

Collaborative Online Writing and Techno-Social Communities of Practice Around the Commons: The Case of Teixidora.net in Barcelona

Mònica Garriga Miret¹ , David Gómez Fontanill¹ , Enric Senabre Hidalgo², Mayo Fuster Morell²

(1) Free Knowledge Institute

(2) Internet Interdisciplinary Institute - Open University of Catalonia,

Abstract

Teixidora.net is a digital platform -working in the local commons and technosocial domains in Barcelona- for collaborative live-writing in community events based on community mapping, engagement and participation. A **communicative ecology** is identified -Foth and Hearn-, as a **social layer** (people and the ways in which they are socially organised), a **technological layer** (digital platform, devices and connecting media) and a **discursive layer** (the content of communication).

Teixidora.net was conceived as a process of digital transdisciplinary activism. It aims to connect distributed knowledge generated by communities of practice (**social layer**) with the relationships among participants at events and with the subjects or discussions, thus creating a **discursive layer**, in which the purpose is to produce collective narratives, follow what happens and weave relationships by sharing knowledge. Its **technological layer**, based on several applications and devices, appropriates and combines Etherpad (a web-based collaborative real-time editor) with a Semantic MediaWiki (an extension of the popular open-source MediaWiki application developed by Wikipedia Foundation), and microblogging platforms, Quitter and Twitter. These three layers combine around an axis based on the commons, creating a joint collective dimension, by sharing, re-elaborating and experimenting with elements that are present in all three.

The project is evolving both at the technical level -testing and activating more features and tools for systematising collaborative writing- and at the conceptual level, developing new approaches for self-organisation of note-taking and adopting action-research methodologies.

Launched in Barcelona, in January 2016, Teixidora builds on previous projects and experiences initiated by digital activists and open source practitioners, and it is now taking the form of a template for the “commonification” of knowledge. It is promoted and used in contexts where participants tend to take notes individually or engage sporadically through social media, without being involved in a deeper process of sharing information and opinions, in person and in real time.

This article first defines Teixidora’s local context and the state of the art in the area of collaborative writing. Next, it describes how Teixidora’s **social layer** is organised and its evolution, and also discusses the **technological** and **discursive layers**, based on a descriptive classification of the 249 registered events, 40 note-takers, 57 mapped organisations, 40 projects, and about 100 texts generated (as shared proceedings, notes, or context articles), up to June 2017.

Analysing Teixidora’s participation in several specific events during its first year of existence, the article applies Foth and Hearn’s framework of communicative ecology to Teixidora and takes its social, technological and discursive layers, and their intersections. The methodology consists of an observational analysis of three events using Teixidora, with the purpose of identifying the role of the three communicative ecology layers of the platform in each one. Having extracted what has been learned and observed, it considers the opportunities and limitations of collaboration among peers when documenting their conversations. Although the project is still evolving, there is close integration among the three layers, in mapping of knowledge, in negotiating the degree of collaboration and governance around it, and its collectivisation. Finally, as a conclusion from the lessons obtained in the analysis, new means of action and development for the project are offered, and questions are raised regarding future research.

Tags: Patterns of commoning, collaborative writing, note-taking, communities of interest, knowledge sharing, mapping of events, action research, transdisciplinary activism, ICT-mediated peer production, innovative P2P practices, self-organisation and community, semantic wiki, mediawiki, commons.

1. Introduction

Teixidora.net,¹ an informative, participatory initiative in the Barcelona area, arose from a desire to follow the intense activity around the local commons and technosocial issues. Emphasising ethical and emancipatory viewpoints and encouraging criticism, Teixidora fosters debate, thought and knowledge. It is also a tool (with a digital platform at its centre) conceived to apply collaborative live-writing in events based on community mapping, engagement and participation.

Analysing Teixidora's participation in three specific events during its first year of existence, the article applies Foth and Hearn's [2007] communication ecology framework to Teixidora and, through observational analysis, identifies aspects of its social, technological and discursive layers, and the intersections among them and with each of the three events.

In these cases close-knit relationships arise in the three different layers of the communicative ecology, with four transversal elements related to the commons: collective dimension, experimental dimension, sharing and re-elaborating. Three levels of learning are extracted in relation to: governance of the text, mapping communities of practice and interest and practising synchronous collaborative documentation of events. Finally, as a conclusion from these lessons, new means of action and development for the project are offered, and questions are raised regarding future research.

2. Context

Teixidora's Local Context in Barcelona

Teixidora was launched in Barcelona in January 2016, in a context of a heated debate about political, economic and social issues related with technology and the construction or revitalisation of the commons. The Teixidora team had been involved for years with events including UrbanLabs,² Hackmeeting, Hardmeeting,³ Media140,⁴ Drumbeat,⁵ Digital Commons,⁶ Viquitrobades,⁷ Geoartivismos,⁸ among others. It was evident, documentation created in these events was often not published and remained exclusively available to organisers or individual

1Teixidora (weaver) is an informative, participatory initiative, around technosocial conversations and activities in the Barcelona area. Teixidora emphasizes ethical and emancipatory viewpoints and encourages criticism. It fosters debate, thought and knowledge. https://www.teixidora.net/wiki/teixidora:Qu%C3%A8_%C3%A9s_%3F#About_Teixidora

2<http://urbanlabs.citilab.eu/index.php/Portada.html>

3https://hackstory.net/Hackmeeting#El_hackmeeting_de_Barcelona

4<http://media140.com/>

5https://wiki.mozilla.org/Drumbeat/events/Festival/Barcelona/Material_difusi%C3%B3

6<http://www.digital-commons.net/>

7<https://ca.wikipedia.org/wiki/Categoria:Viquitrobades>

8<https://hangar.org/es/recerca/noticies/geoartivismos-medios-vocativos-artes-digitales-accion-social/>

participants (people taking notes or recording the events). When documentation was published, it was scattered. Events were disconnected giving the impression of lack of continuity, redundancy, divergence or convergence of discourse. There was debate between events, but it was not visible.

