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Fediverse's evolution from the Cultural-Historical Activity Theory

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Abstract

This paper begins by mentioning some problems we found in social networks belonging to corporations such as Facebook and Twitter, emphasizing the inclusion of algorithmic timelines, the verticality of decisions that respond to market logic, and the privacy of users' data. This research gives rise to presenting open-source social networks as a democratic and safer alternative for their users. These social networks shape the Fediverse, the result of the union of the words Federation-Universe, and whose history and evolution we describe. We expose the main postulates of the Cultural-Historical Activity Theory (CHAT) for using this theory to conduct the Fediverse analysis, characterizing it as an Activity System, and thus, investigating the foremost tensions, reasons for change, and results. Among the findings of this analysis are: the preference of users for specific interfaces, the shift in the choice of social networks by users, the suggestions and opinions of the user community, and their influence on the programming development of social networks, promotion, or abandonment of projects by developers and change in the protocols used to connect the networks. We conclude this work by emphasizing that the CHAT allows this type of systemic analysis to be carried out from the critical moments and historical milestones of a system in constant change, such as the Fediverse. Furthermore, the proposal is made that universities are those institutions with prestige and infrastructure that can promote research, criticism, and reflection on the use of social networks for the benefit of users of the social Internet.

Keywords: activity system; psychology; social networks; technological mediation.

1. Introduction

From the historical-cultural psychology perspective, social networks have become an important niche for investigating human interactions, in addition to the individual vision close to the use and appropriation by people, since it is possible to analyze its historical evolution. In this paper, we propose to account for the evolution of the Fediverse understood as a result of interactions between programmers, protocols, and software from which changes and historical milestones are generated, resulting in concrete projects produced from collaborative communities to develop democratic, safe, and reliable alternatives for users.

We describe the problems of social networks belonging to big corporations, especially

the algorithmic use of timelines, the verticality of their decisions, and the security of user data, to then give way to the description of the Fediverse, its history, and its evolution. Our objective is to characterize the Fediverse as an Activity System from the CHAT, to analyze the tensions and changes within the system. At last, we present the conclusions and future perspectives that can be generated from this analysis.

2. Corporate social network issues

Common social networks such as *Facebook*, *Twitter*, and *Instagram*, among others, are widely used and are part of people's daily lives. However, some problems have caused a significant number of users to seek other spaces for interaction. The problems come even from the very structure of the social networks, which are logically, structurally, and architecturally centralized (Schneider 2019), i.e., it is a single corporation and, therefore, a closed group of people who have the power to decide on the structure and access to the architecture, data, and terms of use, generating a monopoly (Cabrera 2017). The above has led to the fact that the groups of power are the ones who make decisions that directly impact the user's motivations. An example of this is the changes made by *Twitter* in 2022 following the purchase of Elon Musk, including charging for user verification (Lerman and Siddiqui 2023).

Centralization gives whoever controls the social network the ability to choose what to show to users and counteract what the user himself wants to see on the network, taking away control over the conversation and interaction. That has led to different users seeing different versions of a single event or seeing it at different times, which reduces the possibility for users to coordinate actions if they wish to act. The previous Kirschner (2015) described it as something that happens on algorithmic timelines on networks such as Facebook and Twitter, something he called an "echo chamber," where users only communicate with a small circle of friends and do not know anyone outside the group, thus generating a contact bubble. The author mentioned existing repercussions that can be triggered from a network of friends based on similarities, as it excludes variety, closing the way to differences and, therefore, to the points of view necessary to create enriching discussions and argumentations.

One of the most relevant issues is the use of user data by corporate social networks and the fact that these networks include mechanisms to ensure the authenticity of the identity, thus avoiding anonymity. Previously, the thought that anonymous participation in social networks could generate antisocial behaviors was common since there was no perception of a repercussion in the physical world; however, currently, there are many unsocial behaviors in networks such as Facebook. Therefore, having users' actual data seems to create a mercantile relationship and thus target segmented advertising to their profiles, as happened with the *Cambridge Analytica* scandal, which caused many users to delete their accounts permanently or temporarily (Brown 2020).

