D3.13 MAZI as an experiment in interdisciplinarity: the outcome of a self-reflection exercise (version 3)

Other

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1. Executive summary

This is the final version (#3) of the MAZI deliverables that propose self-reflections as a way of dealing with collective work in interdisciplinary action and research projects. Its goal is to provide a meta-perspective of the self-reflection outcome documented in detail in previous deliverables.

More specifically, this document overviews the process as carried out in MAZI, and based on this experience It develops three categories of action toward shaping common spaces for inter- and transdisciplinary research. These are namely

a) communities of practice around DIY networking technology (Section 2);

b) transdisciplinary co-design of the MAZI toolkit across-localities (Section 3); and

c) learning, appropriation of knowledge, sustainability and knowledge transfer (Section 4).

It concludes with a few important lessons learned for the design of future projects, namely the positive impact of assigning overlapping leading roles to partners in interdisciplinary research, and the need for carefully designed intimate spaces for self-reflection.

2. Table of Contents

1. Introduction: The Process

A task of this work package (WP3) is to enhance theory pertaining to inter- and transdisciplinarity through an applied research design methodology which operates inductively, by making sense of the information elicited throughout the project. To shape collectively the MAZI toolkit, a dynamic process of transforming interactions between partners has been conceived since the beginning of the project. The knowledge that generated the toolkit was co-produced within this process, by making practical experiments in the project pilots and temporary deployments of the intermediate versions of the toolkit, and at the same time, also by weaving the exchanges and relationships between partners.

The MAZI interdisciplinary process comprises a series of iterative loops, which are configured around actions of various scope and scale. For instance, there is local teamwork at the level of the pilots, counterpointed by cross-fertilization events and plenary meetings where the consortium came together. The self-reflection exercises following the MAZI cross-fertilization events are elements of a methodological framework for understanding social complexity, for shaping a relational space of cooperation, and ultimately for turning productive the exchanges between partners. In addition, the work included in project deliverables, regarding documentation, dissemination, analyses, evaluation, or concept formation, is another mechanism to facilitate this spiral interdisciplinary process toward co-designing the MAZI toolkit and supporting the associated transfer of knowledge.

Self-reflection exercises were introduced in the conception of MAZI as a method to elicit feedback information on the MAZI experience as a whole, and mostly after interdisciplinary interactions between MAZI partners. The motivation behind this decision was being aware of the difficulty of the task at hand: to introduce a new way of digital communication in local communities, and to communicate the experience gained between different contexts.

Cross-fertilization events are an example of such structured context, where interactions within the MAZI consortium took place, also in the presence of guest participants and members of interested local groups. They are another mechanism to advance the interdisciplinary process of co-designing the MAZI toolkit, and their role is explained in more detail in the deliverables on the MAZI toolkit as a boundary object (D3.3. and D3.4), and in the second version of this document (D3.12). Related deliverables (i.e., D3.2- D3.4 on the boundary object; D3.5-D3.7 on the MAZI interdisciplinary framework, and D3.11-D3.12 on self-reflection exercises) document the primary data of the partners' answers, as well as analyses, interpretations and the process to identifying relevant generic categories toward a methodological framework. Note that the WP3 deliverables function as a whole, and none of them provides a short-cut for the MAZI interdisciplinary methodology.

The MAZI exercises on self-reflection (Appendix II) have been evolving from the first reflections documenting **descriptive scenarios** either in the form of initial pilot scenarios (#1), or as MAZI toolkit speculative scenarios (#2), to more **relative reflections** in shaping a shared vocabulary across the consortium (#1, #2 and #3), and in formulating options of the use of technology and the toolkit that are suitable for each pilot scenario (#3). In developing relational spaces for cooperation, those **temporally sensitive reflections** have been critical, including considerations related to the cross-fertilization events (#3), and reflecting upon the transformation of partners' roles of over time (#4).

Being the last of the deliverables on the role of self-reflection as a research method and an experiment in interdisciplinarity, this document aims to contribute to the synthesis of the various elements structuring the MAZI methodological framework for collective design and learning, a form of guidelines for performing self-reflection in interdisciplinary and transdisciplinary projects.

It is structured in three parts:

- The first section discusses the MAZI interdisciplinary work in the context of communities of practice formed around DIY networking technology.
- In the second section, particular disciplinary dimensions come together with the specificities of localities in a transdisciplinary action process of co-designing the generic MAZI toolkit.
- The third section reflects on the knowledge developed during MAZI, specifically on the appropriation of MAZI concepts as a means for further advancement of experiments and ultimately toward sustainability.

2. Community of practice

A group of people engaged in collective learning is called a 'community of practice', term that was coined by anthropologist Jean Lave and Etienne Wenger (Wenger 1998) to refer initially to learning groups in the context of apprenticeship. Community of practice is a broad concept implying frequent interactions between group members around a shared domain of interest or of action like improving their practice, or around learning how to do something. In this process of interaction, the group develops "a shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems—in short a shared practice" (Wenger-Trayner 2015). The following narrative explains the shared practice in MAZI, while reflecting on common group learning and on the type of communities that may possibly manifest during a three years action and research interdisciplinary European project.

Three elements are critical for any community of practice, which are:

a) a domain, namely DIY networking technology,

b) a community that in our case is the MAZI consortium together with the extended community of practice, and

c) a practice, in other words, co-designing the MAZI toolkit. In the next sections each of the three elements is discussed in more detail.

2.1 The domain of DIY networking technology

This section presents only succinctly what makes the MAZI domain of action. Section 4 of the deliverable D3.4 on the boundary object is especially dedicated to DIY networking technology, and other deliverables like D3.2 elaborate extensively on it. It is important to note, however, that there has been a continuous concern with this topic, since the term “DIY networking” was first promoted by Panayotis Antoniadis in the interdisciplinary Dagstuhl seminar “Do It Yourself networking: an interdisciplinary approach” (Antoniadis et al. 2014).

DIY networking refers to “different types of grassroots networking, such as mesh networks" (Antoniadis 2016). MAZI was conceived as an action project having the boundary object of DIY networking, as a shared domain of practice. DIY networking in the form of the MAZI toolkit was meant to be employed during face-to-face interactions, complementary to internet based ICTs, in order to become a catalyst for social exchanges and community action.

Figure 1. DIY networking: a hybrid MAZI Guestbook installation at Parkplatz community garden in Zurich

At present, at the end of the three years research and action MAZI project, DIY networking could be explained in its dialectical interpretation, similar to the dialectical spatial triad (Lefebvre 1991), namely DIY networking as a concept (see Antoniadis et al. 2014, 2015), a DIY networking toolkit, and a deployed DIY network. These three dimensions coexist within a dynamic process. The MAZI project was born out of the first, conceptual dimension, and during the project time frame is being developed in the form of the MAZI toolkit, while of course the concept has been also evolving over time (e.g., 'the organic internet' etc). Since MAZI Zones have been deployed, they have taken a course of life on their own, being capable to provide knowledge and tools within the third 'lived' dimension. In the following sections more elements are added to this understanding of DIY networking technology.

2.2 MAZI community of practice

It is critical to note that around DIY networking technology the MAZI project has shaped a community of practice extending beyond the consortium. On the one hand, every local team has been engaging interested individuals and groups in the pilot activities. On the other hand, the MAZI toolkit has been explained, tested, discussed, deployed and improved by many people that are not active in the MAZI project. Some members of the MAZI extended community of practice are from grassroots initiatives in Berlin, inhabitants of the favelas in São Paulo, INURA members all over the world, environmental and urban activists, attendees of the CAPS workshops and conferences, and other individuals interested to employ the MAZI toolkit or more generally DIY networking in their activities.

Figure 2. Extended MAZI community of practice in Berlin, Deptford, Zurich, and Edinburgh

Common interest of learning may organize practitioners around a certain domain for which they would develop together a shared repertoire of resources to support their related practice (Wenger-Trayner 2015). For instance, in MAZI there have been many resources in place since the project beginning, analogue and digital tools. The deliverable on the boundary object (D3.3) has elaborated already on them, and they are mentioned in many other project documents. Among the online spaces of interaction, the MAZI github <https://github.com/mazi-project> has been an 'e-place' for exchanges between the extended MAZI community.