This occurred in a metropolitan context where, for more than two decades, a network of initiatives had been growing around technologies and free knowledge and where Platform 0.7 (1994), the anti-globalisation movement (1999), the "no war" movement (2003), the Catalan independentist process (2010), 15M (2011) and the processes to create an alternative-left municipalism (2015) had empowered people through collective management, action and organisation, as well as through free culture (Fuster, 2012). Against this background, Teixidora positions itself as a techno-social initiative allowing an action-research approach to spaces where technological resources are developed and where transforming action and research occur. Teixidora looks at the impact of this transformation and explores relations among emerging discourses.

Participation in previous projects -which sought to establish connections or put together and organise documentation and activities using an online platform (Experimenta_wiki,⁹ HKP,¹⁰ Viquilletra,¹¹ Germinador¹²)- inspired the methodological and technological solution for the project. Teixidora also shares some basic concepts with CitizenSqKm¹³ (Km2Poblenou, in Barcelona, May 2014-May 2015), an experiment to involve citizens in discovering and improving of their surroundings through gathering and organising data related to it. At the same time, Geoartivismos,¹⁴ another project with which Teixidora shares many features, had been launched in Poblenou. This brought together researchers, developers of opensource GIS (geographic information systems) and social groups to improve communication and digital training for local residents and groups and to make a prototype from the application which the collective Constellations Online had developed for a webdoc about gentrification in Poblenou. Both projects looked for ways to cooperate. Constellations Online organised a series of meetings where they took notes in open documents. What would later be the Teixidora team, took part in the meetings and saw the need to organise and share the collectively generated information.

In a broader, metropolitan context, Barcelona and its area have historically been rich in free technology initiatives and commons and peer production. In 2014 the Barcelona Metropolitan Observatory, published a study about "The Urban Commons in Barcelona"¹⁵ based on 17 practices occurring in the city. Between 2014 and 2016 the P2PValue directory reflected the maturity of the

⁹Experimenta_wiki <https://www.madrimasd.org/experimentawiki/feria/Portada>

¹⁰wiki HKP <http://enlloc.net/hkp/w/>

¹¹<http://www.viquilletra.cat>

¹²"Creació col·lectiva: una panoràmica des del projecte Germinador". Article a Papers d'Art núm. 91 de http://enlloc.net/files/GRMR6_PapersArt_novembre2006_notesPag.pdf

¹³Its main aim is to benefit the neighbourhood by engaging the wider community in the discovery and improvement of their environment by collecting and classifying data related to territory. CitizenSqKm Report (Confine Project Deliverables, p.1) <https://mogams.files.wordpress.com/2017/06/reportcitizensqkm.pdf>

¹⁴<https://hangar.org/es/recerca/noticies/geoartivismos-medios-vocativos-artes-digitales-accion-social/>

¹⁵"Comuns urbans a Barcelona. Pràctiques de defensa, cura, reapropiació i gestió comunitària" OMB 2014 http://bcncomuns.net/wp-content/uploads/2014/06/Conclusions_OMB_CAT.pdf

ecosystem by identifying 1,000 cases of peer production in Catalonia. The BCN Smart City Commons Report 2016 identifies more than 300 local actors in the commons.

It is in this context, and on these bases, that Teixidora is set up.

State of the art in collaborative writing

Collaborative writing is one of the largest areas of peer production. The most significant large-scale experience is the collective creation of the free encyclopedia, Wikipedia, in several languages by thousands of volunteers worldwide using wiki platforms. Collaborative writing mediated by networked digital systems is a widespread practice in many projects and organisations. As noted about, this practice has often been adopted, in recent years, at meetings where participants have devices connected to the Internet.

Collective writing has a long history, in which, laws, regulations, reports, essays and literary texts have been collectively written. The procedure might begin with an outline of ideas and then write side-by-side [Ritchie and Rigano 2007] or to divide the writing work into sections (parallel writing), or to exchange versions (sequential writing) [Lowry et al. 2004]. Editing and word processing software has progressively incorporated features to facilitate collaboration among co-authors, and new practices have emerged from the way co-authors use the software, particularly in what Lowry et al. -in their taxonomy of collective writing- describe as reactive writing where, when typing a document simultaneously, co-authors respond in-writing to input from others [Lowry et al. 2004].

There are at least four types of programmes facilitating collective writing: offline word processors, online word processors, wikis and pads. The following summarises their features.

Offline Word Processors	With track changes and comments to facilitate sequential collaboration with sharing file versions.	Microsoft Word / Libre Office Write / iWorks Pages
Online Word Processors	With the option of document sharing between different users, track changes and versions, comments. Used for synchronous and asynchronous writing.	Collabora (Libre Office Online) / Google Docs
Wikis	With asynchronous online publishing, version control, conflict detection	MediaWiki / DokuWiki / Wikispaces / Pmwiki / Tikiwiki
Pads	With synchronous simultaneous online editing, color identification of writers.	Gobby / Etherpad / Dropbox paper

These types are not closed. Word processors, initially offline (Microsoft Word, LibreOffice), developed functionalities for file sharing, but when they went online and introduced editing on browser (Google docs, Collabora) they developed functionalities to manage user permissions and simultaneous editing. This has led them to linkup with pads, -initially in the form of interconnected desktop applications (SubEthaEdit, Gobby) and, later, online systems on server for editing also on Browser (Etherpad)-, and to adopting some of its features. Wikis developed independently improving functionalities for asynchronous collaboration among multiple editors, but are also

linking up with pads, in simultaneous editing options (like the addition of a TogetherJS based extension to MediaWiki or Etherpad's embedding extensions).

Although this four types are taken as separate references, there is a degree of hybridization. Any programme can have characteristics of more than one type, independently of how it is classified. Below is a list that can help to identify the features of a programme for collective writing.

