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Free for all? Knowledge as a barrier in technopolitical communities in Spain

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Abstract

Optimistic visions of its liberating potential have accompanied the Internet since its inception. However, technopolitical communities have defended free knowledge, but they risk adopting liberal notions when there is a group hierarchy depending on technological skills or the time people invest in the project (Coleman & Golub, 2008; Crabu *et al.*, 2016). Using a combined methodology, we aim to understand the decision-making and training processes of technopolitical communities in Spain. Results show that these projects are collective, and their communities are aligned with the availability of public materials on the Internet for individual learning and mutual support values. However, they must consider developing better-established training and decision-making strategies to attract more people and more diverse profiles. Otherwise, there is a risk of generating an elite of experts who may enjoy free knowledge but cannot effectively collectivize it and disrupt the context of informational capitalism.

Keywords

free culture; digital communication; knowledge barriers; self-learning; decision-making processes

¿Libre para todos? El conocimiento como barrera para las comunidades tecnopolíticas en España

Resumen

Visiones optimistas de su potencial liberador han acompañado a internet desde sus principios. Sin embargo, las comunidades tecnopolíticas han defendido el conocimiento libre, pero corren el riesgo de adoptar nociones liberales cuando existe una jerarquía grupal dependiente de las capacidades tecnológicas o del tiempo que las personas inviertan en un proyecto (Coleman y Golub, 2008; Crabu et al.*, 2016). Mediante una metodología combinada, pretendemos comprender los procesos de toma de decisiones y de formación de las comunidades tecnopolíticas en España. Los resultados demuestran que dichos proyectos son colectivos, y que sus comunidades están alineadas con la disponibilidad de materiales públicos en internet para el aprendizaje individual y los valores de apoyo mutuo. Sin embargo, deben considerar el desarrollo de estrategias de formación y de la toma de decisiones mejor establecidas para atraer más personas y perfiles más diversos. De no ser así, corren el riesgo de generar una elite de expertos que pueden disfrutar del conocimiento libre pero que no pueden colectivizarlo de forma efectiva y alterar el contexto del capitalismo informacional.*

Palabras clave

cultura libre; comunicación digital; barreras del conocimiento; autoaprendizaje; procesos de toma de decisiones

Introduction

Informationalism has come to denote the new system developed from the new political and economic capacities of information technologies. As the indispensable vector of communication flows within the framework of the information society, the Internet has become the driving force of modern financial systems based on economic calculation, information management and data production (Fuchs, 2016; Sierra Caballero, 2018; Zuboff, 2015).

The knowledge-based oligopolies are highly concentrated and shape their hegemony through the processes of commodification and technical specialization that give commercial value to Internet users' data (Manzerolle & Smeltzer, 2011; Morozov, 2018; Sampedro Blanco, 2018). Consequently, there is an unequal digital space where strategies of domination and concentration benefit the most extensive economic subjects –i.e., technological corporations– to the detriment of the civil alternatives that envisage a different future from the beginnings of the Internet (Birkinbine, Gomez & Wasko, 2016; Castells, 2008; McChesney, 2015).

Thus, the Internet is politically and economically conflicting, simultaneously producing networks of control and liberation. There is a convergence between the dominant structures and proprietary spaces with the new opportunities emanating from civil society (Castells, 2008; Sierra Caballero, 2018). In this context, some Internet communities express resistance to the hegemonic *status quo* (Tréguer, Antoniadis & Söderberg, 2016), trying to produce and distribute the knowledge as a common good.

Technopolitics emerge as a core term for understanding this resistance. It proposes politically analyzing the influence of the Internet in democratic systems (Sádaba & Gordo, 2011). At the heart of this concept, diverse communities perform strategic practices and design technologies for their political goals (Hecht, 2001). Then, these technopolitical communities manifest a critical vision of innovations, demonstrating that the Internet cannot reach its democratic potential due to its socio-economic foundation. In turn, they imagine and design new technologies according to the values of horizontality and emancipation (Candón-Mena & Montero-Sánchez, 2021).

In a globalized economy, the Internet produces and disseminates knowledge, which is understood as an accumulated and commodified product. The technopolitical communities formed by civil society have covered different spheres of action so that the digital commons realize that knowledge does not belong to corporations or political institutions but rather to all citizenship on the Internet. These communities have thought of and proposed formulas for peer production, collective control of Internet resources, distributed governance, and defense of autonomy and freedom both online and offline (Benkler & Nissenbaum, 2006; Dahlberg & Siapera, 2007; Kelty, 2008). These new models propose a greater autonomy of Internet users and an extensive redistribution of power in it (Benkler, 2006; Fuster Morell, 2011; Ostrom, 1990).

At the same time, these communities' goals involve limitations in scope and barriers to participation (Toret *et al*., 2013), as participation in them often presupposes programming and management skills and social and political knowledge (Haché, 2014). At the first level, this nature could present barriers to accessing these communities. In other words, contributing to them has, so far, meant a degree of abstraction and technological skills that generate barriers to access for people with lower levels of education (Benkler, 2006; Coleman, 2011). Activities such as protecting personal privacy and controlling online resources thus belong to an elite of experts with a higher level of digital literacy (Carr, 2008; Christl & Spiekermann, 2016).

At the second level, this situation could involve barriers to decision-making processes. That is, communities risk adopting liberal notions when they have a hierarchical structure, and the position of their members depends on technological skills or the time invested in the project (Coleman & Golub, 2008; Crabu, Giovanella, Maccari & Magaudda, 2016; Nafus, 2012). For this reason, technopolitical communities must reflect on strategies that allow them to open internal participation to a more significant number of people (Reagle, 2013).

In this research, we propose that technopolitical communities perceive knowledge as a political goal and a barrier. This latter con-

cept implies the risk that technical skills are a precondition for access to, and participation within, communities. Thus, using a combined methodology, we aim to understand the decision-making and training processes established in Spain's technopolitical communities. We address the inequalities and hierarchies noted in previous research, the concerns they express about forms of governance and access to knowledge, and the strategies they establish to have more diverse and horizontal communities.

1. Access and participation in technopolitical communities

As has happened historically with the origin and development of new technologies, the rise of the Internet has generated expectations about the forms of communication and coordination of social groups through technologically mediated relationships and the creation of online personal ties (Lam, Karim & Riedl, 2010; McChesney, 2015; Sierra Caballero, 2018). In the case of the Internet, there was a blossoming of diverse communities such as free software, hacker, and the free culture movement, which are difficult to define and systematize (Gutierrez & Milan, 2017; Milberry & Anderson, 2009).