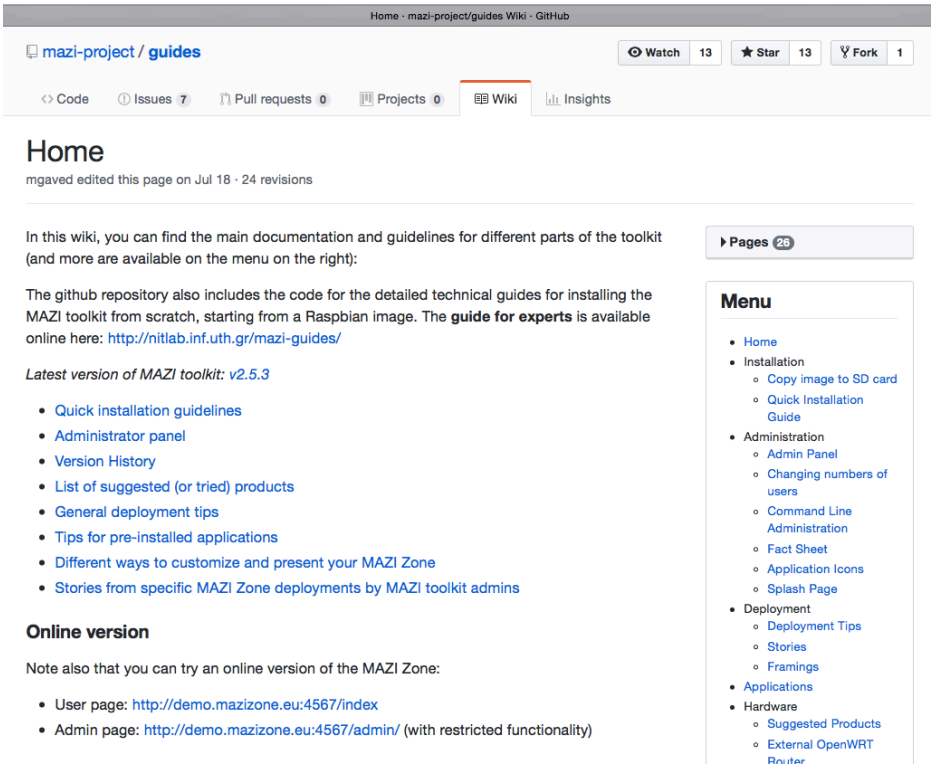

Figure 3. Online (github) 'meeting point' of the extended MAZI community

In addition to the planned resources for collaboration between partners, since the eighteenth month (M18) there have been discussions on creating opportunities for face-to-face work in plenary, either on more theoretical topics like interdisciplinarity and the pilots' evaluation or on the MAZI e-book and on the toolkit's guidelines etc. Thus during the plenary meeting in Brussels and the cross-fertilization events in Zurich and in Volos of the third year of the MAZI project, extensive sessions have been scheduled for workshop type of collective activities within the consortium.

Figure 4. Plenary MAZI workshops in Zurich (May 2018) and in Volos (July 2018)

2.3 MAZI toolkit as shared practice

All the spaces for interaction, negotiation and convergence (refer to D3.3 Section 2.2) have generated fruitful conversations among the MAZI project team. In the course of all these conversations, MAZI partners have developed a set of stories, guidelines, cases that have become a shared repertoire for the MAZI practice. One expression of the shared practice is the various versions of the MAZI toolkit, until its final version at the end of the project. Another expression of the shared practice is the interdisciplinary framework, including the current document, which has been structuring the transdisciplinary process to enable the co-production of knowledge in MAZI.

Let us take the example of shared stories. In the second half of the second year, a template for recording the deployed MAZI zones through some minimal form of 'storytelling' has been proposed as a draft by Panayotis Antoniadis, then it was circulated and discussed with the partners. The MAZI stories template is documented in the second version of the deliverable on the boundary object (D3.3 pp.25-26), and is available online on the MAZI demo server <http://demo.mazizone.eu:9001/p/mazizone-stories> and on the Wordpress MAZI blog <http://demo.mazizone.eu/wordpress/index.php/blog>.

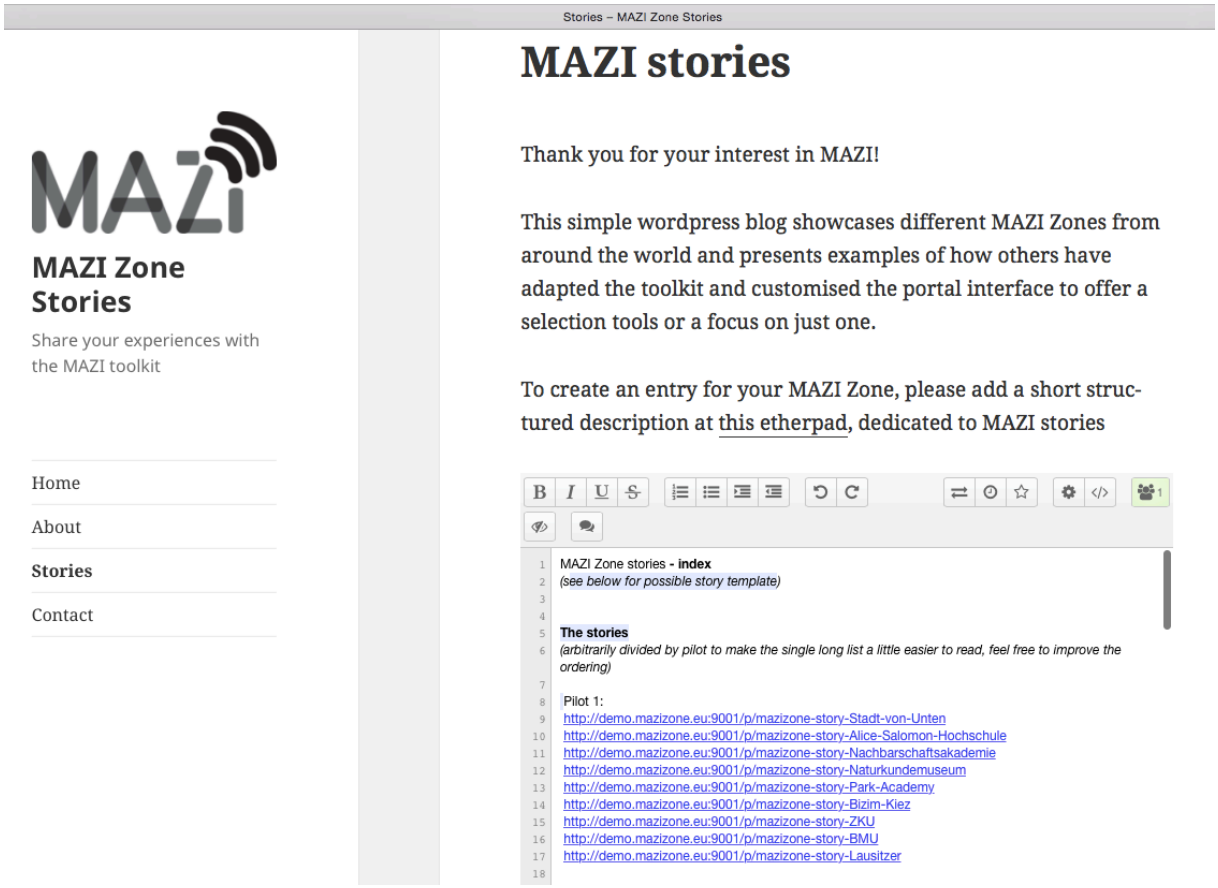

Figure 5. MAZI Zone stories on the Wordpress blog on the MAZI demo server

During the discussions in the plenary meeting in Volos (July 2018) came up issues such as the importance of the storyteller's 'voice', for instance, raising questions related to whose perspective is conveyed through the story? that of a researcher or of an activist? etc. Also the fact that more nuanced information should be included in the stories, which could not fit a 'template' but would require a larger time budget than that of the MAZI project. Thus it has been commonly agreed that the template is not meant to be overly prescriptive, and that based on it the partners will create a database by adapting and contributing to the MAZI stories template.