Functionality	Options	Systems
Time	Synchronous / Asynchronous	Processors / Wikis/ Pads / Online Processors
Historic of versions	Compare versions / Sequentially see / Restore	Wikis
Track changes	Register / See/ Accept / Reject	Text Processors
Conflict control	Detectar / Avis / Comparar / Resoldre	
Editor identification	Anonymous edition / Register / Temporary pseudonym to write	Google Drive / Collabora /Wikis / Etherpad
Anchor text reviews	Insert comments / Reply to comments / Authorship and date-time / solve-archive / mail Notifications	Text Processors/ Pads
Rich text format	bold, italic, styles, titles, size, color	Processors / Wiki /Pad
Text edition	WYSIWYG / code/ enriched code / plain text	Text Processors / Wiki (editor visual/codi) / Pad
Edit Permissions	open / share permissions / permissions: view, comment, suggest, edit	Pad/ Google Drive
Generating URL for document sharing		Google Drive/ Sandstorm
Save	for menu or button / automatic / featured version	Text Processors/ Wikis Google Drive / Etherpad
Distributed copies		Gooby/ Teem/ Jetpad
Arrange	Folders / labels / Categorization / Search	Drive / Wiki
Device / technological environment of use	Desktop/ Web / Mobile App	Gobby / Drive / Collabora / Etherpad
License / Distribution	Free / proprietary / software as a service	
Colored features are present in the Etherpad used by Teixidora when taking notes.		

The form of collective writing mainly promoted by Teixidora is documentation and note-taking at events. Participants don't see themselves as authors of the text but rather as people recording what is said. In some cases the people involved in a debate take turns to write. Taking notes is itself a particular form of writing, different from author writing. Its aim is to retain what is said and retrieve it later [Hartley and Marshall, 1974].

In 2015, Richard Littauer, Antonia Scheidel, Marc Schulder and Sibel Ciddi, students in the Master's degree in Computational Linguistics at Saarland University in Germany, [2015 Littauer et al] studied the use of four methods of collaboration among students, including collective writing on Etherpad (in addition to a wiki, mailing list and shared Dropbox storage). They showed that taking collaborative notes synchronously during a class allowed (without a prior distribution of tasks) effective performance of the four types of subtasks they had identified: 1) transcribe the content of the slides (unnecessary if integrated by the software) and of the board; 2) summarise instructions and additional comments of the professor; 3) record external references and 4) add personal comments and questions [Littauer et al. 2015: 1478 + 1476]. They also observed that form and content of the class would make it easier or harder to take notes resulting in more or less participation of students in the task and more or less complete coverage of content [Littauer et al. 2015: 1474]. Thus, in tutorial classes, it was more difficult for students to take notes in parallel to preserving the insights gained [Littauer et al. 2015: 1478] and in logic or statistics classes the need to use specific symbols or make schemes meant that taking notes on paper was even more useful [Littauer et al. 2015: 1475]. It was found that in classes where students participate more actively in discussions they also take fewer notes [Littauer et al. 2015: 1474-1475].

With regard to the practice of note taking, the fact that Etherpad displays in real time who is writing and where (through different colors and displaying -when performing mouseover function- the pseudonym adopted) facilitated the spontaneous distribution of roles in the writing process. When seeing what others are doing, one can concentrate on what is still to do in another part of the document [2015 Littauer et al. 1474-1475]. In their study, the students also observe how personal comments on the main text of the pad were relocated to the chat as the academic year went by. This tells us something about the evolution of an experienced community [Littauer et al. 2015 1476]. The most salient notes, they say, are taken when a large number of collaborators know little about the subject (and therefore try to jot down everything) and at least one is at an advanced level (and can be concise and help with parts of the notes that are difficult for others) [2015 Littauer et al. 1476-1477]. If everyone is familiar with the subject, few notes are taken, and if no one is well informed, everything is transcribed but notes are empty of meaning. The students also note that collaboration gives linear structure to the notes. If the teacher changes the subject, and goes from one main subject to a secondary one, the writing continues to be linear [Littauer et al. 2015: 1478 -1479]. The discourse is kept in the same order as it is given by the teacher. Later when further processing the notes, changes are introduced to polish the text, avoid redundancies and improve the style [Littauer et al. in 2015: 1478-1479]. Moreover notes come together in a shared repository that is not the responsibility of just one person [Littauer et al. 2015: 1480]

Many of these observations are confirmed in note-taking experiences at Teixidora events. Teixidora completes the note taking process with a subsequent sieving of contents and structuring them on a wiki platform which works with forms, thus combining pad characteristics and those of a semantic wiki with structured data. Hence, two of the collaborative strategies tested by the Saarland students are combined in one platform.

3. Analysis of Teixidora as a Communicative Ecology

The concept of communicative ecology, associated with work on communications and the media, combines ethnographic and participatory action research methods. It refers to "the context in which communication processes occur", analysing technology where it is used. New media should be studied and designed bearing in mind the social relationships of users, the nature of the communication and other means employed [Hearn et al. 2009]. It should therefore be possible to analyse whether or not a particular type of technology can be integrated into an environment and the extent to which it is used.

Communicative ecology is conceived by Foth and Hearn [2007] as a social layer (individuals, social structures with which they identify and the ways in which they organise socially), a discursive layer (the communication content, mediated and not mediated) and a technological layer (digital platform, devices and media connection).

The layers of communicative ecology are useful for conceptual separation of the different aspects of a technosocial ecosystem, without losing sight of their interactions. The description aims to be holistic, both close (from within the ecology), and distant (from the outside). It borrows from studies in classical ethnography and their differentiation between two primary perspectives of research on communicative ecology, which is to say emic and ethic positions. A researcher can work from outside the ecology scrutinising it to create an overall vision (emic) or take a position within the communicative ecology to see things from the perspective of participants (ethic). The outside view is useful if comparison between local systems is sought. Then the inside perspective can be used to understand how people construct and give meaning to their communicative ecology.

We shall now take the three layer perspective to explain Teixidora as communicative ecology in construction and combine observations from within the process and analogies to other processes and systems.

Social Layer

At Teixidora the social layer consists of communities of practice, the relationships among participants, and topics and discussions generated in events (what happens). The act of taking notes is determined collectively by a desire to capture, simultaneously and in real time, knowledge generated by personal statements, questions, comments or debates.