The importance of technological abilities in the role played within these communities poses the question of knowledge as a precondition of participation. This nature contradicts their political goals of the distribution of knowledge in diverse dimensions. The distribution of knowledge is not only part of the political goals of these communities; it is at the core of their practices. Following hacker ethics (Himanen, 2002; Jordan, 2017; Levy, 1994), learning and curiosity become new incentives for participation in these projects, far removed from a logic of maximizing economic profit (Firer-Blaess & Fuchs, 2014; Lerner & Tirole, 2000). For that reason, the communities aspire, ideally, for their members to be trained within these spaces without the need for prior formal training.

However, hackers and geeks "represent one type of privileged actor" in political Internet claims, as the technical orientation of the movement "also means that digital literacy is often a requirement for participation" (Coleman, 2011:515). In the case of free software communities, code writing or the use of specific tools are the core activity of their members, and they must exercise it previously (Sadowski *et al*., 2008; Wang & Sarma, 2011). Communities have tried to avoid these barriers through self-learning, mutual support and mentoring processes, where more skilled members help newcomers. Nevertheless, these relations are not exempt from concerns related to technical knowledge, personal ties, and the sociodemographic and cultural backgrounds of participants in the community (Balali, Steinmacher, Annamalai, Sarma & Gerosa, 2018; Carillo, Huff & Chawner, 2017; Gladwell & Shirky, 2011; Lin, 2004; O'Mahony, 2007).

In general, the advent of the Internet meant that citizens acquired new forms of literacy to participate in democratic systems (Kellner, 2007). More specifically, the contribution to code and interaction with electronic tools require technical training, so that less specialized individuals must limit their participation in education and the dynamization of communities (Castells, 2012; Coleman & Golub, 2008; Jackson & Kuehn, 2016). In this sense, Nafus (2012) notes that communities have valued worse activities like writing manuals and perceived people dedicated to these tasks as less knowledgeable. Some investigations have affirmatively noted that, along with soft skills, technical proficiency is a relevant criterion for leading a free culture group (Barcellini *et al*., 2008; Cai & Zhu, 2016; O'Mahony & Ferraro, 2007).

Therefore, some authors question the term meritocracy, as it mainly connects to the technological work of the communities and proposes hierarchies between those who can contribute more to the code and those who can dedicate less time to these tasks because of lower abilities or social time. Meritocracy is linked to competitive dynamics within the groups (Coleman & Golub, 2008; Powell *et al*., 2010; Wei, Crowston, Eseryel & Heckman, 2017). The extensive literature addressing the motivation of contributions to free software frequently identifies learning, enjoyment and the acquisition of prestigious status in the community as the factors that drive participation in such communities (Ghosh *et al*., 2002; Hannebauer & Gruhn, 2016; Lerner & Tirole, 2000; Shah, 2006).

The centralized processes and knowledge barriers of technopolitics-related activism mean that power is limited to an elite of experts –e.g., Linus Torvalds and Richard Stallman – who create and offer a growing number of tools and projects (Giuri, Rullani & Torrisi, 2008; Jordan, 2017; Prattico, 2012). People with broader knowledge and training have wider access to the Internet and higher online platforms. Thus, these privileged actors are susceptible to monopolizing community participation with their interests and processes (Benkler, 2006; Costanza-Chock, 2018; Milan & Treré, 2019).

This potential monopolization of the projects also begs the question of the hierarchies and forms of organization within them. Much of the research into governance and decision-making in these communities focuses on the specific case of free software communities. This discussion has generated several analogies between their dynamics and diverse political systems, from democracy to anarchism or bureaucracy (Konieczny, 2017; O'Mahony & Ferraro, 2007; Sadowski, Sadowski-Rasters & Duysters, 2008).

The pioneering works of Raymond (1999), Cox, (1998) and Krishnamurthy (2002) developed models on the forms of organization of free software projects through the metaphors of the "Bazaar", the "Town Council", and the "Cave", respectively. The first aligns with Linus' Law and manifests an optimistic spirit, in which the strength of collective production relies on the scrutiny of a multitude of Internet users over collective productions. For Cox, (1998), the "Town Council" is made up of the most active participants, without impediment to occasional contributions by the rest of the community. Finally, Krishnamurthy, (2002) concludes in his empirical study that group dynamics are more akin to a "Cave", where a small number of developers discuss, write and administer the code.

Despite communities' insistence on developing non-hierarchical, community-based, and decentralized forms of organization (Crowston & Howison, 2006; O'Mahony, 2007; Powell, Hunsinger,& Medlin, 2010), further research has provided new data that reinforce the "Cave" views (Raymond, 1999). In general, the research describes a central nucleus that develops the program and a more

decentralized and horizontal periphery that oversees identifying bugs and working on improvements (Allaho & Lee, 2015; Barcellini, Détienne & Burkhardt, 2008; Crowston & Howison, 2003; Long & Siau, 2007). Extensively, the discussion spaces for the improvement and implementation of new code have a central hub of interaction with key members while peripherical participation enhances projects' transparency (Barcellini, Détienne & Burkhardt, 2014; Lin, 2004). Surveys conducted by Ghosh *et al*. (2002, 2005) indicate that most free software developers are involved in only one or two projects, interact with a few other participants, and hardly belong to the leading group of a specific initiative.

Research extends this discussion to several initiatives related to free culture, such as Python, Debian, Wikipedia, Linux, and Mozilla. The aforementioned governance models can be applied to the analysis of wikis, wherein the participants edit posts generated by other, more active users within an online environment open to new participants (Konieczny, 2017; O'Mahony, 2007). The organizations' hierarchy links with several factors; motivation, the time available to dedicate to the project, and technical skills determine each subject's reputation and importance within the community. Specifically, decision-making activities rest on the members with more technological abilities, and therefore there is a tendency toward centralized coordination (Crabu *et al*., 2016; O'Mahony & Ferraro, 2007).

For this reason, some research suggests the need to create mechanisms for the inclusion of more diverse profiles, as well as more decentralized forms of coordination, since the composition and dynamics of groups directly affect the result of their work, the quality of internal decision-making, and the homogeneity of projects (Galdón Corbella, 2018; Lam *et al*., 2010; Reagle, 2013; Woolley, Chabris, Pentland, Hashmi & Malone, 2010). In other words, the collectivization of knowledge must aspire to universal access to participation. At this point, communities with this technopolitical orientation cannot be concerned only with the critique of technologies and technological innovation but also in integrating a broad social base in shaping the desired Internet. Alternatively: "How can we build without the technocratic filters that usually exist on the Internet?" (Barcellini *et al*., 2014; Markus, 2007; Mateos-Garcia & Steinmueller, 2008; Villasante, 2017:71).

2. Methods

In this study, we attempted to discuss the barriers of technopolitical-oriented communities in Spain. While research into the organization and coordination of groups has often focused on specific projects or initiatives with particular attention to free software (Markus, 2007), this research gathers a wide range of initiatives beyond the contribution to free software (O'Mahony, 2007).