In addition to the above, nation-states have been pressuring *Twitter* and *Facebook* to comply with their laws and allow data auditing by the authorities. In an extreme case, this may impact the Internet in such a way as to generate what Arreola (2020) refers to as a "national Internet" and the development of a kind of "digital sovereignty" where governments decide what kind of information is available on the Internet and what applications one can access through it. That is already happening in China and its great *Firewall* or with *Runet* in Russia, where the state intervenes trying to reduce the social impact of different phenomena, what Asmolov (2020) calls "crisis situations" ranging from natural disasters to political movements and protests.

In light of the anterior problems, users began questioning the relevance of maintaining

profiles on the most commonly used social networks. Although there is an important group of people collaborating with free software projects such as *Linux*, *Firefox*, *Open Office*, or *Libre Office*, it is the regular user who began to look at open-source social networks as an alternative with the aim of generating democratic, safe, and free spaces (Mansoux and Roscam 2020). In this context, we highlight the role of the Fediverse.

3. What is the Fediverse?

From the problems of corporate social networks and the hand of free software users and developers arose the desire to build alternative social networks, which emphasized ethical aspects, infrastructure, and organization, highlighting the release of the source code. Through this, they created decentralized and interoperable communities that supported its use. These social networks are part of the "Fediverse" an acronym for "Federation" and "Universe", which takes up the concept of the federation from political theory, understood as the actors that constitute a network and collectively cooperate in distributing power and responsibility. When this concept is grounded in federated social networks, we speak of servers connected, called instances or nodes, which use different software but with the same communication protocol (Mansoux and Roscam 2020).

By May 2023, the Fediverse had more than 7.9 million accounts distributed in almost 19500 servers or instances using social networking projects such as *Friendica*, *Funkwhale*, *Hubzilla*, *Mastodon*, *Misskey*, *PeerTube*, *PixelFed*, and *Pleroma*, among others. Many of these instances respond to specific topics such as music, art, professional or political activity. The preceding has shown that shifting from universal and corporate social networks to small instances that connect to each other is possible and even fills a niche that was necessary to address (Mansoux and Roscam 2020). It is possible to obtain Up-to-date information on the number of active federated social network accounts, instances, and projects from the Fediverse Party website (2023).

In short, the Fediverse possesses three indispensable qualities: it is logically, politically, and architecturally decentralized (Schneider 2019).

The popularity of the Fediverse has increased due to the user's interest in being part of the technical decisions of the networks, recovering their agency as users. This allows for counteracting the sense of estrangement that arose with corporate social networks, which separated the user from technical decisions and knowledge of the infrastructure and, therefore, from the organization (Mansoux and Roscam 2020).

At the user level, to exemplify how the Fediverse works, we cite an example shown by Holloway (2018): It is as if you could log into Facebook and see posts from friends on *Instagram* and *Twitter* without having an account on each social network. A simile would be having an account on *Mastodon*, watching and commenting on a video on *Peertube*, and replying from a *Pixelfed* account. The anterior is achievable by using conventional protocols that we address below in the evolution of the Fediverse, and so its development, due to analyzing the phenomenon that has been the Fediverse's creation.

4. Evolution of the Fediverse

According to MacManus (2022), the Fediverse started almost at the same time as networks such as *Twitter*, approximately in 2008, and for four years, it was centered on the *identi.ca* site,

developed by Evan Prodromou, who used the protocol called *Laconica*, which meant the possibility of communicating with other sites that used this protocol in a decentralized way. In 2012 *identi.ca* split into *pump.io* and *GNU Social* and started to use a protocol called *Ostatus* to communicate between servers. So the registration to the *Identi.ca* site was closed in December 2012. *GNU Social* was the leading software used in the Fediverse from 2012 to 2016. This period was led mainly by *Qvitter*, an interface similar to Twitter's appearance in its early days, but at the core, it ran *GNU Social* (Gehl 2015). Despite this favorable scenario, most users were still software developers or free software advocates.