Metaphorically speaking, the structure of this layer is onion rings. In the centre there is a small group of people who have previously agreed to cover a specific event. A number of rings of participation expand from this core dynamic with people engaged in different ways. Hence, the social layer consists of:

Core Driving Group. In the centre there is a small and interconnected group of people who are familiar with the tools in the Technological Layer and being able to prepare and manage them beforehand. They identify the core driving group of a meeting (through contact channels with other online and local communities) and organise to document the event, announcing it to other attendees. This Core Driving Group will ensure that the documenting activity is ongoing, usually alternating when taking notes, and distributing the work depending on the format of the meeting. They will also encourage other participants to contribute their knowledge of the topics discussed. The activity of this Core Driving Group may or may not be formally integrated into the organisational structure of the meeting.

In-Person Contributors Ring. The next ring of participation around Teixidora activity in a meeting consists of people who participate in person, who have been directly contacted before the event or during the meeting have discovered the simultaneous documentation process. These people will also add notes summarising what is said. There are more or fewer contributions depending on who is involved or the type of session, and they communicate with other participants through the text. They can follow the notes as they are taken at the meeting and contribute to some of the subtasks identified by Richard Littauer [Littauer et al. 2015: 1478], adding data, references or comments that are relevant, or including in the midst of taking notes their personal opinions about something that has been said.

Online Contributors Ring. Teixidora's third participation ring is comprised by people who are not physically present but who access the pad from elsewhere¹⁶. If the technological layer includes video streaming or something similar, people in this ring will be able to take notes, like those in the in-person ring, but will do so from a viewpoint in the offline context, not located or influenced by it. If online followers do not have access to direct broadcast they will also be able to follow the session as it is written on the pad and will be able to interact through the chat.

Subsequent Participants Ring. The fourth ring is composed by all those people who can access content generated by the Semantic MediaWiki or pads, whether or not they have taken part in the activity in real time and in person or online. The content is addressed to them, so they are a *raison d'être* of the project. These participants in Teixidora's communicative ecology are a thread connecting with the knowledge generated, in a kind of digital trail that can be recovered later by themselves or others. Hence, a broader process of knowledge generation by stigmergy can occur through indirect coordination of work and activities from which knowledge is built and organised (in a combination of automated mechanisms and human activity) on the platform.

Another way to imagine the social layer is distinguishing between **present** and **absent** participants in an event, where one category does not totally exclude the other. Present participants are the Core Driving Group and the In Person Contributors Ring. They are the most active agents in generating documentation. Absent participants are those who follow the event at another point in time, and they may also contribute to documentation. Teixidora gives added sense for absent participants (as well as those who took part in the event and later return to see documents). Since these absent participants (or now absent participants) relate the event to other events, complete the contents or re-elaborate them. In a future event they may discover relationships with other events documented in the past.

Combining the onion ring metaphor with the categories of present participants and absent participants allows us to take the idea of stigmergy, borrowed from biology, to understand the social layer of Teixidora as an ecology coordinated indirectly through the trail left by events, and that is fixed and reunited on the platform.

Technological Layer

According to Foth and Hearn's [2007] concept of communicative ecology, devices and applications inside the technological layer, are distinguished by the model of communication they facilitate; one to many, many to many, online, in person, et cetera [Foth & Hearn, 2007]. Teixidora also aims to facilitate ways of sharing information gathered in an event, according to this model (from one to many, many to many,...) and beyond the time and space where it occurs. In doing so, it combines several technological resources, the most relevant of which are: the Semantic MediaWiki for the platform, Etherpad for notetaking and microblogging accounts for communicating, exploring and establishing dialogue.

The main Teixidora tool is a semantic wiki¹⁷. Besides being an online platform which can be edited by anyone, it allows information to be saved in a structured way with semantic properties, and to retrieve it by queries in dynamic lists like those used at the Seguir Filles sub-portals (Following the Thread) and Teixim Xarxes (Weaving the Networks)¹⁸, and other pages. Much of the wiki can be edited using forms, in which parameters of templates are filled with information¹⁹.

¹⁶They may know about the existence of the pad because it was included in the program or in the publicity of the event or may find the link on social networks during the event.

The idea of collectivising the story is a core concept of Teixidora and is taken into account at the earliest level of documentation. It therefore uses software that allows collective writing, the Etherpad. A self installed Etherpad is not used. Organisers at each event are asked if they already have pads to take notes. New pads are activated in a 'farm', mainly Guifinet's and la Mar de Bits', and also Wikimedia, Mozilla, Riseup, Titanpad, Piratepad or Etherpad Foundation.

Etherpad is used in many communities to take notes or minutes at meetings and assemblies. At an early stage, Teixidora made extensive use of Etherpad as an online system for collaboratively taking notes, inviting attendees at each event to participate. The idea was to extend its use and to facilitate processing and re-use of content.

Etherpad enables participants (those who take notes and those who do not) to interact with each other, not only through what is written on the pad, but also through the chat associated with it. In some cases, the chat can be a way of conveying questions or comments from online to face-to-face meetings.

Another significant tool, as well as constituting a connecting element between technological and social layers, is the microblogging platforms, namely Twitter or Quitter. These platforms are useful for exploring, discovering event organizers, and establishing contacts with the actors of the technological and social scene, and later reporting the information collected. Microblogging platforms help to encourage the driving core to provide information before and during the events, encouraging other participants to take notes and give links to the pads, connecting Tweets - via hyperlink- to the pad where the notes of a specific event are taken. They also serve in the face-to-face contributors ring, and are used by online contributors (people interested in the content generated by the event), who learned about the meeting (from any location) while it occurred or later, because other twitterers mentioned it, or through keywords and hashtags on the platform.

Discursive Layer

As described in the introduction and subsequent sections, the aims of Teixidora are to collectivise the story, follow what happens, weave relationships by sharing documents and reuse content generated in face-to-face meetings to produce new knowledge and relationships. In this regard, the discursive layer of the project also connects, at a metaphorical level, with the concept of "weaving" (in Catalan 'teixidora', in Spanish 'tejedora', in French 'tisserande'...) which can designate the person weaving, also the machine and the factory or space where the weaving is done. It also refers to the digital environment as heir of previous technological mechanisms and feminist culture (S. Plant, 1998).