We are particularly interested in studying how the centrality of knowledge in technopolitical communities implies a tension between its political objectives and its participation in them. Based on the above theory, we understand that this participation may be limited by the conception of knowledge as skill or merit. Therefore, we propose the following research questions:

a. Are there specific conditions to be part of a technopolitical community in Spain?

b. Are there specific conditions for decision-making participation within the communities?

To answer these questions, we propose a combined two-step methodology. Firstly, we distributed an online questionnaire to 290 free culture organizations in Spain. In a second phase, we conducted 37 interviews in order to select the communities participating in the questionnaire.

Since there was no previously defined sample of free software groups in Spain (Cea D'Ancona, 1996; Howard, 2002), we initiated this research by identifying communities through the snowball technique. To limit the sample, we established four minimum conditions (Álvarez Pedrosian, 2014) for the initiative selection:

a. identification with free software and free culture;
b. participation in Spanish territory;
c. activity dating back at least one year; and
d. no establishment as private companies nor public administrations. We identified 739 groups to whom we sent the questionnaire, designed in a free license software.1 Finally, 290 communities responded to this survey, so the response rate was 39.24%.

As a complement, 5 of the communities analyzed in advance the complexity and comprehension of the questions posed in a pre-test phrase (Arribas, 2004). The final questions of the form were three:

a. How many people are regularly involved in the community?
b. How many people are involved in the community's decision-making processes?
c. Is any training needed in order to participate in the community?

The questionnaire and sample are available in a public repository (anonymized).

Once we extracted the quantitative data from the questionnaire, we conducted interviews with 37 of the previously surveyed groups. We select them by intentional sampling to look for communities that would have offered different answers to the aforementioned questions and thus have a more diverse number of views in interpreting the results (Cuesta, Font Fábregas, Ganuza, Gómez & Pasadas, 2008).

Interviews were conducted between September and December of 2018, attended by between 1 and 8 project participants and lasting a maximum of 161 minutes. We did not ask specific questions, but rather provided the document with the data from the questionnaire to be interpreted within their logics as collectives (Flick, 2014; Ruiz Olabuénaga, 2012). To ensure a comfortable atmosphere in the interviews, we anonymized participants' names with a random number (Valles, 2002).

3. Results

In the first approach to these communities, the results exhibited the existence of collective projects that necessarily carry out organization and governance processes in decision-making. The data showed the presence of collective rather than individual projects: 63.4% of the sample had between two and ten regular members; 15.2% had between 11 and 25 participants; 9% increased to a range between 50 and 100. In 5.2% of the communities, there were between 26 and 49 members; in 1.7%, the number of participants exceeded 500 components; and in 1% of them, the amount was between 101 and 249. Only 3.8% of

the initiatives had individual participation. In the following sections, we picture how these communities manage the entry of new participants and their involvement in decision-making.

Table 1. How many people are regularly involved in the community? (n=290)

	Frequency	Percentage (%)
One (1)	*11*	*3.8*
Between 2 and 10	*184*	*63.4*
Between 2 and 10	*184*	*63.4*
Between 11 and 25	*44*	*15.2*
Between 26 and 49	*15*	*5.2*
Between 50 and 100	*26*	*9*
Between 101 and 249	*3*	*1*
500 or more	*5*	*1.7*
I don't know / I do not wish to answer	*1*	-
Total	**290**	**100**

Source: own creation

4. Access to communities

Open access is a salient feature in the communities, either rejecting prior knowledge to access them or proposing training courses. Specifically, 45.9% of the communities denied prior training in order to participate in their activities. At the same time, only 14.8% of the organizations indicated that they did not offer any instruction. The most common learning was informal among collectives that provided training to participants: 22.8% of the communities designed advisory and accompaniment actions among their members.

Along the same lines, 12.4% proposed continuous training plans based on the circumstances of the participants and the community. At the same time, on 9.3% of occasions, the groups considered carrying out introductory activities that would allow them to understand and approach the disciplines of knowledge and technical skills that their projects require. In this sense, 7.9% of the initiatives admitted that their actions required prior education in order to participate in them.

Table 2. Is any training needed in order to participate in the community? (n=290)

	Frequency	Percentage (%)*
It is required in advance to participate in it	*23*	*7.9*
No prior training is required	*133*	*45.9*
We carry out introduction training	*27*	*9.3*
We carry out constant training	*36*	*12.4*
We provide informal training (accompaniment)	*66*	*22.8*
We do not provide training	*43*	*14.8*
Other	*20*	*6.9*
I don't know / I do not wish to answer	*11*	*4.5*
I don't know / I do not wish to answer	*1*	-
Total	**361**	**-**

* The percentage displays the frequency of selection of each of the options (Multianswer question)
Source: own creation

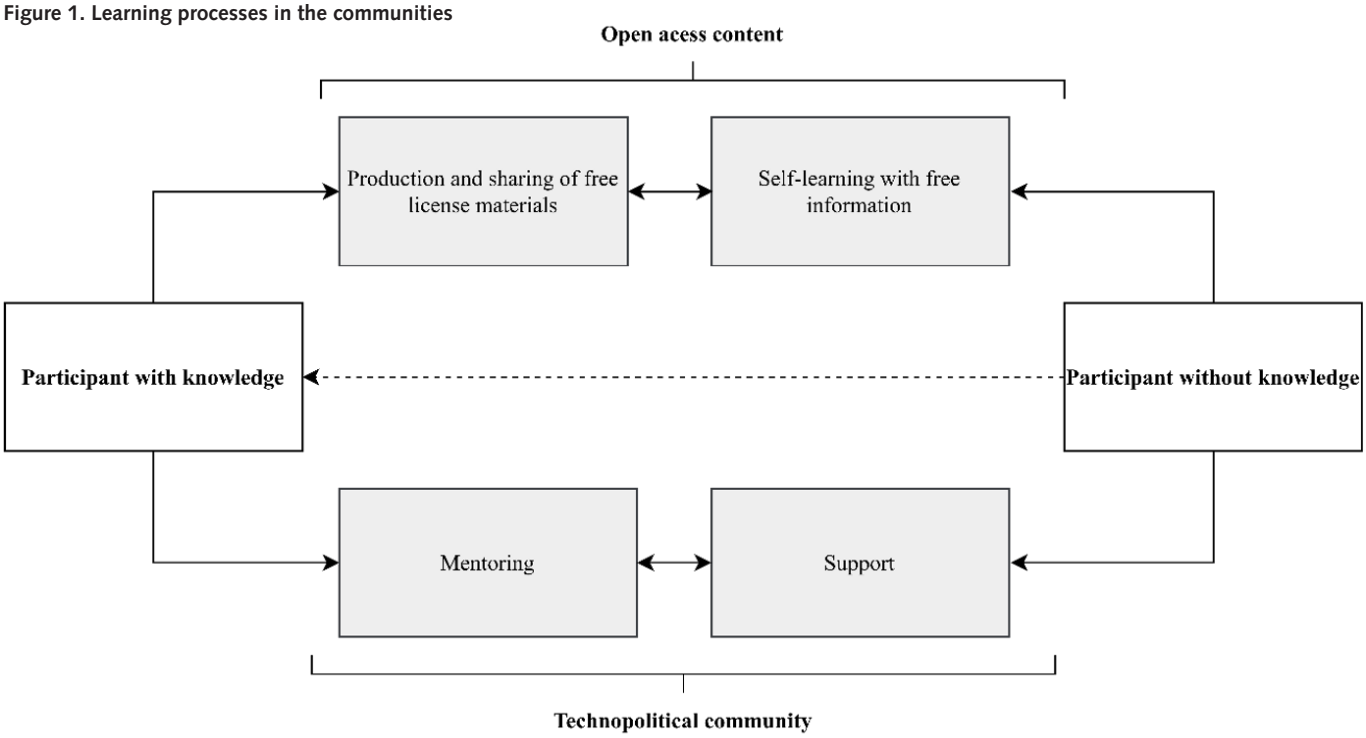
During the interviews, the groups indicated that they did not require prior training, since they recognized that any demand for knowledge involved building entry barriers between themselves and society, especially when open access is a value intrinsically linked to their identity as a community: "If we demand prior training, then we would be fighting against our end, which is the freedom of knowledge." (Interview 16). They understood that their communities precisely aimed to break down any educational barrier and regulated teaching, so they denied recognizing educational diplomas as the only valid knowledge.