Karpiniec (2018) mentions that the broadest instance of *GNU Social* with the *Qvitter* interface was *quitter.se*, which came to register 10,000 users who were proud to claim that they were part of a federation of microbloggers concerned with ethics and solidarity, far from the social networking systems controlled by large corporations, so that even right-wing agitators were denounced and expelled by the same moderators of the instance.

Again, in 2016, *GNU Social* underwent another bifurcation since it was limited only to updating international translations, stagnating the main project. This led to the *PostActiv* project, which had technical advantages such as fluidity and storage. In the same year, several projects emerged almost simultaneously and began to use a protocol that unified several projects called *ActivityPub*. Eugen Rochko developed *Mastodon* with an interface similar to *Twitter*, taking into account the *Ostatus* protocol and including, for the first time, the *ActivityPub* protocol to connect between instances (MacManus 2022).

In 2017, a new social network called *Pleroma*, also similar to *Twitter*, appeared and, then, in 2018, the projects *microblog.pub* as a simplified *Twitter*, *PeerTube*, similar to *Youtube*, and *PixelFed*, similar to Instagram, all using *ActivityPub* (Fediverse Party 2023) emerge.

However, the Fediverse began to gain momentum with *Mastodon* as it became the most popular network. As of March 2023, the *Mastodon* network has approximately 6 466 240 accounts, about 4 213 694 active people in more than 12 573 instances, according to the Fediverse Party portal (2023).

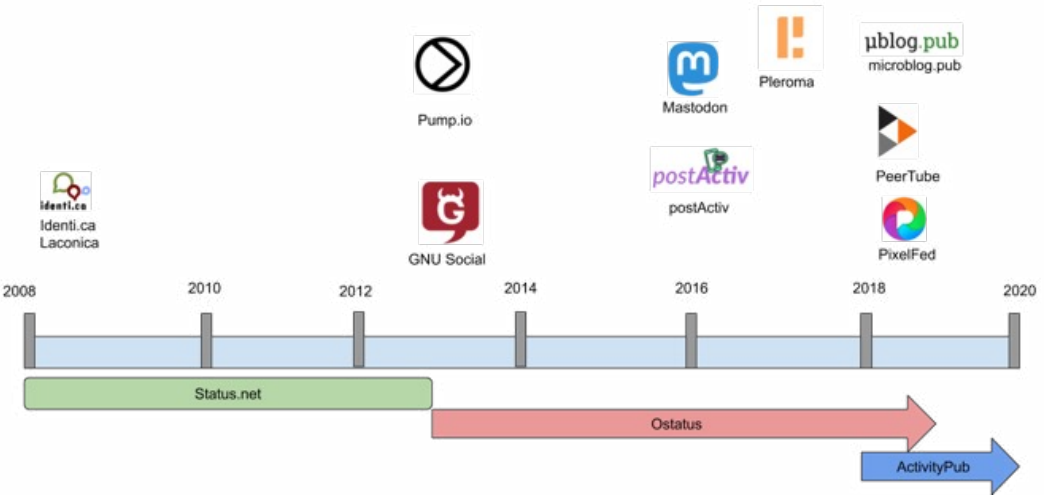
Mastodon's popularity seems to be due to several factors that made people with a non-technological profile see the Fediverse as an alternative option to corporate social networks. Among the main advantages and possible causes of its popularity is that it was disseminated as an alternative to *Twitter*, but without tolerance for people "trolls" or "agitators" (Gehl and Zulli 2022). In addition, the possibility arose to modify the terms of use of each instance according to the user's interests. Another possible advantage was the appearance of *Mastodon*'s advanced interface, which is very similar to that of *Tweetdeck*, employing columns for specific purposes such as timelines and direct messages, among others (Leswing 2022), and, in addition, being free software, users can participate in making decisions on how the interface, or any element of *Mastodon*, can be improved (Zulli, Liu, and Gehl 2020).

The adoption of the *ActivityPub* protocol by *Mastodon* in early 2018 caused it to become the *de facto* standard in the Fediverse even though the previous *Ostatus* protocol continued to be used and, technically, a *Mastodon user* could communicate with a *GNU Social user*. The prior ended in May 2019 when it was announced that compatibility would no longer continue with *Mastodon*, opting only for *ActivityPub* (Gargron 2019), a decision based on increasing the security of messages. Although this could fragment the Fediverse into *Ostatus* and *ActivityPub* instances, the W3C (World Wide Web Consortium 2018) considered the latter the official standard for all the social web.