Both the reference to (human and technological) networks and that to making or producing something, well portray the project approach and its discursive layer. The latter including several "sections" as areas of intervention in the social and the technological layers. Each section has its

17A wiki is a website where you can edit all the pages from the browser itself, which keeps track of all changes in the page history and where inexistent pages can be linked and created later. The software used in Teixidora is a MediaWiki, the same used by Wikipedia, a free software developed under the auspices of the Wikimedia Foundation; to which a Semantic MediaWiki extension, is added, allowing to work with structured data and to do semantic queries to retrieve them.

¹⁸https://www.teixidora.net/wiki/Seguim_fil

¹⁹Teixidora.net's wiki is in a Wikis.cc server and is part of a "farm" of wikis that share the same configuration and are managed as one, at the level of installation, upgrade and extensions.

own identity and its title acts as a metaphor to describe the nature of the transmedia intervention and some visual characteristics making it recognisable:

- "Following the Thread Section" (Seguim Fils), refers to Teixidora's characteristic as a proactive observatory which completes, orders and re-elaborates material produced as part of the socio-technological activity occurring in Barcelona, and in the form of conversation threads in social networks, forums, mailing lists, blog comments, and others.
- "Weaving the Networks Section" (Teixim Xarxes), indicates how Teixidora places knowledge in the glocal context, providing additional information about how things work, its historical development, ethical debates it may have raised, et cetera. This section unblackboxes technologies and provides information on how they are configured. It also refers to the idea of establishing and strengthening links between people and communities.
- "Giving Rope Section" (Donem Corda), refers to the fact that Teixidora offers opportunities to expand personal and social autonomy, giving visibility to free technologies and technological appropriation.

Intersections among the three layers

There are some common elements in the intersections of the social, discursive and technological layers.

There is a common collective dimension in the production and processing of content (social layer), in the functionalities of the technologies chosen (technological layer), and in the discourse calling for collectivisation of the story (discursive layer).

The concept of sharing is present in the orientation of collective action -both for those who are present and those who are absent in the events, and in the four rings of participation- (social layer), in the decision to use only free software and design the platform to provide open access and use (technological layer), and in explicit discourse in favour of freeing access to content (discursive layer).

The idea of re-elaboration is implicit in the actions that follow an event, where participants are invited to work with collected content (social layer), in the functionalities provided by the pad open to contributions and in the formulaires which produce a semantic wiki structure (technological layer). This idea is conveyed by the metaphor of "network weaving" (*Teixim Xarxes*), an invitation to create links, map actors and events, and work with the contents created (discursive layer).

The experimental dimension is identified in willingness to adapt methodologies to the characteristics of the event and the participants (social layer), in exploring the possibilities offered by pads and wikis (technological layer), and in Teixidora's discourse as a continually reviewed iterative process in constant evolution (discursive layer).

These four elements, collective dimension, concept of sharing, idea of re-elaboration and experimental dimension, reveal the construction of a commons that forms a three-layer (social, technological and discursive) transversal axis. This axis is not only formed in relation to intangible assets (content documented, mapping generated, network of relationships created, stories re-made) but also in relation to capacities created (group practices experienced, transmitted and improved). Accordingly, Teixidora is a particularly rich example of where to apply the concept of communicative ecology which integrates the three social, technological and discursive layers, to then conduct a separate analysis of some aspects of this ecology and observation of some of the interactions between layers, in specific cases.

4. Lessons Learned

The final analysis of this section is build on the following three examples of specific projects in which the three layers of Teixidora's communicative ecology have developed and interrelated, and the lessons learned in this process.

4.1. Participation in three specific events

4.1.a. SobTec

When Teixidora was launched, the first events where the platform was tested was the Alternative Mobile World Congress (2016): the Mobile Commons (UPF), the AntiMWC (Ateneu Llibertari de Sants), the Mobile Social Congress (Setem), and the First Congress of Technological Sovereignty (SobTec). The Teixidora team attended all four events and took notes, inviting others (via Twitter and word of mouth) to join them (social layer, core and first ring). The pads used were later embedded in the platform and the topics covered in the events, were collected in a single page, titled "Learning from the Alternatives to MWC"²⁰ (technological layer).

A year later, Teixidora was at the MSC and Sobtec, this time with the prior agreement and cooperation of the organisers (social layer). At Sobtec, Teixidora's participation in documenting the conference was announced in the programme published online²¹: "During the meeting we encourage you to jointly take notes summarising talks. These notes will be stored later in the semantic wiki Teixidora.net". Each session in the programme had a link to the Mardebits pad where notes were taken, to the organisation's wiki documentation in Sandcats²², and to Teixidora's page for the session (technological layer). Teixidora was given a slot for its presentation : "Welcome and Introduction to Teixidora.net's Pads." At the beginning of each session everyone was invited to take notes, and there were posters with QR codes in the room to access pads from mobile phones.

Looking at the social layer, the Teixidora team and members of the organisation took notes, as did several anonymous people (one or two per session, with a total of fifteen). Two overlapping sessions were not covered. In spite of the large number of participants, many came without laptops and only a few tried to take notes or access them using mobile phones (Etherpad's interface is responsive but writing long texts with a phone keypad is difficult).

A few days after the conference a Dathaton Session "*Buidarada*" (of content and data)²³ was held. It was called by the SobTec organisers and attended by eight people. A wiki page was prepared with a semantic query to show all pages of the sessions and to detect those that missed documentation or data. (technological layer as a tool for the social layer). With this page as a reference data from each session was collected. The names of speakers were added with the link to their presentations and video recordings were embedded. The contents of each session and corresponding notes were transferred from each pad to the wiki. Keywords, organisations, projects and individuals mentioned were identified and harmonised (in terms of spelling). The SobTec

²⁰https://www.teixidora.net/wiki/Aprenent_de_les_alternatives_al_MWC

²¹<http://sobtec.cat/calendari.html>

²²<https://sobtec.sandcats.io/>

²³https://www.teixidora.net/wiki/teixidora:Buidarada_SobTec17

mapping actors was carried out clicking on the red links in each session's form and creating other forms for organisations, people and projects that had not been mapped by Teixidora before.