Indeed, formal education was repeatedly criticized, as these institutions did not offer a critical view of new technologies but rather contributed to the consolidation of proprietary technologies. They considered that the centers with highly-qualified technology students do not promote critical awareness. For example, they criticized technological empowerment programs adopting neoliberal criteria and focused on entrepreneurship. Rather than generating enterprises, they supported the appropriation of technological tools for the purpose of political participation in democracy.

The groups confirmed that they felt linked to self-learning in line with the hacker culture. They interacted with platforms, experimented with specific software, tested the functionalities of hardware pieces, and imagined new projects, even though they had no previous experience. Once they had acquired enough knowledge, they shared it with other members. When a new person arrived, the previous members provided informal training. Otherwise, they supervised their activity in the group until they had enough information to carry out autonomous participation capable of investigating and generating new information of collective interest. With more experience, they were able to give back to the community what they had previously received from it. One of the interviewed participants described the following:

> "When I entered [...] in 2007 or 2008, I did not know Linux. I had heard about it, I had an Ubuntu CD and was testing it. I met [the community], got involved and now all I know is thanks to them. It's one of the reasons I've been encouraged to stay in the group. At first, you receive a lot because you think: 'I have no idea.' Then you start asking. You ask a question in the forum, and the next day you have 15 answers, and you say: 'This is fantastic.' And you get involved until, in the end, you feel so grateful that you feel like collaborating or doing something however small as a gesture of gratitude. At least that's my personal experience. [...] And now I'm in conferences, come on! So, I think these communities are very collaborative. Even with other groups, there is a lot of collaboration. And that process is fantastic; I think that's what generates enthusiasm" (Interview 27).

Figure 1. Learning processes in the communities



Source: own creation

At the same time, they recognized that self-learning and empowerment were usually related to prior knowledge about the Internet and new technologies. They perceived that sometimes, this knowledge was related to the educational level of the participants. They indicated the difficulty of their field: "I sometimes talk to someone, and I think, 'No, you do not understand it, the Internet is a fantastic thing that is being blocked, that is increasingly manipulating dangerously.' And people don't see it, but they don't see it because they don't know it, and they don't know it because their contacts don't know it" (Interview 17).

Positioning favoring a free, decentralized, neutral, and autonomous electronic environment required more complex arguments and support that were not identified by a social base that could be activated politically. Besides, the concepts and processes with greater technological complexity that the groups were performing also required broad levels of qualification that would allow new participants to integrate more quickly into the projects undertaken by the groups. "It's complicated sometimes. We try to make all sessions as accessible as possible, but it is complicated when someone new comes and finds us in the middle of a process" (Interview 15).

Both in the case of training and decision-making processes, the groups reflected on the exclusion of specific social groups because of these factors: "I don't know whether we are leaving someone out or whether there is a sector of the population that doesn't participate. However, saying that there is a sector that does not want to participate is to presuppose something very classist" (Interview 29). In this regard, one of the participants in the collectives described the free software movement as "an elitist and biased environment. Despite being an environment supposedly of freedom and free culture, it is an environment that is not accessible to most of the population. It is a challenge of these movements" (Interview 10). These considerations show self-critical thought and a reflection on the internal processes that may or may not facilitate diversity and access to their projects.

5. Decision-making processes

Coordination groups frequently made the decisions in their projects. In 59.7% of cases, the group discussed their strategies and objectives. The legal forms of the collectives could suggest the internal structure since, in foundations, the governing body was limited to a board of trustees. At the same time, the general assembly made the decisions in associations. Communities preferred assembly models 37.9% of the time. In 7.9% of the sample, a single participant made the decisions. However, considering that 3.8% of the sample are individual projects, then in 2.1% of communities with several participants, only one member led the project.

Table 3. How many people are involved in the decision-making processes of the community? (n=290)

	Frequency	Percentage (%)
One person	*23*	*7.9*
Some of the people	*147*	*50.7*
All the people	*110*	*37.9*

Other	*3*	*1*
I don't know / I do not wish to answer	*7*	*2.4*
We do not provide training	*43*	*14.8*
Other	*20*	*6.9*
I don't know / I do not wish to answer	*11*	*4.5*
I don't know / I do not wish to answer	*1*	-
Total	**290**	**100**

Source: own creation

The communities with the lowest number of participants indicated that they conducted assembly processes. However, they generally admitted to not making decisions frequently and having more informal mechanisms when deliberation was necessary: "We are not regularly participating all the time. But well, you've raised it. Here you speak and propose if you want to and if you don't want to, then you shut up" (Interview 26). Therefore, although they proposed the inclusion of a higher number of members in the project's development, they admitted that the quorum rarely corresponded to the total number of members.

The groups tended to prioritize offline environments when discussing community strategies and objectives, which implied the exclusion of participants who could not attend face-to-face meetings. On the contrary, when decisions were less far-reaching or only involved administrative activities, some communities reported moving the debate to the online environment through forums in instant messaging applications or mailing lists. Communities considered non-response to the messages an acceptance of the specific proposal that had been put forward: "Usually you chat something like, 'Let's do this, Okay? What do you think about that?' Only a few replies. Depending on who answers, then we do it, or we don't" (Interview 1).