To better understand the development of the Fediverse, Figure 1 shows a timeline indicating

the years in which the different projects and protocols appeared.

Figure 1. The Fediverse social networking projects and the use of the *Status.net*, *Ostatus*, and *ActivityPub* protocols. Source: Own elaboration.



There is another line of development based on the *Diaspora** protocol that brings together other social networks such as *Friendica*, *Hubzilla*, and *Diaspora**, some of which currently use ActivityPub as their protocol. Although they are worth mentioning, their origin and development have followed another path we don't report in this paper. Once we have described the development of the Fediverse, it is pertinent to detail the theory on which we based our analysis.

5. Cultural-Historical Activity Theory (CHAT)

Generally, psychology has been seen as a discipline in charge of studying individuals, focused on problems such as depression, anxiety, or special educational needs, or even studying groups in interaction, as is the case of a school classroom; however, some approaches go beyond the duality of individual-group, taking into account the interaction of people in their social and cultural context. This approach allows us to speak of artifacts, such as social networks, relevant for studying the evolution and development of the Fediverse from a systemic approach. In this regard, the Cultural-Historical Activity Theory (CHAT) allows us to approach this perspective. From Vigotsky's initial postulates, Engeström (2009) proposes that it is possible to analyze groups and communities through it to account for elements that are found in the subject since we characterized it by being both a historical theory and a theory of development, due to how it allows for an analysis of changes in human practices, taking into account the contextual elements of both local and global history, including individual and social practices.

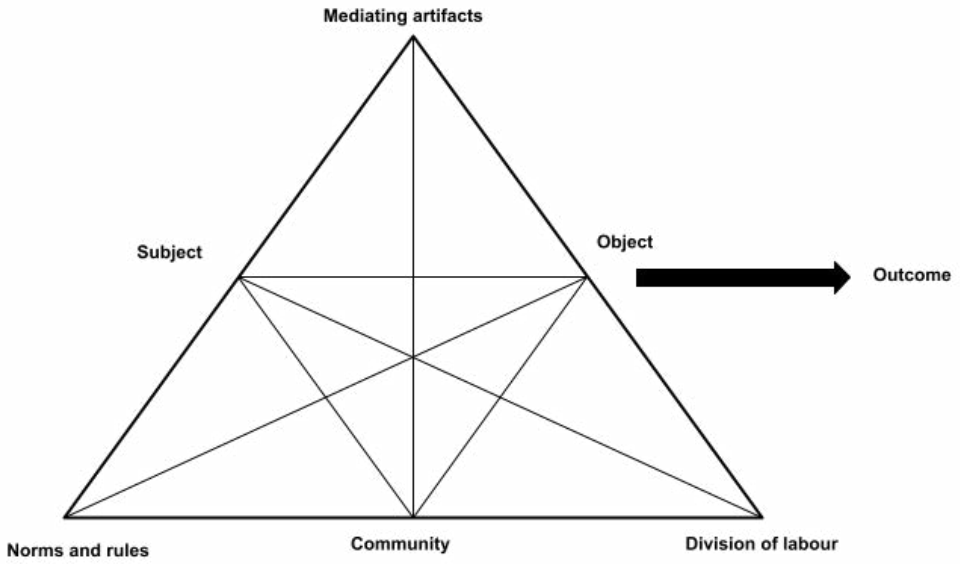
In general terms, CHAT evolved with the initial proposals of Vigotsky, who included the notion of mediated activity, focusing on the individual and his relationship with the environment through tools and artifacts (1st generation); then, Leontiev included human activity as the unit of analysis distributed in objects and individuals in a given environment and context (2nd generation). Subsequently, based on his model, Engeström (2009) extended the perspective to Activity Systems which identifies a

series of new components, including rules, community, and division of labor, in addition to those proposed by Vigotsky and Leontiev: subjects, artifacts, and mediating objects, where is possible to link more than one Activity System through the search for the same result or product (3rd generation).