4.1.b. Procomuns

In the field of local governance and in relation with the gestation of new public policies for the commons collaborative economy, Teixidora was the space in which the event Procomuns²⁴ documented, in March 2016.

Before the meeting, more than 20 people contributed to the draft of a joint statement and a series of proposals for public policies, working on a Google Doc. This document had evolved from an early version into the one presented at the meeting. Teixidora's core team suggested that, during the event, notes would be jointly taken. It therefore opened a list of pads (one per each conference), announcing and promoting it on Twitter and StatusNet, and making sure that the existence of the pad was announced at each session, and that at least one person would take notes. In other words, there was a ring of contributors for the social layer of the project.

Some participants, speakers and members of the audience took notes during the talks, to varying degrees, following the guidelines set out in pads (in Catalan, Spanish and English), referring to two types of key contributions to this discursive layer: notes, links and relevant references, on the one hand, and the specific proposals for public policies related to the commons, on the other.

Lists of proposals, linked to the conversations during the event, were produced. A category in Wikimedia Commons²⁵ was also created and participants were encouraged to link to Teixidora photos and documents from the talks after they had been uploaded to other platforms (such as Archive.org) and social networks, systematising the content produced by the event. Thus the core Teixidora team, together with researchers and experts in the sector of the commons and collaborative economy, merged, classified and relocated more than 60 new proposals at the municipal level and 18 at the European level. These had been collected in the pads technological layer and color-marked to trace the origin of proposals which were eventually transferred to the draft of the earlier joint statement and, later, to the Decidim Barcelona platform²⁶ (the municipal platform to facilitate participatory processes), for integration in the Municipal Action Plan of the City Council (PAM).

Recommendations collected via Teixidora during the event were later reflected in two documents, one for the municipal level (the third version, published in May 2016 with more than 120 measures accompanied by an executive summary of ten measures and, the other submitted to the European Commission.

4.1.c. La Comunicadora

Another project in which Teixidora has participated is La Comunicadora,²⁷ a Barcelona Activa programme (organisation for promoting the economic development of the city) together with three

²⁴Event promoted by de Àrea d'Altres Economies i Proximitat de Barcelona Activa i Barcola
https://www.teixidora.net/wiki/Economies_col%C2%B7laboratives_procomuns_03/11/2016

²⁵https://commons.wikimedia.org/wiki/Category:Procomuns_Barcelona_2016_conference

²⁶Decidim Barcelona <https://decidim.barcelona/users/13290>

²⁷La Comunicadora at Teixidora.net: Related events and participating projects
https://www.teixidora.net/wiki/La_Comunicadora

organisations which are part of the commons scene: Platoniq, Goteo and the Free Knowledge Institute. Regarding the discursive layer, the aim of the programme was to promote initiatives for the collaborative economy and help transition towards the commons economy through training, advice and guidance in fifteen projects which shaped the social layer of the process.

Teixidora was used in several ways:

- To take notes collectively in four, four-hour training sessions, in conventional classrooms where some participants wore laptops. Between five to eight people took part in the note-taking (roughly 25% of participants). In the more explanatory sections of two hands-on workshops, notes were also taken.
- As agenda and documentation of events (notes, materials and other documents were collected) in both training sessions and workshops, as well as in open meetings, each with their own form on the wiki.
- As documentation for these projects, which already had a page on Teixidora, where they are introduced, characterised and related with other contents.
- To register the feedback received in open meetings: every project was presented in an elevator pitch and participants gave feedback on a postit, which was stuck on a Wotify.eu canvas. Next, someone with a laptop transcribed the content of the postits to a Teixidora form, producing a page with columns on the same canvas (I would join the project if..., I like it because..., It is similar to..., It would improve if..., or This would interest such person...). This made it possible to produce a page combining all the contributions from a semantic search²⁸.

Participants were grateful to have notes from the training sessions. They were able to observe the dynamics of collaboration which had been described by the Saarland students [Littauer et al. 2015]. The Module 4 session, about legal status and obligations was especially "magic" since up to ten people took notes. Four or five took turns to transcribe what was said and others corrected minor errors, completed missing information, or searched for links to documentation as it was mentioned.²⁹

After, digitally recording the postits feedback at open meetings, thus achieving almost-live results at the end of the session, opened the way for further exploration of documentation of sessions beyond the classic lecture format.

The contents past on by La Comunicadora to Teixidora, after the forms are emptied, are integrated and related with other contents already in Teixidora. Hence, for example, one can click on keywords which will automatically make a semantic search. For instance, clicking on "commons" can relate a La Comunicadora session to past or future events.

4.2. What has been learned and observed

Three levels of learning - the managing of collaboration and negotiation around the governance of the text; mapping actors, communities of practice and interest; and practicing synchronous collaborative documentation of an event³⁰- emerge from our study of the cases described above, which revealed how to relate the communicative ecology layers with Teixidora.

²⁸La Comunicadora at Teixidora.net: Feedback on projects at open meetups
https://www.teixidora.net/wiki/Feedback_a_projectes_La_Comunicadora

²⁹This process can be watched at the session's Etherpad Timeslider
<https://pad.lamardebits.org/p/laco04/timeslider#0>

4.2.a Collaboration and Governance

The integration between social layer (organisers, note-takers and participants), technological layer (Teixidora.net, pads, programme, and website of the event) and discursive layer (creating a common good and shared documents) was notable in SobTec 2017. This generated a team spirit, a real sense of working together. It enabled participants to see how others take notes, complete what others write and how others stop at some point and later retrieve the notes. It was then possible to contribute to notes taken by others, and also to learn by observing others in the processes of receiving and reflecting when they receive information. This gave note-takers the possibility of being active at an event, not only receiving information but also enriching it, in an act of communisation. This experience was further strengthened in the Dathaton ("Buidarada") meeting after the congress, in which information was classified, organised, and shared sensibilities and interests identified.