To be functional, the larger collectives created decision-making boards or specific departments in charge of specific issues: "We make decisions openly, and anyone can opine and recommend anything. However, the marketing department will be the one to make the decisions about how to manage social networks, and the webdev department will be the one to decide about their issues" (Interview 5). The existence of specific, smaller groups showed a diversification of tasks within the groups. There is, therefore, no exclusive education for tasks involving high technological skills, such as programming, and the communities opened other spaces involving different abilities.

At the same time, they indicated that the decision-making groups were open to anyone with an interest in working on this type of process. However, they noted that not all members of the groups were interested in influencing or determining projects and processes: "In fact, it is the board of directors and the people employed who make the relevant decisions of the organization. Some associated people only want to pay their fee and do not want to be part of the organization's decision-making processes." (Interview 10).

Faced with identifying different degrees of involvement in the community, some groups indicated prioritizing the opinions of those who had worked more on concrete projects. Otherwise, they attributed greater legitimacy to those who assumed higher responsibility and contributed more to the development of concrete activities and actions:

> "I think we are pretty like the Debian project, to mention an example. The Debian project has something like a 'docracy'; those who do the things are the ones who command. If you don't agree with something, your counterargument is not enough; work as the first one to demonstrate that your conclusion is as good as the other one and already in any case. Users will try what they like the most, and that's it" (Interview 17).

Conclusion

Optimistic visions of its political and social potential have accompanied the Internet from its origin and expansion in the nineties. Technopolitical communities have articulated a discourse supporting the collectivization of knowledge under the essential premise that access to computers and technology must be unlimited (Kelty, 2008; McChesney, 2015). Collective participation, decentralized decision-making, and the disappearance of access barriers to knowledge are not minor matters, as they connect with these communities' identities and core values. The research we propose in this article sheds light on how these barriers are present and discussed within technopolitical communities in Spain. We inferred two ways of understanding knowledge as a barrier from previous academic literature –one related to access and the other to participation in decision-making.

Access to the community is a contradiction identified and addressed by the communities. There are two strategies for overcoming this access barrier: on the one hand, the opening of the community to people with different technological capabilities, and on the other hand, the management of informal teaching processes. At this point, as Figure 1 shows, there is a virtuous circle in which the less educated benefit from the open-access materials available on the Internet and the support of more educated participants. At the same time, when new members reach a high technological level, they can write tutorial documents and mentor newer participants.

So, strategies for training in projects take on an informal nature. The groups manifest a hacker spirit (Himanen, 2002), where self-learning and accompaniment are the main pathways to gaining critical viewpoints and technopolitical skills. Furthermore, these learning processes also acquire a solid technopolitical character. From their criticisms of formal education, we can deduce their interest in carrying out non-hegemonic training processes, based not only on technological skills but also on the critical interpretation of the socio-economic conditions of the Internet.

However, this process rarely resolves the fact that knowledge is a necessary precondition for participation in projects or even the approach to technopolitics (Hannebauer & Gruhn, 2016). Without creating more formal training or dissemination processes, communities run the risk of reproducing access barriers to knowledge and creating an elite of technical experts that includes only the privileged actors in the system (Coleman, 2011). Future research must also include the mentoring processes themselves and the conditions that

affect these forms of mutual support (Balali *et al.*, 2018), which could intersect with issues such as gender, as previous research suggests (Nafus, 2012).

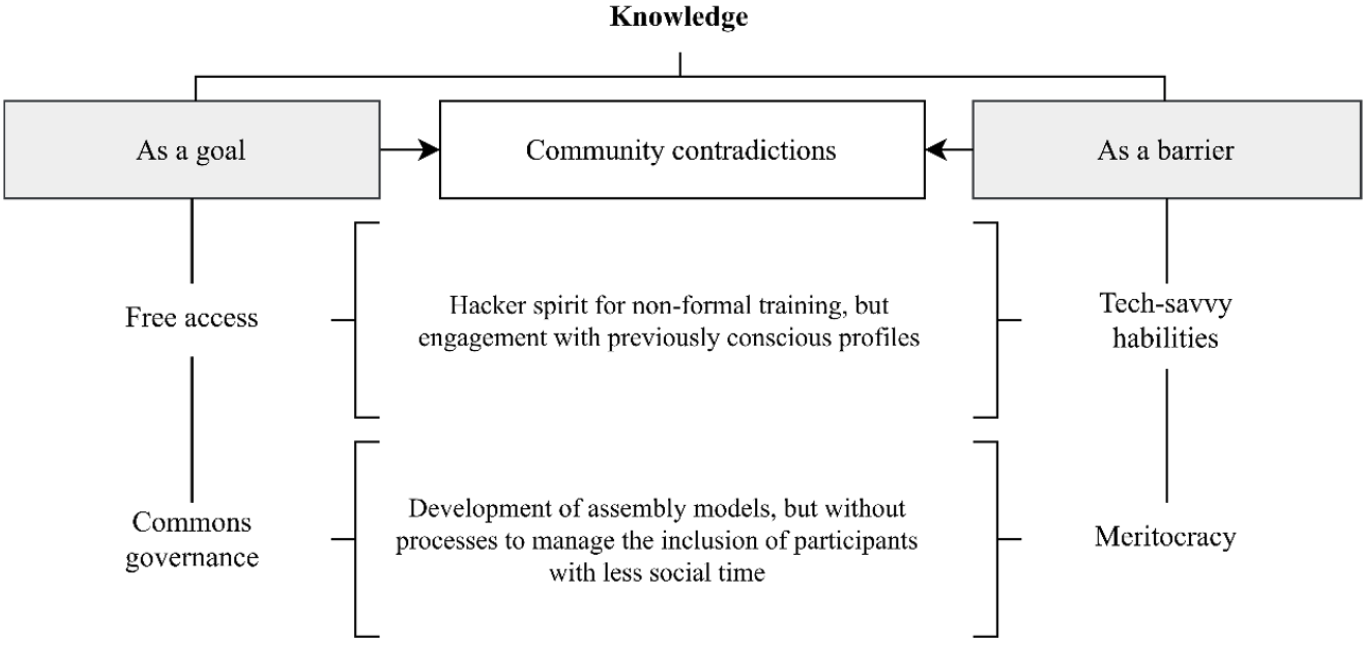
While opening access to participation is a clearly-identified issue in these communities, participation in decision-making takes on other nuances. The results of this research indicate that only some of the people make decisions in the community. This structure is not attributed to the difficulty of access to leadership roles but rather to the lack of formal decision-making structures (Garzarelli & Galoppini, 2002). Social inequalities affect the governance of collectives, where people with more social time to work on the initiative occupy organizational responsibilities (Crabu *et al.*, 2016). Therefore, we consider that these groups should approach governance with the conscious purpose of creating more horizontal and inclusive mechanisms for all participants (Reagle, 2013).