This theory serves as a framework for action-oriented research, practice in context, mediated learning, human development, and pedagogical practice. In addition, it is also a methodological tool for specific interventions to manage change and the development of new practices through formative interventions and social designs in human Activity Systems (Yamazumi 2006). According to Roth and Lee (2007), CHAT reduces the theory-praxis gap; therefore, it is not limited to the explanation of phenomena but can also have an impact on human praxis by seeing subjects as agents of their actions in the scenarios and contexts to which they belong through change and criticism.

In the analytical aspect, the CHAT elements interact systemically; for this purpose, we use the triangle below to illustrate how the elements interrelate through the activity. This figure shows the theoretical components and the processes that arise from their interaction, such as the product, the exchange, and its distribution. In this sense, the notion of activity goes beyond relatively brief events defined in time, so Roth and Lee (2007) take them as an evolving structure of collective mediation. Figure 2 shows how these elements are interrelated in an Activity System.

Figure 2. Model of the Cultural-Historical Activity Theory. Source: Engeström (2009).



The system is as follows: the community delimits the division of labor within itself while collaborating to achieve an object in common to accomplish a product or result. They direct these efforts by a set of rules and norms agreed upon and shared among its members, which limits or favors a determined type of activity that, in turn, is mediated by tools and artifacts. This activity historically generates tensions, contradictions, and points of conflict that, if resolved, can modify the system or even generate a new one called an Expansive Learning cycle (Engeström and Sannino 2016).

Concerning Expansive Learning, Aramo-Immonen, Jussila, and Huhtamäki (2015) emphasize

that there must be a triggering action, such as a conflicting questioning of existing standard practice in the organization or group to provoke them, which, in turn, produces culturally new patterns of activity. Asmolov (2014) states that how a contradiction, or tension, is resolved can suggest who dominates in an Activity System, and this can range from emphasizing institutions, organizations, or individuals for its resolution.

CHAT headlines five fundamental principles that favor the process of inquiry into Activity System relationships. First, it establishes as the unit of analysis the relationship that an object-oriented Activity System has with other Activity Systems in a network of systems. Second, it emphasizes the multiplicity of voices within the systems, thus bringing into play diverse points of view that favor the emergence of differences among participants and the generation of tensions. Third, historically, it emphasizes that Activity Systems are the product of an object's changes over time, which can derive from the tensions of the second principle. Fourth, there are contradictions in the system that must be resolved, or a new system must be formed. Fifth, there is the possibility of expansion of the system generated by the participation of its members by successively resolving tensions and contradictions (Engeström, 2009).

The theoretical-methodological characteristics of CHAT allow for deep analysis; in this regard, Asmolov (2014) suggests the following questions to inquire into how the Activity System is constituted and related: What are the boundaries, purpose, and degree of the system's flexibility? What is the structure of the community, and how does the division of labor occur? Who is influential in defining or mediating the boundaries of the system? What are the central tensions within the system? Are there any competing Activity Systems around the same objects? How can the same technologies lead to the creation of different Activity Systems in diverse cultural or historical settings?

Therefore, to investigate these questions, we linked this theory to the evolution of the Fediverse.

6. The Fediverse is characterized as an Activity System

The Fediverse social networks, as well as the technologies and the decisions that programmers make when using them, can be seen as an Activity System from the CHAT. In that sense, as with any Activity System, it has its internal tensions and contradictions that originate changes, which are historically modified and generate the system's expansive learning cycle. The following is a description of each element of the CHAT applied to the elements of the Fediverse.

Subject. It is constituted by software developers who have contributed to the creation and evolution of the Fediverse, making decisions about the main programming tools and protocols used to perform the federation between instances (connection). These programmers have long remained the main subject, although they have now been joined by users who do not have software programming skills. For non-programmers, the main activity is based on using social networks, publishing, exchanging information, or promoting their usage to other users.