Figure 6. Stories in the MAZI e-book

This database of MAZI stories could then provide information for future interpretations, later on allowing time for the refinement of its formatting, for translations and so forth. It has been also agreed that there is already a broad diversity of cases and pilots, so the stories will be inevitably written on different voices. Out of the stories that have been recorded online, the MAZI e-book (D4.5) includes twenty four stories documenting the deployments of the MAZI toolkit during the project.

Figure 7. MAZI timeline showing cross-fertilization events (red) and deliverables' deadlines

There have been many opportunities during the project timeline for common experiences (Figure 7). The methodology for collaborative work has been adjusted as a consequence of these interactions, by developing ways of addressing either recurring problems or tasks at hand etc. Among the many tools developed in MAZI, one of them is the plenary workshops that emerged in the last year of the project.

For example, the pilots' evaluation workshop by the OU team, that took place in Volos in July 2018, was meant to document the work progress in the local pilots through a survey to be evaluated, interpreted and discussed in the plenary meeting, providing for comparative evaluation (for more details refer to the related deliverable D3.10). The MAZI pilot teams have been asked to summarize the story and context of MAZI zone(s), as well as a particular event, activity or deployment. A deployment would be characterized through storytelling, MAZI 'offering' listening, meaningless conversations, understanding the needs and reflection on the challenges and its success. Afterwards the MAZI stories were self-evaluated to select a more successful, and a more challenging MAZI zone instantiation. MAZI partners looked then across the input to find clusters, keeping in mind that

deployments could fit in different categories. But even if the deployments are distinctly different, there are certainly similarities in methods or tools used at the various locations.

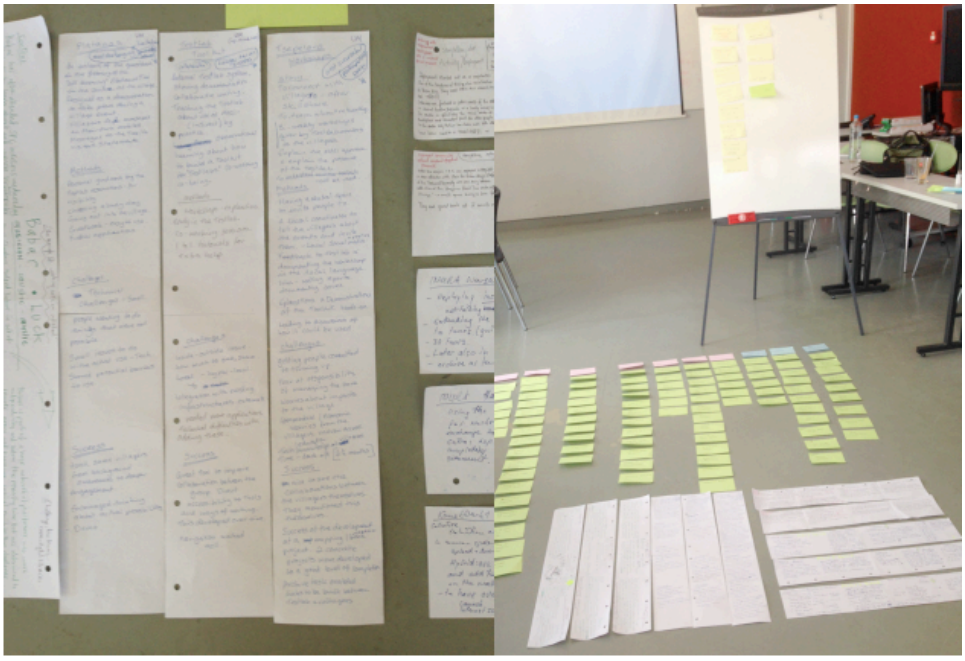

Figure 8. Workshop on the evaluation of pilots in Volos (by OU): MAZI Zones deployments

Such 'hands-on' exercises are not only eliciting information fast and in an effective way, but they generate a dynamic atmosphere within the group that is entirely different than the typical reporting/conference-like plenary project meetings. Thus it is a very valuable complement coming from the experience of practical (field) research, which employs the workshop format on a frequent basis.

Similarly but somewhat a different tool exercised in MAZI is the self-reflection exercise, by means of which the partners have been recording their reflections on the project activity and on the interdisciplinary exchanges throughout the project. Individual self-reflections have been sometimes followed by pilot team discussions and negotiations of the final answers. The answers are documented in the WP3 deliverables. In addition, the reports include either an interpretation of these answers by the deliverables' coordinators or analyses of the knowledge produced, and its categorization into broader and integrated answers. As a result of this process of knowledge co-production, a MAZI shared repertoire has been shaped over time, building on it in the different versions of deliverables. Of course the current MAZI toolkit includes guidelines and stories derived from the shared practice, but nevertheless many more insights and useful toolkit advancements could be derived from the shared practice of the MAZI interdisciplinary community.

2.4 Discussion on common learning

Regarding interdisciplinary research, Rossini and Porter (1979) argue that, it "can realistically aspire only to an intermediate level of integration wherein disciplinary components serve as substantive inputs to each other. […] Attainment of well-integrated interdisciplinary research is a complex task" (p.70). In context their paper proposes "common group learning" as a way to generate a "common intellectual property belonging to the research group", which may be well-integrated at the cost of a loss of analysis' depth. Common group learning has been introduced in the first deliverable concerning the interdisciplinary work in MAZI namely in D3.2 on the boundary object.

The project's short duration is a critical aspect, as interdisciplinary and transdisciplinary research typically requires longer than three years to achieve integration. In spite of the short timeframe, however, the overarching interdisciplinary framework in MAZI has achieved a relatively good level of integration. Note that it is so, despite

the various degrees of disciplinary affinity for interdisciplinarity work, the different degrees of commitment and engagement with the domain of practice, and sometimes divergent perspectives toward the end of the project.

Moreover, an important characteristic of the MAZI project is the work in pilot teams. Thus group learning activities at the consortium level has been complemented with a process of integration by these subgroups in Berlin, Deptford, Zurich and in rural Greece. Certainly, the production of shared knowledge benefited of the significant diversity of the pilot studies, which is briefly explained in the next section. Section 4 of this document discusses different uses of learning, and how the co-produced knowledge in MAZI may be transferred toward the sustainability of the project.

3. MAZI across disciplines and localities

Indeed MAZI work was designed across disciplines and localities, and the interdisciplinary framework has been structured to support the interdisciplinary generation of the MAZI toolkit, its application and transfer of knowledge. With the mention that previous WP3 deliverables have extensively elaborated on each topic, the next sections overview

a) the work in pilots across localities,
b) inter- and transdisciplinary research and action in MAZI, and
c) produced relational spaces.

3.1 Work in pilots

This section is meant only to reinforce the idea of locality in MAZI, as the pilots' location specific elements are already dealt with in WP2 deliverables on the pilots. However, relevant for the WP3 objectives is to stress the role of the cross-fertilization events to share the knowledge produced across localities, and further integrate it toward co-designing a generic toolkit that can be deployed with different framings and at various particular locations.

A strong feature of the MAZI research design is the diversity of pilots, which facilitates scaling through replication. Various characteristics of localities, communities, pilot teams, moments in the local projects or influences from the global trends are creating a large array of field research that provided particularized versions of the MAZI toolkit. Between these highly contextualized toolkit versions, which were locally designed at the pilot level, and the final generic MAZI toolkit was an intense back-and-forth process enabled by the interdisciplinary framework.