In the communities, meritocracy is not directly related to knowledge but rather to one's contribution. The data obtained from the questionnaire disprove the thesis on the movement of software and free culture as a "Cave" (Krishnamurthy, 2002), but the structure of the communities is more similar to the "Bazaar" (Raymond, 1999). This model occurs not only in communities dedicated to programming, but in general in those with a technological orientation.

The community organization expresses this concept's collective sense and collaborative will (Crowston & Howison, 2006; Powell *et al.*, 2010). Therefore, research that addresses the degree of engagement with technological communities should understand this logic. Analyzing the structure of communities through the contribution to the code limits the myriad forms of participation (Barcellini *et al.*, 2014; Nafus, 2012; O'Mahony & Ferraro, 2007). In the communities, this nature is expressed through the different departments and tasks that are assigned to the people who participate and where they can make decisions regardless of their technical contribution to other areas.

The usage of the Internet for internal communication is especially pertinent when dealing with technologically-literate communities capable of creating tools and discussing the political meaning of the Internet. The role that virtual tools play in these processes is also relevant. Members usually use them to complement offline meetings when decisions are less relevant or require a quicker response. Furthermore, communities show no complex deliberative processes in online forums. Research into these groups leads us to assume that the exploration of means to create digital platforms that provide spaces for collective and participatory discussions and processes is still open.

Figure 2. The knowledge question in technopolitical communities



Source: own creation

To conclude this article, we raise Villasante's (2017) question about the possibility of generating online tools that are far from the prevailing hegemonic logic. In this research, we consider that the configuration of a pro-democratic public space on the Internet is underpinned by the question of the modes of knowledge management in current times. Technopolitical communities defend open access and common governance. However, these objectives encounter tensions during the very development of their practices (Figure 2), which remain among those who can contribute the most and have enough expertise. The studied communities have problematized these barriers, especially in the case of knowledge as a condition for access. However, the process of resolving this issue is dynamic and still open.

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Notes

The license (GNU Lesser General Public License) can be viewed at Github, https://github.com/ushahidi, accessed March 8, 2021.

References

ÁLVAREZ PEDROSIAN, E. (2014). "Lo urbano como laboratorio para la exploración transdiciplinaria". In: *Cartografía de territorios y territorialidades. Un ejercicio de integralidad en el encuentro de la geografía humana y la antropología de la comunicación*. Montevideo: Espacio Interdisciplinario de la Universidad de la República, pp. 17-28.

ALLAHO, M. Y.; LEE, W. C. (2015). "Analyzing the Social Networks of Contributors in Open Source Software Community". In: Kazienko P.; Chawla N. (eds.). *Applications of Social Media and Social Network Analysis*, pp. 57-75. https://doi.org/10.1007/978-3-319-19003-7_4

ARRIBAS, M. (2004). "Diseño y validación de cuestionarios". *Matronas Profesión*, vol. 5, no. 17, pp. 23–29.

BALALI, S.; STEINMACHER, I.; ANNAMALAI, U.; SARMA, A.; GEROSA, M. A. (2018). "Newcomers' Barriers... Is That All? An Analysis of Mentors' and Newcomers' Barriers in OSS Projects". *Computer Supported Cooperative Work (CSCW)*, vol. 27, pp. 679-714. https://doi.org/10.1007/s10606-018-9310-8

BARCELLINI, F.; DÉTIENNE, F.; BURKHARDT, J. M. (2008). "User and developer mediation in an Open Source Software community: Boundary spanning through cross participation in online discussions". *International Journal of Human Computer Studies*, vol. 66, no. 7, pp. 558-570. https://doi.org/10.1016/j.ijhcs.2007.10.008

BARCELLINI, F.; DÉTIENNE, F.; BURKHARDT, J. M. (2014). "A situated approach of roles and participation in open source software communities". *Human-Computer interaction*, vol. 29, no. 3, pp. 205-255. https://doi.org/10.1080/07370024.2013.812409

BENKLER, Y. (2006). *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven: Yale University Press.

BENKLER, Y.; NISSENBAUM, H. (2006). "Commons-based Peer Production and Virtue". *Journal of Political Philosophy*, vol. 14, no. 4, pp. 394-419. https://doi.org/10.1111/j.1467-9760.2006.00235.x

BIRKINBINE, B.; GOMEZ, R.; WASKO, J. (2016). *The Global Media Giant. The nine firms that dominate the world*. New York: Routledge. https://doi.org/10.4324/9781315682334

CAI, Y.; ZHU, D. (2016). "Reputation in an open source software community: Antecedents and impacts". *Decision Support Systems*, vol. 91, pp. 103-112. https://doi.org/10.1016/j.dss.2016.08.004

CANDÓN-MENA, J.; MONTERO-SÁNCHEZ, D. (2021). "From Cyber-Activism to Technopolitics: A Critical Take on Historical Periods and Orientations in the Use of Digital Technology by Social Movements". *International Journal of Communication*, vol. 15, pp. 2921 2941

CARILLO, K.; HUFF, S.; CHAWNER, B. (2017). "What makes a good contributor? Understanding contributor behavior within large Free/Open Source Software projects – A socialization perspective". *Journal of Strategic Information Systems*, vol. 26, no. 4, pp. 322-359. https://doi.org/10.1016/j.jsis.2017.03.001

CARR, N. (2008). *El gran interruptor. El mundo en red, de Edison a Google*. Barcelona: Ediciones Deusto.

CASTELLS, M. (2008). "Comunicación, poder y contrapoder en la sociedad red (I). Los medios y la política". *Telos*, no. 74.

CASTELLS, M. (2012). *Redes de indignación y esperanza*. Madrid: Alianza Editorial.

CHRISTL, W.; SPIEKERMANN, S. (2016). *Networks of Control. A Report on Corporate Surveillance, Digital Tracking, Big Data & Privacy*. Viena: Facultas.

COLEMAN, G. (2011). "Hacker Politics and Publics". *Public Culture*, vol. 23, no. 3, pp. 511-516. https://doi.org/10.1215/08992363-1336390

COLEMAN, G.; GOLUB, A. (2008). "Hacker practice: Moral genres and the cultural articulation of liberalism". *Anthropological Theory*, vol. 8, no. 3, pp. 255-277. https://doi.org/10.1177/1463499608093814

COSTANZA-CHOCK, S. (2018). "Design Justice: towards an intersectional feminist framework for design theory and practice". *Design Research Society: Catalyst*, pp. 1-14. https://doi.org/10.21606/drs.2018.679

COX, A. (1998). "Cathedrals, bazaars and the town council". Slashdot [online article]. Available at: https://news.slashdot.org/story/98/10/13/1423253/featurecathedrals-bazaars-and-the-town-council. [Accessed: 01/03/21].