Mediating artifacts. These are all the tools that allow the system to remain active, mediating between subject and object. We are not only talking about technological devices such as web servers but also about software tools such as programming languages (*PHP*, *Ruby*, *Elixir*), the protocols used to communicate instances (*Ostatus*, *ActivityPub*), and also the Fediverse social networks (*Identi.ca*, *GNU Social*, *Mastodon*, among others).

Norms and rules. This element can be understood from the generalized agreement within

the Fediverse to use open-source licenses that allow adopting any development of these networks, studied, improved, and published again under the same licensing terms. The most widely used license is the *GNU Affero General Public License* v3.0, used by *Mastodon* (Github 2016), *Pleroma* (Git 2019), and *PixelFeed* (Github 2018) and which allows for commercial use, modifications, distribution, and private use. In addition, there are rules within the system agreed internally upon for each development, such as the time to update the source code or the agreements to use or not a specific development technology (*PHP*, *Elixir*, and so on) or protocol (*Ostatus*, *ActivityPub*).

Division of labor. Different roles are involved in creating the networks, their maintenance, modification, distribution, and improvement. Among the main actors are the programmers who develop the code of the networks and federation protocols, as well as the mobile versions. Also, there are graphic designers in charge of creating a graphic identity for the projects: logos, imago-types, mascots, and others. On the other hand, some users do not have the programming skills to collaborate in the development of the source code but instead can collaborate with the dissemination of the projects, opinions, and their use.

Community. This aspect refers to all members who are actively part of the Fediverse through the accounts created in the instances. It includes users, collaborators, and developers since they are, at the same time, a community and actors with roles in the division of labor. The above allows everyone to interact with each other, suggesting improvements and changes that can favor the development of the networks in horizontal participation.

Purpose. The object in common of the members of the Fediverse community is to interact in democratic and safe social networks, using, for this purpose, different instances according to their interests.

Product. As a product, from the interaction within the system, the Fediverse is obtained, understood as a space made up of instances of federated social networks of open source code, secure and in constant change.

Figure 3. The Fediverse is characterized as an Activity System from the CHAT and its elements. Source: Adapted from Engeström (2009).

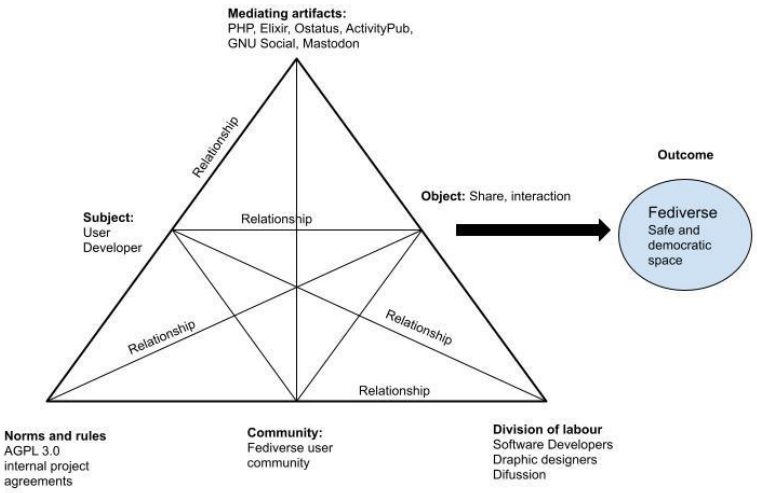
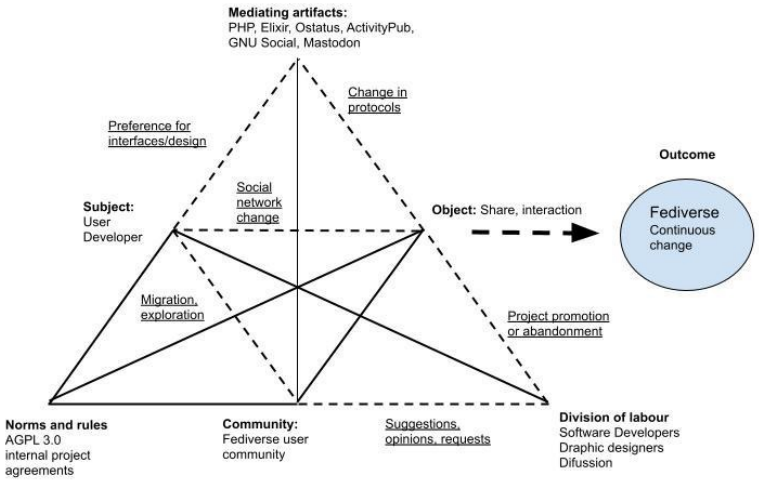