As a result the common toolkit could be customized in various circumstances and according to a multitude of needs (refer to the deliverables on the boundary object D3.2, D3.3, D3.4). Besides the planned moments that facilitated and catalyzed these actions such as the cross-fertilization events, along the way there were diverse reactions of MAZI partners to the planned tasks, according to differentiated ways of dealing with the task at hand and attitudes in functioning within the personal and institutional frames, or breaking through them. Therefore, the next section elaborates on inter- and eventually transdisciplinary research in MAZI.

3.2 Transdisciplinarity

MAZI has a strong component of interdisciplinary cooperation toward co-designing the MAZI toolkit, which has been documented or interpreted in a conceptual useful way in previous deliverables especially in D3.5, D3.6 and D3.7. Applied research and design work could not be done otherwise and the necessity for interdisciplinary framings was noted early on, even regarding engineering higher education. For instance, in the mid 1970s at the University of Illinois was designed a program to examine the role of the social sciences and humanities in an engineering curriculum. After being engaged in the program, philosopher of education Hugh Petrie (1976) wrote an article on the epistemology of interdisciplinary inquiry, in agreement with the argument of Harry Broudy (1970 and 1972) that "a complex technological society requires interdisciplinary solutions to its problems" (p.30). Since then half of a century has passed and there is slight progress in education, but research programs like CAPS have been particularly addressing interdisciplinary work.

An interesting question often raised refers to the difference between interdisciplinary and transdisciplinary framings. One of the common answers is that transdisciplinary projects are necessarily applied to the 'real' world, a product of academic and non-academic work (e.g., Zinsstag 2018), engaging those for whom the technology is designed. From that perspective, MAZI has been shifting from an interdisciplinary project to a transdisciplinary one, the more the MAZI extended community of practice has been growing over time.

In addition to using the real life laboratory, transdisciplinary work produces outcomes beyond what each discipline could generate on its own as well as methods and tools for communication, concepts defined together from different perspectives in order to establish a common ground necessary for functioning together toward fulfilling the project goals. For instance, urban planning is by nature transdisciplinary, as it is about creating synergies in the co-production of knowledge and in the process of manifesting it in practice.

Moreover, the so called 'wicked problems' (Rittel and Webber 1973) expressing the unique nature of planning problems are necessarily addressed through transdisciplinary research. Basically the authors argue that planning problems cannot be completely 'solved' due to the fact that planning practice is about performance and not about absolute value. A process of spatial understanding, as it has been used in MAZI, on which to base the action in the real life laboratory is different than employing sets of performance criteria, which is proposed by a structural approach to design. Every planning solution is a 'one-shot operation' that leaves little room to learn through trial-and-error, and even more, the lessons learned cannot be transferred across to other problems. In the next sections these topics are presented in more detail. Before that, a few examples of transdisciplinary work in MAZI are described in the following.

One example of transdisciplinary work in MAZI was creating a shared vocabulary, the so called MAZI glossary (e.g., D3.4 Section 3.2). First reflecting individually on definitions, from disciplinary perspectives and practical experience, and then integrating basic concepts at the level of the interdisciplinary consortium was very important in shaping relatively fast, before the technical toolkit, a common space toward helping the MAZI project final outcomes.

Another example of transdisciplinary work in the co-production of knowledge in MAZI was working together on the deliverables. On the WP3 deliverables, first a structure of the document was proposed to the group, then specialized sections were developed according to the partners' expertize, and at the same time, in some of the deliverables was included input from all partners like in the case of answers to the surveys (see MAZI Self-reflection exercises in Appendix II). Then all partners had access to the draft documents for editing, additions, comments etc.

In November 2016 and November 2018 MAZI was presented at the Swiss Inter- and Transdisciplinary Day by NetHood, the WP3 coordinator. This year's presence was particularly important, as the conference framing was related to digital technology, its impact on the coproduction and integration of knowledge, and also the teaching and learning processes. An interesting mix of academia, practitioners, artists elaborated together during the course of one day, in plenaries, workshops and posters' exhibition.

Some of the lessons to take on from this meeting, to self-reflect on the MAZI process, was the necessity of inter-epistemic dialogues (including integrated knowledge and belief systems), and of building further epistemology bridges (Zinsstag 2018). Of course, the MAZI self-reflection method is an interdisciplinary mechanism that is able to enable such inter-epistemic bridges.

Another lesson to take is that learning and teaching inter- and transdisciplinarity in the digital world is currently structured according to two concepts of discipline. The Humboldtian approach conceptualizes teaching and learning concerning one particular fact, while Newmanian concept is fundamentally about understanding society. Moreover, to complicate things even more, a global (internationalist) perspective provides nowadays an overall picture about the meaning of 'scientific competence'.

Most importantly, finding ways to interact across disciplinary boundaries requires a philosophy of science foundation. But still presently having a philosophical and critical perspective on science is seldom common among scientists, as it predominates a Cartesian mechanistic and deterministic way of thinking. That is often the case also due to how humans are dealing with complex systems, as the predictable human behavior is to establish institutions that regularize the interactions and limit the patterns of response, to reduce the uncertainties associated with the relation between building an understanding and choices to be made, or in other words between the knowledge constructed and its practical application. In applied disciplines like spatial planning, rational comprehensive models are based on previously experienced spatial and institutional models, thus reproducing the order and the experiences of the past in future design. Certainly this is not a good approach for innovation, mostly social innovation.

In context the L200 prototype for a hybrid living lab equipped with a permanent MAZI zone, an outcome of the Zurich pilot, generated interest of various actors, ranging from the deployment of the MAZI toolkit for permanent exhibition spaces in Lausanne, and creating L200-type living labs, to engaging in interdisciplinary research structured around cycles of cross-fertilization and self-reflection. It was mentioned that even successful transdisciplinary projects do not formulate ways of achieving that success, so there is a serious need for methodological guidelines. Most importantly the necessity of a location where interdisciplinary interactions could take place regularly was of particular interest.

3.3 Relational spaces

While the concept of 'community of practice' proves to be very useful in understanding the interdisciplinary work in MAZI, it does not mention a specific spatial dimension as being critical for its existence. To shape the necessary spaces for cooperation in the process of co-designing the MAZI toolkit, the project established a situation with the toolkit as a boundary object. The latter materialized through multiple actions in the back-and-forth process during the project between local pilots and generic tasks of the MAZI consortium. The relationships and exchanges created by this situation have shaped relational spaces (for more details refer to Section 2.2 in D3.11; to Section 2.3 in D3.3 and Section 3 in D3.4 on the boundary object).

Let us take three examples from the beginning of 2016 that illustrate short-term relational spaces at the consortium level. One came with the occasion of creating the project identity through the MAZI logo. Another one was initiated by the engineering team's expectation to receive from the pilot projects' teams the so called 'requirements'. A third example is that of the discussion generated by the 'incident' regarding the informed consent forms in Berlin.

Table 1. Relational spaces at the beginning of MAZI

MAZI moments	Location	Effects of the exchanges that generated the relational space
MAZI logo	Online poll and discussions	Shaping a pool of aesthetic preferences expressing the project's identity; having to choose among individual preferences; establishing consent.
Technical requirements	Kick-off meeting in Volos (January 2016)	First understanding of the critical need to create communication tools and shared methods for cooperation across disciplines; the importance of developing the interdisciplinary framework in the co-production of knowledge toward co-designing the MAZI toolkit.
Informed consent forms	Berlin pilot workshop (July 2016)	It shaped a relational space where the MAZI community of practice was able to act toward the project goals; reinforcing the idea that such research and action projects require careful and time intensive consideration.

The design of MAZI logo was an opportunity to discuss our various 'projections' of the MAZI identity, and to create polls for individual preferences, mostly aesthetic preferences, that had to be integrated into a common choice. Four versions of the logo were designed by two partners with design background (UdK and NU), and after two rounds of online discussions and voting, the final logo was chosen based on consent, or 'no objections' (e.g., Buck and Villines 2007).

It was the first trial of the MAZI consortium to integrate individual choices into collective decisions, which generated a specific relational space for this new and diverse interdisciplinary team undertaking applied research. Next are summarised the other two examples, which are related to inherent tensions between interdisciplinary frames and perspectives, between engineering framings and social scientists understandings.

