism is something else, it seeks appropriation, and the technology that allows real appropriation is free software.* [Participant N° 3]

At this point, the testimonies emphasize a concern about the growing number of initiatives that have been taking place in recent years to 'bring' or 'add' women and sexual minorities into technologies. If digital inclusion lacks a critical view of social relations, knowledge and technology itself, it ends up reinforcing not only the heteropatriarchal structures that characterize technological production, but also capitalist production relations and the arbitrary designs of the market that the free software movement intends to challenge (Ortmann, 2020).

Besides, from this political vision they construct a (self)reflexive position that questions the instrumental uses of technologies in the activist field:

> *There was a lot of discussion about how to cite, what the license is like, what it means that the photo is mine but it is free... So we managed to convince that the photo is still yours, you are only deciding how to share it or how you want your work to circulate, and that apart from being stored, boxed in your own hard drive or in a cloud that is not even yours, like social networks, it managed to be in one place, categorized, and we can return to a moment of the local feminist struggle from photography, from the diverse look, and I think that's a lot.* [Participant N° 7]

> *Sometimes it seems that it is a one-way relationship: feminism has to make free software see the problem of the gender gap. And the other way around? What happens with*

Recognizing that 'the master's tools' cannot contribute to the achievement of feminist struggles (Lorde, 1979), the activists interviewed keep in mind that technology is never neutral. Thus, enclosure, private property, mercantilism, data extractivism and control mechanisms appear as contradictory logics for feminist aspirations, while autonomy, participation and shared knowledge enabled by free software open interstices for a feminist appropriation of technologies.

Clues for a feminist pedagogy of free software

A transversal reading of these experiences and of the stages in which they develop allows us to glimpse a set of principles that incipiently delimit certain features of a feminist pedagogy of free software. Among these principles, three emerge in a more recurrent and defined way.

In the first place, these experiences are crossed by a political conception of technologies. In the contemporary context, in which technologies occupy a central place in people's daily lives, a critical reflection on what the tools are and what interests they serve often tends to remain in the background. Efforts to increase the number of women using, designing and making technologies frequently subscribe to an instrumental model based on an assumed neutrality of computer tools.

On the other hand, a critical view emphasizes that the ways to achieve a feminist appropriation of technologies must necessarily inscribe the discussion in the political plane, in order to make visible the ways in which patriarchy, capitalism and colonialism are materialized in traditional – commercial, proprietary and non-free – technologies. Thus, a feminist pedagogy of free software takes as its starting point the recognition that technologies are not neutral and that those that are designed and produced to favor the distribution and democratization of knowledge are the ones that can serve feminist purposes.

Secondly, these experiences promote collaborative construction and peer-to-peer work. While many proposals implemented to reduce the gender gap in technologies emphasize the possibility of accessing more and better jobs and thus developing 'successful' careers in the IT field, a feminist pedagogy of free software recognizes that the path is never individual and that the transformation of inequalities is achieved through reflective and

collective work. In this sense, it reaffirms that learning as a way of inclusion in the field of technologies is produced, constructed and shared with others.

In third place, the recognition of multiple trajectories, practices and knowledge goes through these experiences, anticipating that a feminist pedagogy of free software considers the subjects in a particular and situated way. This valuing of the particularities of the protagonists of these learning experiences is manifested in two dimensions: assuming that people have particular interests and desires that motivate them to approach and take part, and recognizing the knowledge acquired in previous paths, which is not necessarily limited to the computer field, is equally valid and necessary for a field of activism that seeks, through free technologies, a greater access and a better redistribution of resources.

In sum, the experiences investigated here offer indications for a pedagogical proposal that establishes specific definitions of technologies, subjects and methodology. Thus, a political conception of technologies, collaborative construction and peer-to-peer work, and the recognition of diverse trajectories and fields of knowledge appear in the first instance as three founding principles of this feminist pedagogy of free software.

Conclusion

The studies that have investigated the causes of the gender gap in free software have focused on the analysis of the dynamics of communication, organization and hierarchy that characterize the functioning of the communities. The use of aggressive language, the marked computer science imprint and the stereotypes inherited from this field, and the centrality of programming as the activity that 'gives life' to free software are some of the factors identified as having the greatest impact on this phenomenon.

In the local context, a set of experiences that have been taking place in recent years allow us to identify and reconstruct strategies that seek not only to include women and sexual minorities, but also involve a deeper dialogue between feminism and free software. In order to identify and analyze recurring aspects, in this paper I presented an approach to the trajectories, motivations and purposes of the protagonists of these experiences.

These initiatives share some elements that allow a preliminary glimpse of new scenarios. Among them, the arrival at free software through enabling figures, who recognize participants' interests and needs, appears to open a path of exploration, autonomy and

collaborative construction. Also, the political dimension of the technologies that these figures introduce is another feature that runs through these experiences and that offers meeting points for the achievement of feminist and free purposes.

Another shared aspect resides in the playful and exploratory practices that free software enables and promotes. In this way, the learning with themselves and by themselves that the participants go through helps to undermine the pretension of the hacker as the only valid subject that knows and produces.

Finally, communities where horizontal and collaborative work takes place, together with a non-neutral and non-instrumental view of technologies and the desire to transform inequalities, allow participants to question traditional practices, knowledge and discourses in this field. Thus, in community with others, disputing enclosures and hegemonies, these activists also make – design, produce, maintain and disseminate – free software.

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