CRABU, S.; GIOVANELLA, F.; MACCARI, L.; MAGAUDDA, P. (2016). "Hacktivism, Infrastructures and Legal Frameworks in Community Networks: The Italian Case of Ninux". *Journal of Peer Production*, no. 9 [online article]. Available at: http://peerproduction.net/wp-content/uploads/2016/08/the-case-of-ninux.org-draft.pdf [Accessed: 01/03/21].

CROWSTON, K.; HOWISON, J. (2003). "The Social Structure of Open Source Software Development Teams". *School of Information Studies - Faculty Scholarship*, vol. 123, pp. 1-20.

CROWSTON, K.; HOWISON, J. (2006). "Hierarchy and Centralization in Free and Open Source Software Team Communications". *Knowledge, Technology, & Policy*, vol. 18, no. 4, pp. 65-85. https://doi.org/10.1007/s12130-006-1004-8

CUESTA, M.; FONT FÁBREGAS, J.; GANUZA, E.; GÓMEZ, B.; PASADAS, S. (2008). *Encuesta deliberativa*. Madrid: Centro de Investigaciones Sociológicas.

DAHLBERG, L.; SIAPERA, E. (2007). "Introduction: Tracing Radical Democracy and the Internet". In: Dahlberg L.; Siapera E. (eds.). *Radical Democracy and the Internet. Interrogating Theory and Practice*. London: Palgrave Macmillan, pp. 1-16. https://doi.org/10.1057/9780230592469_1

FIRER-BLAESS, S.; FUCHS, C. (2014). "Wikipedia: An info-communist manifesto". *Television and New Media*, vol. 15, no. 2, pp. 87-103. https://doi.org/10.1177/1527476412450193

FLICK, U. (2014). *La gestión de la calidad en Investigación Cualitativa*. Madrid: Morata.

FUCHS, C. (2016). *Critical Theory of Communication: New Readings of Lukács, Adorno, Marcuse, Honneth and Habermas in the Age of the Internet*. London: University of Westminster Press. https://doi.org/10.16997/book1

FUSTER MORELL, M. (2011). "An introductory historical contextualization of online creation communities for the building of digital commons: The emergence of a free culture movement". In: *CEUR Workshop Proceedings*, vol. 739.

GALDÓN CORBELLA, C. (2018). "Cosmovisiones feministas en clave generacional. Del movimiento 15M a la Huelga Feminista del 8M". *Encrucijadas - Revista Crítica de Ciencias Sociales*, vol. 16 [online article]. Available at: https://recyt.fecyt.es/index.php/encrucijadas/article/view/79175. [Accessed: 01/03/21].

GARZARELLI, G.; GALOPPINI, R. (2002). "Capability Coordination in Modular Organization: Voluntary FS/OSS Production and the Case of Debian GNU/Linux". In: *2002 DRUID Summer Conference*. Copenhage.

GHOSH, R. A. (2005). "Understanding free software developers: Findings from the FLOSS study". *Perspectives on Free and Open Source Software*, pp. 23-46.

GHOSH, R. A.; GLOTT, R.; KRIEGER, B.; ROBLES, G. (2002). *Free/libre and open source software: Survey and study (FLOSS Final Report Part 4)*. Maastricht.

GIURI, P.; RULLANI, F.; TORRISI, S. (2008). "Explaining leadership in virtual teams: The case of open source software". *Information Economics and Policy*, vol. 20, no. 4, pp. 305-315. https://doi.org/10.1016/j.infoecopol.2008.06.002

GLADWELL, M.; SHIRKY, C. (2011). "From innovation to revolution-do social media made protests possible: An absence of evidence". *Foreign Affairs*, vol. 90, no. 153.

GUTIERREZ, M.; MILAN, S. (2017). "Technopolitics in the Age of Big Data: The Rise of Proactive Data Activism in Latin America". In: SIERRA CABALLERO, F.; GRAVANTE, T. *Networks, Movements & Technopolitics in Latin America: Critical Analysis and Current Challenges*. Cham: Palgrave Macmillan. pp. 1 17.

HACHÉ, A. (2014). "Technological sovereignty". In: *For Free Information and Open InternetIndependent journalists, community media and hacktivists take action*. París: Ritimo. pp. 165 172.

HANNEBAUER, C.; GRUHN, V. (2016). "Motivation of newcomers to FLOSS projects". In: *Proceedings of the 12th International Symposium on Open Collaboration, OpenSym 2016*. Berlin. https://doi.org/10.1145/2957792.2957793

HIMANEN, P. (2002). *La ética del hacker y el espíritu de la Era de la información*. Barcelona: Imagino destino.

HECHT, G. (2001). "Technology, politics, and national identity in France". In THAD, M. A.; HECHT G. *Technologies of Power: Essays in Honor of Thomas Parke Hughes and Agatha Chipley Hughes*. Cambridge: The MIT Press, pp. 253-294.

JACKSON, S. K.; KUEHN, K. M. (2016). "Open Source, Social Activism and 'Necessary Trade-offs' in the Digital Enclosure: A Case Study of Platform Co-operative, Loomio.org". *TripleC: Communication, Capitalism & Critique*, vol. 14, no. 2, pp. 413-427. https://doi.org/10.31269/triplec.v14i2.764

JORDAN, T. (2017). "A genealogy of hacking". *Convergence*, vol. 23, no. 5, pp. 528-544. https://doi.org/10.1177/1354856516640710

KELLNER, D. (2007). "Globalisation, Technopolitics and Revolution". *Theoria*, vol. 48, no. 98, pp. 14 34. https://doi.org/10.3167/004058101782485520

KELTY, C. M. (2008). *Two bits: the cultural significance of free software*. Stanford: Duke University Press. https://doi.org/10.1111/j.1467-9655.2011.01725_19.x

KONIECZNY, P. (2017). "Adhocratic Governance in the Internet Age : A Case of Wikipedia". *Journal of Information Technology*, vol. 7, no. 4, pp. 263-283. https://doi.org/10.1080/19331681.2010.489408

KRISHNAMURTHY, S. (2002). "Cave or Community? An Empirical Examination of 100 Mature Open Source Projetcs". *First Monday*, vol. 2, no. 1-8. https://doi.org/10.5210/fm.v7i6.960

LAM, S. T. K.; KARIM, J.; RIEDL, J. (2010). "The Effects of Group Composition on Decision Quality in a Social Production Community". In: *Proceedings of the 16th ACM international conference on Supporting group work*, pp. 55-64. https://doi.org/10.1145/1880071.1880083

LERNER, J.; TIROLE, J. (2000). "The simple economics of open source". *NBER Working Paper*. Boston. https://doi.org/10.3386/w7600

LEVY, S. (1994). *Hackers. Heroes of the Computer Revolution*. New York: Dell Publishing.