Negotiation around governance of a text may come up in the least expected manner, not only to achieve a better final text, but also to learn while note-taking. A resource that is common can be managed by individualising it (everyone keeps their own notes) or socialising it, and bringing about a new result with better notes for everyone, enriched by contributions from all participants. When socialising, new authors and similar events may come up, old notes about the same issues may be rediscovered, etc.

So far, no behavior that could be considered vandalism or trolling has been detected when taking notes on pads. There is no sign of this in any of the three cases described or in the other hundred sessions where notes have been taken. In future research, it will be appropriate to check whether this is still the case when the practice of collective documentation is widespread and more visible. For the time being, we advance the hypothesis that the nature of the activity does not encourage this type of behavior.

4.2.b. Mapping of communities of practice and interest

When Teixidora was launched, the focus was on collecting content rather than mapping communities of practice and interest. Nevertheless, the latter finally stands out as one of the most valuable project contributions. This is one of the main lessons learned when considering how the social, technological and discursive layers interrelate.

The starting point was a peer-production experience where participants are invited to sieve knowledge generated offline, with a view to later building common good in the form of digital documentation. In practice, through cases like Sobtec, La Comunicadora or Procomuns, it was observed that recording events, who organises them, what is said, and documenting the debates, discussions and reflections, makes it easier to map and systematise actors (individuals, organisations and projects) in real time.

This lesson has been present throughout the process and has gradually been incorporated into it. Accordingly, forms -easily generated from the event page-, were also added to document actors, and test methodologies, for example adding the pre-sieving information system at the foot of the pads or organising datathon "*Buidarada*" sessions like the Sobtec experience.

With this mapping coming from the three layers, documentation which is usually difficult to find, connect and re-use, is systematised. Inclusive, in person and online, and synchronous or asynchronous participation is facilitated which in turn, means that informed, documented proposals and collaborative work emerge from events and debates. The technological layer provides tools to

[30https://www.teixidora.net/wiki/Especial:Ask/-5B-5BHas-20event-20keyword::procom%C3%BA-5D-5D/mainlabel%3D/order%3Ddesc/sort%3DHas-20event-20start/offset%3D0/format%3Dul/searchlabel%3Dprocom%C3%BA](https://www.teixidora.net/wiki/Especial:Ask/-5B-5BHas-20event-20keyword::procom%C3%BA-5D-5D/mainlabel%3D/order%3Ddesc/sort%3DHas-20event-20start/offset%3D0/format%3Dul/searchlabel%3Dprocom%C3%BA)

bring the mapped information together semantically, to contextualize it, synthesize it and collectivise knowledge and the narrative concerning certain issues, starting from the social layer and going through to the discursive layer.

The result is constantly developing conceptual mapping. This mapping is not only of actors, communities of practice and interest, but also of narratives and innovative visions, of alternatives, of issues related to the intersection of technology and society, and other issues related with them.

4.2.c. Synchronous documentation of events

As noted about, especially in the cases of Sobtec and La Comunicadora, the discursive layer (creating a common good, sharing documents) is relevant for the success of the social layer while also benefitting from the technological layer. The potential of collective note-taking in real time, at an event, a conference or a series of training sessions, is important in terms of results (materials are created and they can be used later), but it is also a positive factor in the development of the activity (participants also construct the narrative, and in doing so they become more familiar with the contents, the result of working together is of better quality and there are no missing details). The effect on the social layer is therefore significant. Even people who do not participate know the narrative is not being created without them, or in other words, those who are participating or are attending a parallel session know that they are not being excluded, that the contents can be related with those they are producing. Participation in note-taking was low in relative terms. It remains to be seen in future studies whether this is a structural issue or whether it could be higher and, if so, whether the practice would support a change of scale.

Yet, obviously one wonders why some people do not participate in note-taking or share the collective discourse, even in the case of the commons discourse, as has been observed in many events covered by Teixidora, or why they take personal notes (on paper or with electronic devices) while refusing to use a joint pad.

In some cases explanations are found in the technological layer:

- weak wifi signal or one limited to a certain number of simultaneous connections
- proxy that prevents access to pad or pad server crash
- participants who do not bring electronic devices

However it has also been found that when these obstacles do not appear, in contexts where commons issues are discussed, it cannot be assumed that knowledge-sharing will occur, or that it will be collectively generated. Sometimes notes are not shared, despite affinities of the people in the social layer and the general agreement over principles of free knowledge in the discursive layer.

Why, in some cases, are notes not shared? Our observations and interaction with participants lead us to wonder whether this can be attributed to determinants from the social layer rather than the technological or discursive layers:

- Format: activities which, due to their methodology, do not conform with the usual contexts of note-taking (lecture or meeting) and which are difficult to document digitally. This challenge was first explored in the documentation of La Comunicadora Meetups and should be revisited.
- Skills Limitation: participants who do not bring a laptop to meetings or who are not in the habit of writing with a phone or cannot type fast.
- Personal attitudes: unwillingness to take notes (either on paper or digital devices) or lack of experience.
- Perceived risks: perceptions regarding the provision of data or even expressing opinions or views because of fear of making oneself vulnerable or for reasons of data privacy. Fear of

interference by vandals who may get involved in the note-taking in order to alter or even pervert the sense or meaning of content.

- Personal insecurity: insecurity about the writing skills (spelling or knowledge of the language used).
- Attention economy: rivalry between stimuli and attention during the course of the meetings documented.
- Competition with other forms of documentation in real-time: social media (Twitter, GNUsocial, Whatsapp, Telegram, Instagram, Facebook, etc.), photographs or audiovisual recordings.
- Purpose: Lack of knowledge regarding the final destination or goal of the collectively generated content.

In terms of future research, study as to whether, despite the apparent achievement of commons discourse, there are still obstacles in the way of putting its principles into practice, might be advisable.

5. Conclusions

The main focus of Teixidora today is note-taking and identifying themes discussed in events. Although the project is still evolving, the communicative ecology structure, with its three tight-knit layers (social, technological and discursive), is clearly discernible. These layers, where communication occurs and where contents are processed, blur the boundaries of time and space.

With its structure of concentric rings, the social layer, is indirectly coordinated by the trail left by the events. This then becomes fixed and placed on the platform. The technological layer also facilitates a diverse communication model, in person and in real time, or *a posteriori* from any location. The discursive layer works with concepts related to the collectivisation (who produced, where and when) of the story.