At the kick-off meeting in January 2016, engineers from the Volos team asked for 'requirements' from the pilot teams that included social scientists, participatory design researchers and practitioners. Those partners that have had already the experience of working with local community actors, have strongly reacted to such requests. Over time the social scientists' necessity of contextualised analyses and systemic approaches have been listen to, sometimes even adopted. But as it could be read in the acknowledgments of a recent paper, the consortium is seen as two separate entities of "us" and "them" in terms of toolkit development, mostly through fragments or phases of knowledge production, rather than as an ongoing process, "we would also like to show our gratitude to the whole MAZI consortium for sharing their expertise with us during this research. Their feedback as well as active contributions throughout the design and development phase was a critical factor for the MAZI toolkit's success" (Niavis et al 2018, p. 58). There is still a long way toward truly understanding the imminence and complexity of interdisciplinary research, rather than using the input from social scientists as a 'laundry list' (refer

to, e.g., Dourish and Bell 2011). No doubt this is a long process that requires sustained effort in turning permissive the disciplinary frames (see Part I of the first version of this deliverable: D3.11) to enable shared understandings across disciplines and an effective co-production of a shared repertoire.

More importantly, this situation at the very beginning of the project created a first understanding among partners of the critical need to create communication tools and shared methods for cooperation across disciplines. Also it highlighted how important is to take seriously the development of the MAZI interdisciplinary framework, to enable the inclusion of differentiated contributions, toward a more representative and multifaceted toolkit.

The second example has been already presented in the previous versions of this deliverable (D3.11 and D3.12), and mentioned in those on the interdisciplinary framework (D3.6 and D3.7). So an explanatory citation reads, “A critical moment during the pilot workshop in Berlin appears in many answers to the second self-reflection exercise and regards the ‘consent form’ request from the activists participating at MAZI event. It stimulated various reflections on the role of team members of a EU project and their role in the actions of local communities. OU brought up the issue of consent forms and here is the explanation: “In Berlin, there was debate about what data would be gathered, and the OU as Task leaders for pilot evaluation suggested that if data was to be collected that would be analysed and promoted, consent should be gained from participants. We wanted to show solidarity with the hosting organisations by offering some active input, and we drew on our disciplinary background. Some confusion occurred about the extent to which consent was required, by whom, and how it should be attained, and it revealed the importance of the provision of time to enable a participatory approach to the resolution of interdisciplinary issues and shared actions.” (see D3.6 Appendix IV). […] Invoking again the “informed consent” exposing moment at the Berlin workshop, NH noted the alarming feeling of “research meeting action with "requests" and more "taking" than "giving", in contrast to other project experiences when “activism appeared more like a "privilege" rather than a "sacrifice", having the impression “that activists enjoy a freedom that is very precious and which most of them do not easily negotiate.” At the same time INURA noted that when research and action come together due to the nature of the topic of interest, separating them might be advisable sometimes, “by stepping back in times to the one or the other of them” (D3.6 Appendix IV)” (D3.12 pp. 9-10).

These exchanges, which started in Berlin in July 2016, and then have evolved during further discussions and through answering the self-reflection exercises, have shaped a relational space where the MAZI community of practice was able to act toward the project goals. As it is already known form related literature (e.g., Petrie 1976; Broudy 1970), learning about each other's cognitive and perceptual apparatus is a necessary condition for pursuing interdisciplinary research. For the MAZI partners, that certainly reinforced the idea that such research and action projects require careful and time intensive consideration, as well as allowing the participatory and interdisciplinary research processes to unfold over time.

4. Sustainability and knowledge transfer

Just like the transdisciplinary work in the MAZI project, the answers to this sort of questions are complex, and require nuanced, differentiated consideration. Nevertheless, their structure is comprised in this document. The relational spaces that have been commonly shaped in the process of co-designing the MAZI toolkit could extend beyond the project timeframe, as long as the domain, practice and community will continue to keep being active.

The domain of DIY networking technology is gaining more and more interest for various reasons, and the MAZI toolkit provides already an easy, user-friendly, way for individuals and community groups to set-up and configure a local network. But a lot is still to be achieved in terms of specialized applications, and community engagement methodologies and practices. The MAZI topic will be surely further developed through work in the initiated projects during MAZI, and through working groups and new initiatives (like CoHab or INURA coop initiative). By and large, dissemination will continue the domain active. The fact that there are numerous external collaborators in the MAZI github repository, and more and more people are asking for information and invite MAZI partners to public presentations is a clear evidence that the extended community of practice of MAZI is growing.

Then it is likely that from MAZI extended community of practice other interpretations may take shape like by environmental activists, urban activists, teachers, and more (refer also to Section 4.2 on Appropriation). The work in pilots might take different directions, but every team has consolidated a certain structure for continuity, and in all four cases local pilot's communities have expanded already the scope of their cooperation.

The MAZI shared practice is documented and structured as generic as possible for others to adopt the tools and methods and adapt them to their needs and values. As long as the MAZI demo server will be in function, the interactions between the partners could take place online also after the end of the project. Face-to-face meetings will be less likely to happen frequently, yet related workshops and conferences could gather those partners who will keep an interest in the domain of DIY networking.

As already mentioned, in Zurich a dedicated hybrid space (L200 online at http://langstrasse200.ch) has been already shaped where the experiments with the MAZI toolkit will continue in the context of an urban living lab, toward advancing the DIY networking technology. Teaching the MAZI is another common activity that could extend the cooperation between partners, therefore, the next sections elaborate on the topic of learning and knowledge transfer.

4.1 Uses of learning

Researching various manners of making use of what one learns is very valuable for understanding how the project concepts and practices may have been learned during MAZI, and thus how they could be further employed. So Table 2 presents four different uses of learning, according to the categorization of Broudy and colleagues (1964).

Associative and replicative uses of learning are helpful in interdisciplinary research, to create common spaces from where the team could begin to cooperate. The applicative, however, and mostly the interpretive uses of learning are providing that necessary shift toward shaping relational spaces where transdisciplinary cooperation may occur. Needless to say, at the center of innovative thinking lies the critical interpretive use of knowledge.

Table 2. Uses of learning in MAZI

Types of uses	Explanatory notes	Examples of MAZI concepts
Associative	Learning provides a context of associations (aesthetic learning in the appreciation of art)	Understanding the 'MAZI toolkit' is based, by and large, on using learning associatively
Replicative	Replicating the learning in the very form it has been learned, without providing a	Using externally, peculiar MAZI formulations like 'a MAZI Zone is an instantiation of the toolkit', outside of a theoretically explained processual

	context or being knowledgeable of its theoretical sources	understanding (in this case the term was generated by Lefebvre's theory of moments; refer to Lefebvre 2002, 2004 etc).
Applicative	Doing something in light of the learning, which requires expertise, regarding how and when to apply the theory that is very well known	Many deployments of 'MAZI Zones'
Interpretive	Learning gives new perspectives in interpreting the situations of use	MAZI partners working within the 'hybrid condition of space' and other situations particular to the local pilot projects

4.2 Appropriation of the project concepts

In light of the categories presented in Table 2, the appropriation of project concepts may be (self-)evaluated, in order to further advance the activities initiated in MAZI beyond the project timeline. Certainly this may be seen as a way to measure the project's sustainability.

To present it simply, appropriation is the process of taking possession of, or assigning purpose to properties or ideas. Based on the acceptance that knowledge is socially constructed, the process of appropriation of knowledge means constructing knowledge from social and cultural sources --in our case the repertoire of the MAZI community of practice-- and integrating it into pre-existing personal, disciplinary, institutional, and cultural schemas. However, because any "technology introduces a new form into a pre-existing space" (Lefebvre 1991, p. 165), it is important to make the distinction between domination (what the technology might impose) and appropriation.