Figure 3 shows the CHAT's elements and how the Fediverse conforms to them. As can be seen, all the elements maintain a close interaction relationship, thus achieving the object in common. This allows the analysis of the history of the Fediverse, finding tensions to which it has been subjected as a system, resulting in a modification of the product (Fediverse) and the re-conformation of the interactions of its elements from the change in some of them (expansive learning). Figure 4 emphasizes these tensions marked with dotted lines.

Figure 4. Tensions in the Fediverse's history are framed in the CHAT elements and their interaction. Source: Adapted from Engeström (2009).



From the analysis carried out, we found five tensions that have contributed, to a large extent, to what the Fediverse is today.

1. Preference for interfaces/design. Users show preferences for specific interfaces or graphic design of the networks. The previous is possibly the case of the migration that favored *GNU Social through the Qvitter* interface around 2012-2016, and so the *Mastodon* project with a *Twitter* and *Tweetdeck* similar interface.

2. Change of preferred social network. We found reasons for users to switch from one federated social network to another. The main one is the obsolescence of the network, derived from the lack of updates or the change in the principal protocol for federation with other networks. That is the case, for example, of *GNU Social*, which did not receive updates and continued to use the *Ostatus* protocol; meanwhile, other projects emerged that joined under the use of *ActivityPub* (*Mastodon*, *Pixelfed*, *Peertube*, among others).

3. Suggestions, opinions, and requests from the community. Being part of a community where users, developers, and graphic designers interact horizontally promotes a particular type of technology or the rejection and abandonment of another. That happened with the adoption of *Mastodon* and the gradual abandonment of *GNU Social* due to improvements in the interface and mobile applications (Karpiniec 2018).

4. Personal promotion or abandonment of projects. Although it can be a multifactorial decision, whether projects are promoted or abandoned depends principally on the developers who, at the

same time, are influenced by the rest of the community, where they take sides for some particular technology based on its future advantages. One example is Evan Prodromou, a member of the community but also the leading developer of *Status.net*, *Laconica-Identi.ca*, who decided to support the *ActivityPub* project and help in the homogenization of protocols. Thus, the community and the key members agree to make decisions based on their roles in the division of labor.

5. Change in protocols. This tension is one of the main reasons why the Fediverse is constantly changing. Protocols are how instances connect, even if they are different social networks (for example, connecting *Mastodon* users with *Pixelfeed*). As stated before, the developer makes the decisions about protocol changes influenced by the community having a direct impact on the system's object and an indirect impact on the product, which is the Fediverse itself. An example is the concern for splitting the Fediverse in two by choosing the *ActivityPub* protocol as the main one; meanwhile, *Ostatus* continued to be a protocol widely used by *GNU Social* instances. This constant tension, when resolved, generates an adjustment in the system, but, as can be seen, it could engender two systems from a previous one over time.

Based on this analysis, we described the most significant tensions and their influence on the history of the Fediverse, characterized as a space in constant change in which the community is part of the decisions. According to Zulli et al. (2020), developments based on free software, such as the Fediverse social networks, allow aligning the interests of programmers and users, so there is no distant power gap between them sharing similar concerns. In these types of networks, it is possible to collectivize decisions about what is or is not acceptable, including preferences, thus improving the experience for all users.

7. Conclusions

Throughout this paper, we have presented the problems of corporate social networks and the alternative that the Fediverse offers, characterizing it as an Activity System from the CHAT. This has allowed an analysis of this system that, at the same time, has led to findings about its internal tensions and their resolution. We present the main conclusions below.