With these attributes of the communicative ecology, the platform becomes a space for negotiation about the degree of collaboration and governance around knowledge. It also enables mapping of actors, projects and technosocial issues in the Barcelona area, and this is becoming one of the most valued features of the project. Moreover, it is also a meeting place for people who participate in person and in real time, to document events, and those who don't.

Applying the communicative ecology framework to Teixidora on the bases of observing and analysing three practical cases has enabled for a better understanding of its needs and possibilities. From what we have learned and for the future development of the project, we identify four key fronts to develop:

- Explore automation of note-taking tools and assess whether their use improves or gives depth to the debate.
- Systematise the ways in which conclusions are drawn, proposals are made and debate occurs in the discursive layer, in a scalable manner, as in the Procommons event.
- Find out how to go beyond note-taking in documenting events, especially those with physical media-content, like workshops or dynamic sessions of knowledge-generation, and how to transfer notes from the physical to the digital, which is to say into Teixidora's technological layer, as explored in La Comunicadora.
- Investigate methods and technological tools in order to facilitate re-elaboration and synthesis of content from different events with a common theme, so that self-organisation experiences of the social layer (as with Sobtec, for example), can more easily and independently benefit from Teixidora.

Teixidora is an evolving project, which will continue to implement technological solutions, work on social methodologies and generate discourse. Three questions for future research emerge from our examination of this first year of activity:

- How the communicative ecology framework can be useful for planning and understanding the use of Teixidora at different events, in new iterations.
- How to improve use of Teixidora, involving all three layers of the communication ecology in scientific research, public policy innovation and citizen participation.
- How to adopt practices similar to those used at Teixidora in other contexts, thus contributing to collective intelligence-gathering processes, registering community activity and conceptual mapping of social actors and topics.

6. References

Barker, C. (1999). *Television, globalization and cultural identities* (pp. 84-93). Buckingham: Open University Press.

Benkler, Y. (2006). *The wealth of networks: How social production transforms markets and freedom*. Yale University Press.

Chadwick, A., & May, C. (2003). Interaction between States and Citizens in the Age of the Internet: "e-Government" in the United States, Britain, and the European Union. *Governance*, 16(2), 271-300.

Ede, L. S., & Lunsford, A. A. (1990). *Singular texts/plural authors: Perspectives on collaborative writing*. SIU Press.

Elliot, M. (2006). Stigmergic collaboration: The evolution of group work. *m/c journal*, 9(2).

Foth, M., & Hearn, G. (2007). Networked individualism of urban residents: discovering the communicative ecology in inner-city apartment buildings. *Information, communication & society*, 10(5), 749-772.

Fuster, M. (2012). The free culture and 15M movements in Spain: Composition, social networks and synergies. *Social Movement Studies*, 11(3-4), 386-392.

Fuster, M. (2014) Governance of online creation communities for the building of digital commons: Viewed through the framework of the institutional analysis and development. In Frischmann, B., Strandburg, K. & M. Madison (eds.), *Governing the knowledge commons*. Oxford University Press, UK. (Compilation homage to Nobel Economics laureate 2009, E. Ostrom). http://www.onlinecreation.info/wp-content/uploads/2013/07/IAD_OCC_Junio_19_MFM.pdf

Garriga Miret, M. (2016) "CitizenSqKm: Transforming the Square Kilometre That Surrounds Us." In *2016 - Economic, Social and Cultural Rights (ESCRs) and the Internet | GISWatch*, edited by Alan Finlay, 269. APC and IDRC. <http://www.giswatch.org/country/spain>.

Garriga Miret, M., Luis Salcedo, J., Vives Ylla, N., Meseguer Pallarès, R. 2015. *ICTs for Inclusive Communities in Developing Societies*. Edited by Jacques Steyn and Darelle. Van Greunen. Cambridge Scholars Publishing.

Gómez Fontanills, D. (2010). GRF wiki UOC. Trabajo colectivo, colaboración y evaluación. In *Crisis analógica, futuro digital: actas del IV Congreso Online del Observatorio para la Cibersociedad, celebrado del 12 al 29 de noviembre de 2009* (p. 45).

- Habermas, J. (1991). *The structural transformation of the public sphere: An inquiry into a category of bourgeois society*. MIT press.
- Hearn, G. N., Tacchi, J. A., Foth, M., & Lennie, J. (2009). *Action research and new media: Concepts, methods and cases*. Hampton Press.
- Lassig, C. J., Lincoln, M. E., Dillon, L. H., Diezmann, C. M., Fox, J. L., Neofa, Z. (2009). Writing together, learning together: the value and effectiveness of a research writing group for doctoral students. In Proceedings of Australian Association For Research In Education 2009 International Education Research Conference. AARE.
- Laudel, G. (2002). What do we measure by co-authorships?. *Research Evaluation*, 11(1), 3-15.
- Littauer, R., Scheidel, A., Schulder, M., Ciddi, S. (2015). Crowd Sourcing The Classroom: Interactive Applications In Higher Learning <https://www.burntfen.com/publications/LittEdulearn.pdf>
- Lowry, P. B., Curtis, A., & Lowry, M. R. (2004). Building a taxonomy and nomenclature of collaborative writing to improve interdisciplinary research and practice. *Journal of Business Communication*, 41(1), 66-99.
- Ritchie, S. M., & Rigano, D. L. (2007). Writing together metaphorically and bodily side-by-side: an inquiry into collaborative academic writing. *Reflective Practice*, 8(1), 123-135.
- Plant, S. (1998). *Ceros+ unos: mujeres digitales+ la nueva tecnocultura*. Destino.
- Ritchie, S. M., & Rigano, D. L. (2007). Writing together metaphorically and bodily side-by-side: An inquiry into collaborative academic writing. *Reflective Practice*, 8(1), 123-135.
- Senabre, E. (2009). Nuevas dinámicas presenciales de intercambio de conocimiento: cuando lo online se apropia del espacio físico. *Divulgación OCS*.