If the disciplinary frames and territoriality (refer to D3.11) were crossed at certain moments in the co-production of knowledge, and partners exposed their views and methodologies to the perspective of other disciplines, following a spiral evolution of this dialectical process there may be an enriched return to the disciplinary base. At the core of dialectical thinking, there is a German concept that is worth to present it in this context namely the transcendence or sublation of contradiction (in the German language: das Aufheben des Widerspruchs). On that Schmid (2008, p.30) explains the concept by citing Lefebvre's work (1968 and 2000):

> *Aufheben signifies, on the one hand, negation and overcoming; on the other hand, preservation and placing on a higher level. This ambiguity is completely lost in most translations: for example, in the French (dépasser) or English ("transcend" or "sublate").*
>
> *On the concept of Aufheben, Lefebvre writes: "It is obvious that this concept does not have that simplicity, that clarity and refinement which Cartesian thinking leads one to look for in concepts. What do we find at the origin of this essential concept? A word play, an untranslatable pun, nothing formal and perhaps also nothing that could be formalized in a perfectly coherent discourse"* (2000, p.40).
>
> […] *As opposed to bivalent or formal logic, in dialectics no construction of unequivocal relationships and rules of logical association of the truth and falsehood of propositions is possible. Where formal logic says: "No proposition can simultaneously both be true and false," the dialectician Lefebvre maintains: "If we consider the content, if there is a content, an isolated proposition is neither true nor false; every isolated proposition must be transcended; every proposition with a real content is both true and false, true if it is transcended, false if it is asserted as absolute"* (1968, p.42). *This quotation is the key to Lefebvre's famous rhetorical figure of speech in which he answers a self-addressed question with "yes"and "no."*

Thus once the perceived contradiction with one's frame(s) was sublated, one may consider that appropriation has occurred. Mostly if information was adapted to one's disciplinary schema in a meaningful way, under the condition that knowledge would be further used consciously and responsibly. That is so because, similarly to the

case of appropriation of space (Lefebvre 1991), there is a difference in how the knowledge is to be used, between the use value and the exchange value of conceptual appropriation.

At the end of a successful project, the question of authorship becomes relevant. How the MAZI brand will be managed from now on? Who will have the final decision on issues related to the direction that the MAZI toolkit will take the next years, hopefully with the contribution of external actors, others already in the MAZI extended community of practice, and others not? These are complicated questions whose definite answers depend on various factors, some of them unpredictable. The discussion on these topics in the MAZI plenary was postponed for the final review meeting. Then MAZI partners will have already some distance from the final outcome of the project and will benefit of the feedback of the project reviewers.

4.3 Knowledge transfer

The research paradigm in MAZI aims to generate scientific knowledge that is transferable and applicable to address real-life problems. The project's framing on knowledge transfer has mainly a sustainability background, based on the premise that knowledge is not a finite product, but rather a dynamic multi-view agreed-upon process.

Related interesting questions are 'What is good knowledge?' and "What is knowledge good for?'. Between these two questions Broudy (1964) consistently distinguished, and "relegated the first to specialists in the various disciplines and the second to define his own research program" (Vandenberg 1992, p. 7). Similarly the different MAZI pilots, and also disciplinary or individual commitments, had various perspectives on 'what of the MAZI co-produced knowledge is to be transferred'. An attempt at generalization is presented in Table 3 below.

These four dimensions of knowledge presented in the table do match the categories according to which MAZI partners understand of DIY networking (documented D3.6 Section 2.1), categories that were integrated from partners' answers to the the self-reflection exercise #1. They are

a) a technology-centered perspective;

b) a data/information exchange dimension;

c) the empowering "self"-production point of view;

d) the experimental dimension of technology; and

e) the community organization perspective.

Table 3. Dimensions of MAZI knowledge

Dimensions	Explanatory notes	Examples of goals / research programs
Technological	Toolkit applications, guidelines	Empowering self-production of toolkits and networks, independent communication and exchange of data/information
Representational or spatial	Novel (hybrid) condition of social space	Creating awareness regarding the necessity to design hybrid space for gatherings, discussions and exchange of information; right to the hybrid city;
Awareness, dissemination and networking	Dissemination of ideas elaborated in MAZI	Building awareness, informing, teaching DIY networking and MAZI goals; linking different existing initiatives; developing the MAZI community of practice
Community	Enhancing community ties, supporting educational activities	Enabling participatory practices; addressing locally identified needs, improving communication between strangers,

		intergenerational connections in proximity during ad-hoc installations or temporary events; allowing social innovation,

But how the co-produced agreed-upon 'good' knowledge may be translated into practice? For that we return to the lessons learned from long-term experiences with transfer of planning knowledge, which were used as references throughout MAZI. On the one hand, planning seeks to achieve rational ends, and so professionals employ in the spatial production explicit scientific and technical knowledge that is self- explanatory. Planning theorist John Friedmann's (1987) shows that the links between knowledge and action address mostly 'rational' practice, as it adheres to formal criteria (e.g., economic efficiency), and implies approval based on presumptive universal validity. Yet the Section 3.2 on transdisciplinarity noted how inappropriate is the Cartesian way of thinking for interdisciplinary research on complex systems. On the other hand, with regard to knowledge transfer to groups and communities, "the preparedness of the professional culture is of more urgency than the specific technologies themselves" (Banerjee and Chakravorty 1994, p.77). In the case of MAZI the 'professional culture' refers to the local groups and interested individuals in the offering and possibilities opened up by that DIY networking technology.

Another important aspect is the role of networking and dissemination (refer to WP4 deliverables), for instance, by publishing for different audiences (e.g., SPC's blogs; NetHood's diverse publications from online articles in The Conversation to book chapters in publications by Routledge, Palgrave), as well as through various forms of gatherings that could promote the topic like hands-on workshops, events, exhibitions, presentations, and the like. Nevertheless, the adoption of this experimental technology depends on the local groups' expertize, curiosity and interest in experimental formats that allow for social innovation and can address locally identified needs.

4.4 Unintended uses of the toolkit

In addition to the knowledge integrated into the toolkit design and guidelines, MAZI toolkit is a technological artifact that can be used in different ways, more or less close to the intentions of its creators. To what extent should partners care and/or take precautions regarding such unintended uses of our work? Panayotis Antoniadis had posed this question exactly four years ago, in a blog titled "From personal computers to personal networks: are we ready for the DIY networking era?" <http://blogs.lse.ac.uk/mediapolicyproject/2014/12/12/from-personal-computers-to-personal-networks-are-we-ready-for-the-diy-networking-era>

The ending of that blog entry at the LSE Media Policy Project reads:

> "*Just as in the past some people couldn't imagine the possible uses of a personal computer at home, today there are many who do not see a role for such "personal networks". But I believe that when the current usability barriers are (soon) overcome, they will become part of our everyday lives. Are we ready? Are we ready to tackle the governance of this distributed alternative (and complementary) infrastructure? Are we ready to address the possible illegitimate uses and the reactions by surveillance states and key Internet players, without sacrificing the potential benefits toward a more democratic, pluralistic and convivial society that it can offer?*"

A very interesting case study appeared during the MAZI project, which stimulated a debate between the MAZI partners that captured some important aspects of this difficult question. More specifically, in October 2018, an environmental activist group invited Panayotis Antoniadis to present the MAZI toolkit in light of an intended "WiFi action". The idea was to use a local hotspot to expose people in an airport to messages that would encourage them to fly less, for obvious reasons. They would be attracted to connect to the specific hotspot through the use of a suitable network name, SSID, promising free Internet access, as in most airports.

Although not really necessary for the specific action (only a splash page and a wordpress for further information was needed), the MAZI toolkit was considered as a good choice for setting up the Raspberry Pis that the activists would carry with them in the airport. The reason was that none of the engaged activists had the suitable technical skills for producing a 'custom' version, and so the MAZI toolkit would facilitate significantly the process for them.

The action was eventually successful, and in the promotion video produced afterwards one could see clearly the default MAZI toolkit URL, portal.mazizone.eu, appearing in the smartphone of the activist explaining how the action worked.