LIN, Y. (2004). "Contextualizing knowledge–making in Linux user groups". *First Monday*, vol. 9, no. 11, pp. 1-10. https://doi.org/10.5210/fm.v9i11.1187

LONG, Y.; SIAU, K. (2007). "Social Network Structures in Open Source Software Development Teams". *Journal of Database Management*, vol. 18, no. 2, pp. 2-5. https://doi.org/10.4018/jdm.2007040102

MANZEROLLE, V.; SMELTZER, S. (2011). "Consumer Databases, Neoliberalism, and the Commercial Mediation of Identity: A Medium Theory Analysis". *Surveillance & Society*, vol. 8, no. 3, pp. 323-337. https://doi.org/10.24908/ss.v8i3.4167

MARKUS, M. L. (2007). "The governance of free/open source software projects: Monolithic, multidimensional, or configurational?". *Journal of Management and Governance*, vol. 11, no. 2, pp. 151-163. https://doi.org/10.1007/s10997-007-9021-x

MATEOS-GARCIA, J.; STEINMUELLER, W. E. (2008). "The institutions of open source software: Examining the Debian community". *Information Economics and Policy*, vol. 20, no. 4, pp. 333-344. https://doi.org/10.1016/j.infoecopol.2008.06.001

MCCHESNEY, R. W. (2015). *Desconexión Digital. Cómo el capitalismo está poniendo a internet en contra de la democracia*. Barcelona: El Viejo Topo.

MILAN, S.; TRERÉ, E. (2019). "Big Data from the South(s): Beyond Data Universalism". *Television and New Media*, vol. 20, no. 4, pp. 319-335. https://doi.org/10.1177/1527476419837739

MILBERRY, K.; ANDERSON, S. (2009). "Open Sourcing Our Way to an Online Commons". *Journal of Communication Inquiry*, vol. 33, no. 4, pp. 393 412. https://doi.org/10.1177/0196859909340349.

MOROZOV. (2018). *Capitalismo Big Tech Welfare o neofeudalismo digital*. Madrid: Enclave.

NAFUS, D. (2012). "Patches don't have gender: What is not open in open source software". *New Media and Society*, vol. 14, no. 4, pp. 669-683. https://doi.org/10.1177/1461444811422887

O'MAHONY, S. (2007). "The governance of open source initiatives: What does it mean to be community managed?". *Journal of Management and Governance*, vol. 11, no. 2, pp. 139-150. https://doi.org/10.1007/s10997-007-9024-7

O'MAHONY, S.; FERRARO, F. (2007). "The emergence of governance in an open source community". *Academy of Management Journal*, vol. 50, no. 5, pp. 1079-1106. https://doi.org/10.5465/AMJ.2007.27169153

OSTROM, E. (1990). *Governing the Commons: the Evaluation of Institutions and Collective Action*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511807763

POWELL, W. E.; HUNSINGER, D. S.; MEDLIN, B. D. (2010). "Gender differences within the open source community: an exploratory study". *Journal of Information Technology*, vol. XXI, no. 4, pp. 29-37.

PRATTICO, L. (2012). "Governance of Open Source Software Foundations: Who Holds the Power?". *Technology Innovation Management Review*, vol. 2, no. 12, pp. 37-42. https://doi.org/10.22215/timreview636

RAYMOND, E. (1999). "The Cathedral and the Bazaar". *Knowledge, Technology & Policy & Policy*, vol. 12, no. 3, pp. 23-49. https://doi.org/10.1007/s12130-999-1026-0

REAGLE, J. (2013). "Free as in sexist? Free culture and the gender gap". *First Monday*, vol. 18, no. 1-7. https://doi.org/10.5210/fm.v18i1.4291

RUIZ OLABUÉNAGA, J. I. (2012). *Metodología de la investigación cualitativa*. Bilbao: Deusto.

SÁDABA, I.; GORDO, Á. (2011). "La indolencia tecnopolítica de las ciencias sociales". Viento Sur, no. 117, pp. 76 82.

SADOWSKI, B. M.; SADOWSKI-RASTERS, G.; DUYSTERS, G. (2008). "Transition of governance in a mature open software source community: Evidence from the Debian case". *Information Economics and Policy*, vol. 20, no. 4, pp. 323-332. https://doi.org/10.1016/j.infoecopol.2008.05.001

SAMPEDRO BLANCO, V. (2018). *Dietética digital. Para adelgazar al gran hermano*. Barcelona: Icaria.

SHAH, S. K. (2006). "Motivation, governance, and the viability of hybrid forms in open source software development". *Management Science*, vol. 52, no. 7, pp. 1000-1014. https://doi.org/10.1287/mnsc.1060.0553

SIERRA CABALLERO, F. (2018). "Ciberactivismo y movimientos sociales. El espacio público oposicional en la tecnopolítica contemporánea". *Revista Latina de Comunicacion Social*, vol. 73, no. 980-990. https://doi.org/10.4185/RLCS-2018-1292

TRÉGUER, F.; ANTONIADIS, P.; SÖDERBERG, J. (2016). "Alt. vs. Ctrl.: Editorial notes for the JoPP issue on Alternative Internets". *Journal of Peer Production*, no. 9.

VALLES, M. S. (2002). *Entrevistas cualitativas*. Madrid: Centro de Investigaciones Sociológicas (Colección Cuadernos metodológicos, vol. 32).

VILLASANTE, T. R. (2017). *Democracias transformadoras. Experiencias emergentes y alternativas desde los comunes*. Barcelona: El viejo topo.

WANG, J.; SARMA, A. (2011). "Which bug should I fix: Helping new developers onboard a new project". In: *CHASE 2011 - Proceedings of the 4th International Workshop on Cooperative and Human Aspects of Software Engineering, Co-located with ICSE 2011*, pp. 76-79. https://doi.org/10.1145/1984642.1984661

WEI, K.; CROWSTON, K.; ESERYEL, U. Y.; HECKMAN, R. (2017). "Roles and politeness behavior in community-based free/libre open source software development". *Information and Management*, vol. 54, no. 5, pp. 573-582. https://doi.org/10.1016/j.im.2016.11.006

WOOLLEY, A. W.; CHABRIS, C. F.; PENTLAND, A.; HASHMI, N.; MALONE, T. W. (2010, October). "Evidence for a Collective Intelligence Factor in the Performance of Human Groups". *Science*, vol. 330, no. 6004, pp. 686-689. https://doi.org/10.1126/science.1193147

ZUBOFF, S. (2015). "Big other: Surveillance capitalism and the prospects of an information civilization". *Journal of Information Technology*, vol. 30, no. 1, pp. 75-89. https://doi.org/10.1057/jit.2015

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