In the first instance, it is important to mention that the Fediverse, being an entity that develops and evolves on the Internet, leaves its milestones and historical moments in different websites of the community itself; therefore, in this work, we consulted various sources of information ranging from personal pages of blogs, generated by the own community, news portals that talk about the Fediverse, and also recent works in academic journals.

On the other hand, using CHAT made it possible to characterize the Fediverse as an Activity System and to find its internal tensions. The analysis we proposed in this study has made it possible to demonstrate that this theory favors broadening the perspective toward tools, social interactions, internal roles, division of labor, and others.

Engeström (Wong 2018) mentions that, from expansive learning, human beings end up in contradictory situations in their systems, where demands would seem wrong, but which allow them to distance themselves from the context and build a bigger, broader picture. Therefore, expansive learning implies learning something and building a new activity. Under this perspective, the Fediverse could be an unfamiliar system for most people, especially those using the most common corporate social networks. In fact, in the beginning, they were mainly used by free software developers and anarchists, then gradually were positioned, as a result of *Mastodon*, as a viable alternative for use in everyday life, filling a niche from a new way of approaching the use of social networks that

corporations did not take into account: horizontal, democratic, federated and with emphasis on the user. However, Cabrera (2017) argues that the invisibilization of Fediverse social networks is a symbolic violence case, given that corporate social networks consolidate the idea that there are few Internet services and they must be privative.

Another important conclusion relies on the Fediverse's possibilities for the future of networks, especially to create instances that allow people with the same interests to interact. The above is feasible and, it seems, desirable. In the words of Engeström (Wong 2018), this would move people away from the niche markets that corporate social networks have become, where they emphasize individual activity, and there is no actual concern for community, nor for the effort of collaboration or production of something in common. He suggests that the way to counteract this phenomenon is the creation of communities among the networks so that the significant nodes are not the individuals, but the community itself, which coincides with the Fediverse approach and its instances as nodes. That also coincides with the statements of Karpiniec (2018), who mentions that people will join in their instances, grouping themselves in those servers where they will discuss with people with similar interests, forming micro-communities, but where moderation is at the discretion of the community itself, favoring the emergence of diverse discourses (Kirschner 2015).

The Fediverse has grown in recent years and has been nurtured by former users who, due to historical milestones, have sought alternatives in what Karpiniec (2018) calls "waves" linked to actions they consider unethical or invasive, especially from Twitter. Then, people organize themselves and try to promote migration to other networks, finding in the Fediverse a democratic-horizontal space, as happened in 2016 with the implementation of algorithmic timelines, generating the *#RIPTwitter* movement or the recent wave of people who came to *Mastodon* due to purchase by Elon Musk (Huang 2022).

Despite this organic growth, it has been fundamental to promote the use of these networks. However, as opposed to corporate social networks, how to promote using Fediverse?

The proposal would be from the implementations, uses, and reports of experiences generating knowledge that favors reflections on the use. In this regard, Cabrera (2017) points out that universities can play an important role because they are referents of social prestige and parameters of cultural valuation; however, they are immersed in using corporate social networks, reproducing their symbolic hegemony. This is even contradictory, especially when the universities themselves have infrastructure capable of managing their communication service, which would limit dependence on large corporations. With this infrastructure, they could promote the development and dissemination of the Fediverse, having servers and instances at the university, school, or faculty level; they can also generate a change in social thinking since universities are ideal contexts where they should question using software and the services used by their community (teachers, researchers, and students); also generating reflection and criticism on what are the most appropriate technologies for educational activity (Cabrera 2017) that can also benefit society in general. Fortunately, some universities have realized this and have begun to create profiles or instances for their students and teachers; among them, Berkeley, MIT, and FES Iztacala, UNAM stands out (Leppert 2021).

How is it possible that users allow themselves to be part of social networks that profit from their data? In this regard, Cabello, Franco, and Haché (2012) state that users assume a cost from a profit perspective, allowing data to be profitable as long as the big corporations don't hinder the processing of sharing with others. However, the authors above propose extending the open and free social web to the entire Internet, where people should control their privacy, which is indeed what Fediverse promotes.

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