Panayotis Antoniadis announced to the MAZI consortium this "success story" raising at the same time two issues. First, how unintended uses of the toolkit could have an effect on the "intended" ones. This specific action is an interesting case because it is a somehow "ethical" deception, aiming to create awareness of the negative consequences of flying on the climate. But there could be also unethical ones. And such unintended uses (ethical or not) could legitimize technical or legal efforts to disable the ability to build one's local network with a freely chosen SSID, for example.

Second, to what extent should the MAZI project use this case as an evidence of its own success? Panayotis Antoniadis' situation is somehow delicate since activist groups are often secretive about their actions and most importantly they might consider the dissemination of this story of MAZI as inappropriate.

The internal discussion that followed revealed clearly the different disciplinary perspectives, ranging from the typical engineering position "*We develop the toolkit, it is not our responsibility the appropriate usage of it*", to a social science perspective of "*We could use the communication of this appropriation as a case to reflect on this problem? … and use it to generate research knowledge and nobody can say we're blind to the dangers. This case is definitely illustrating the fact that we (or anybody else) can't control what their innovations are being used for, especially in times when aspirations similar to ours are being pursued by actors with diametrically opposed political trajectories (at least not more successful: <https://www.wired.co.uk/article/alt-right-internet-is-a-ghost-town-gab-voat-wrongthink>"*, or a more philosophical one: "*there are different positions: deontological (the importance of obeying rules) vs. consequentialism (the importance of considering the consequences and outcomes) and as part of that, utilitarianism (what is best for the majority). I'd welcome this debate.*"

Others focused on a more detailed evaluation of the situation: "*It could be argued that deception is being used, though I can't see that any damage is being done to people who log in to the site*" and raised to what extent our project could be held liable for unintended uses of its main outcome, the MAZI toolkit:

"*Regarding the ethical aspect of the situation, as we freely distribute the code as open source we could argue that it is beyond our control, equally, it could be considered that in some situations we are encouraging uptake by groups we know carry out direct actions. I suspect this is not a novel challenge for funded projects that can have a social impact and a philosophical, as much as legal stance might be worth stating.*"

Regarding concerns about illegitimate uses of DIY networks impacting on legitimate uses, the case of the German Störerhaftung law was mentioned, which made the owner of a wifi network responsible for any illegal activities conducted on the connection <https://qz.com/694618/why-is-it-impossible-to-find-free-wi-fi-in-germany/>. In the Creeknet, there was also a concern from the local environmental education charity about distribution of environmental data in case developers misuse it.

The final resolution of the consortium was to kindly respect Panayotis Antoniadis' delicate position and not "make a lot of noise" out of this case, and that although there is no way to control how one's open source software is used, one could at least promote certain uses against others in the corresponding documentation. The fact that the MAZI guidelines include specific "framings" <https://github.com/mazi-project/guides/wiki/Framings> and "stories" <https://github.com/mazi-project/guides/wiki/Stories> regarding the use of the toolkit is perhaps already the best we could do to this respect.

5. A quick guide to self-reflection methodologies

At the time of writing the MAZI project proposal, it was not very clear how the proposed self-reflection process would impact the collective work carried out in the project. The whole structure of the WP3 on interdisciplinary research was quite novel, thus experimental since it did not follow closely previous work or an existing methodology, but rather was inspired from diverse sources of interdisciplinary research and action projects.

Looking back at how the design of the prs DoW worked in practice, there are a few important lessons learned that will hopefully be useful for future projects of ours or other interdisciplinary groups.

First, it proved extremely helpful to include in the project's description of work a set of overlapping 'overviewing' tasks. Indeed, the interdisciplinary framework, the comparison between pilots, the self-reflection exercises, and the project's dissemination and coordination, are activities that position the leader of the corresponding task to a 'leading' role, requiring a deep understanding of the whole project and the interrelations between the project partners.

In the beginning this sounded like an overkill. During the kick-off meeting the MAZI partners were scared by what all believed was an overwhelming number of overlapping deliverables, looking like it was a mistake to include them in the project proposal. In practice, this overlapping enabled the analysis of the project activities from multiple perspectives, revealing aspects that a single analysis couldn't cover in their entirety. But they also empowered significantly the partners that had to undertake the corresponding task.

It is not a coincidence, as we see it, that all leaders of those tasks are also leading today separate threads toward the project's sustainability addressing different wider communities. NetHood in Zurich with the new space (L200) supported by the wider cooperative housing and other urban and ecological movements in the city, Open University with educational projects in Zambia, UdK with the new research group "Inequality and digital sovereignty" at the German Internet Institut in Berlin, Napier University with the research topic on DIY and approaches to "making" in the CHI (Computer-Human Interaction) community, and the University of Thessaly with the evolution of the toolkit to address the Next Generation Internet challenges.

This initially unintended, but very positive, consequence of MAZI's design hints also to a possible solution to the potential conflicts regarding the evolution of MAZI's branding, and also possible undesirable appropriations of it. More specifically, in line with the creative commons principles, or the GPL software licenses, one should make appropriation not only possible (e.g., by providing open source code) but should actively encourage it, like the Framasoft or Mastodon communities. Then further conceptual appropriation becomes a proof of impact (refer to the section above) and an indication of an actually "welcomed", not dominating, appropriation, which helped the concept to evolve toward different directions and to be "owned" by more actors. At the same time, failure to be appropriated could be considered as a measure of either low quality of outcome (low impact) or intentions for domination, taking advantage of the exchange (instead of use) value of the project concepts etc.

Local networks like those promoted by the MAZI toolkit can survive the threat of appropriation by large corporations only if they include in their core identity the concept of virality and appropriation by design. As a related anecdote, in a big event co-organized by Panayotis Antoniadis at Transmediale 2015, during the preparation of the MAZI proposal, the different "offline networks" at that time were invited to join their forces not toward a single solution or brand but toward an even more diverse set (see Figure 9). See https://transmediale.de/content/offline-networks-unite. Unfortunately the "off.networks" mailing list was discontinued due to technical problems but one can still read the e-mails sent during this period here: http://librelist.com/browser/off.networks/

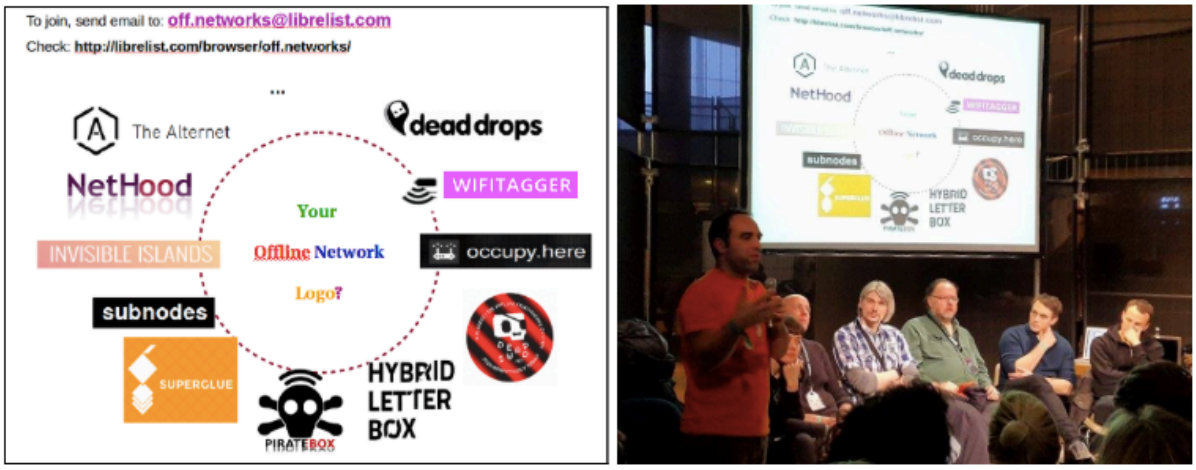

Figure 9. The slide that was projected during the public panel "offline networks unite!" at Transmediale 2015.

Self-reflection includes also some more practical aspects, related to the ways MAZI partners are asked to provide their input, the frequency of these feedback sessions, and the treatment of their outcome. In MAZI we followed a few different strategies all documented in detail in the deliverables of WP3, trying to find a balance between the varying rhythms of the project pilots, according to their particularities and the strict deadlines for the reporting.

Perhaps what was not properly evaluated at the proposal writing time is the level of intimacy and trust that self-reflection processes entail. The fact that self-reflection was designed to be a public process, whose outcome is actually part of the project's outcomes under evaluation, generated a certain level of stress that could have been avoided, in order to allow partners to be more open and confident during the feedback sessions. However, going to the other extreme might be also problematic, because a fully private space for self-reflection might decrease the incentives for partners to participate in time-consuming exercises, whose value is not always obvious beforehand.

Despite its inherent shortcomings in terms of freedom of expression and time constraints, beyond any doubt MAZI's self-reflection exercises have generated information and knowledge about the different partners' perspectives and the boundary object, the MAZI toolkit, would have stayed hidden otherwise. And this hidden information would have caused unnecessary misunderstandings that would have obstructed the collective design process. It has created also a very useful data repository for future research and analysis in comparison with other similar future projects.

Based on the MAZI experience, self-reflection should become an inherent part of the research design of interdisciplinary and transdisciplinary projects, subject to continuous experimentation regarding methodologies and frameworks, toward a more balanced relationship between engineering and social sciences in shaping the future technologies that will inevitably shape the future of our planet.

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MAZI Deliverables:

D3.2: DIY networking as a boundary object in interdisciplinary research (V1)

D3.3: DIY networking as a boundary object in interdisciplinary research (V2)

D3.4: DIY networking as a boundary object in interdisciplinary research (V2)

D3.5: An interdisciplinary framework for comparisons and cross-fertilisation strategies on MAZI pilots (V1)

D3.6: An interdisciplinary framework for comparisons and cross-fertilisation strategies on MAZI pilots (V2)

D3.7: An interdisciplinary framework for comparisons and cross-fertilisation strategies on MAZI pilots (V3)

D3.10: Comparative evaluation of the MAZI pilots (V3)

D3.11: MAZI as an experiment in interdisciplinarity: the outcome of a self-reflection exercise (V1)

D3.12: MAZI as an experiment in interdisciplinarity: the outcome of a self-reflection exercise (V2)

D4.5: E-book: A MAZI guide for community champions.

Appendix I: Input on the project process

At the end of MAZI, an optional survey has been sent to the group, to answer a final self-reflection exercise on activity in the entire MAZI project (2016-2018) and to document impressions, resolutions etc. The questions referred to particular points of view on the process; challenges faced, compromises to be made; and new perspectives that opened up while collaborating on MAZI toolkit. Below is the answer of Mark Gaved (OU).

Particular points of view on the process

Ambitions of the different MAZI consortiums partners varied, and we had to negotiate common ground. While the EU project Description of Work might initially look to be highly detailed and all-encompassing, it became clear that many interpretations were possible, and this created opportunities for negotiation, as well as requiring clarity about the different partners' ambitions for the 'MAZI toolkit'. This itself was a term that was contested: sometimes referring to the software and hardware components, while increasingly referring to the wider outcomes of guidelines, methods and practices as well as constituent networking tools.

For some partners, the focus was on exploring the MAZI toolkit as a catalysing object, emphasising the discursive power it offered to trigger debate in communities on topics such as the ownership and autonomy of digital and networked practices. For other partners, the focus was on developing a set of software tools that could be practically deployed during the lifetime of the project to resolve community challenges and result in significant changes. These different foci led to a range of approaches and preferences around which work efforts should be given priority.

Differing approaches to community engagement across the project drew upon different practitioner and research methods and hence there were a range of expectations about how often and for how long we would be in direct engagement with neighbourhood groups. Participatory design can be interpreted as having a range of types of interaction, from short time frame workshops through to ongoing periodic collaboration over a long period of time. These had to be managed in terms of where the emphasis of work would be.

This meant that an important process was seeking as many and varied ways of meeting and exchanging ideas, perspectives, and methods to gain a better understanding of each other's approaches and to ensure mutual benefit when carrying out project activities, recognising that different approaches were more or less applicable in different locations.

Visits to each pilot site and experiencing local contexts were critically important and shared collaborations around concrete actions (such as multi-partner input into different pilots, or running engagement workshops at DataFest and the Edinburgh Symposium) resulted in valuable cross-fertilisation. Communication between meetings was essential as a result and heavy use was made of email. For the Creeknet team, the github list was an essential channel for feedback to the technical partners. For the OU, it was valuable hearing about other pilots' progress, and we benefited from wherever there was active engagement with other pilots, for example SPC's visits to the UM/Napier field sites. SPC in particular were effective at regular updates through blog posts, this is a mechanism the OU team valued and in future will seek to emulate. Formal reporting written for public audiences, achieved through deliverable writing and journal and conference papers enabled partners to capture snapshots of each other's perspectives and methods. Equally valuable were private channels of communication (conversations at cross fertilisation events, phone chats, emails) that allowed informal reflections, negotiations, consensus building and thoughts-in-progress.

Challenges faced, compromises to be made

Finding common ground to enable the project consortium as a whole to move forwards while making room for contending priorities was one of the greatest challenges: in some cases there wasn't necessarily a 'right way' or a 'wrong way' that could be resolved through debate, but rather than there would be multiple 'right ways' in different contexts that might bring contending pressures to a project. For example, different pilots might prioritise different software development needs and a process had to be agreed to enable the technical team with its finite resources to decide which tasks to prioritise, even if this hindered progress in one pilot to move forward another pilot.

A key challenge was the tension between practice and research and these terms themselves meant different things to different partners and had to be negotiated throughout and across the project. Approaches and

language taken for granted by one participant might be alien to another and the process of explaining and negotiating had to be undertaken through the project. Even within pilot dyads, negotiations had to be carried out to enable a common front when engaging with neighbourhood groups. From their perspective we were 'the MAZI project' but agreeing methods and terms of engagement between consortium members was often a lengthy process that was not always complete at the point of working in community settings, and in many cases had to be renegotiated over time and in the light of experiences and lessons learned. In Creeknet, for example, SPC and OU came from very different backgrounds in approaches to gaining consent for participation and recording activities in community research, and a suitable approach had to be agreed upon.

A key challenge with working on such a community based technology focussed project is managing project (closed timeframe) vs. initiative (open ended timeframe) processes and expectations. It is clear that MAZI has a limited funded timeframe, yet working in neighbourhood settings with the ambition of supporting the resolution of local challenges brings the commitment of ensuring community groups are supported to continue their actions beyond the end of the MAZI funded period. Strategies had to be developed to manage expectations.

New perspectives that opened up

I've benefited from being exposed to new methodological approaches to participatory research; understanding different contexts and domains' approaches to research, and community based practice. A range of activities at the beginning of the project presented opportunities for exchanging practice, conversation, and observation, and appeared unrelated, but as the project continued trajectories emerged that led to truly collaborative ventures that were trialled, repeated and improved in the final year. The bringing together of a wide range of expertise has been challenging but enlightening.

Ethics as a topic has proven interesting territory over the project: managing how we engage, involve and record the actions of participants, the co-design process, and how agreements are reached between researchers and practitioners. It has been very valuable to hear the different perspectives of all consortium partners, and involved community groups, and reflecting on how we can ensure all voices are equitably heard.

I've really benefited from the range of expertise around considering place – this is central to MAZI as a hyperlocal tool (and set of methods) and academic as well as practitioner views have given me a great deal to think about. Particularly valuable in this aspect were the visits to other partner and pilot locations, to understand contextual realities on the ground, and I think I as well as others benefitted from both observing and participating in local situations. These brought reported deliverables and presentations to life in rich detail.

I've long thought about the tension between 'project' (closed timeframe) vs. 'initiative' (open ended commitment) approaches to community based research (see Day and Cupidi 2004) and the concept of 'infrastructure time' has helped analyse and clarify this challenge (see Karasti et al., 2010; Star and Ruhleder, 1996).

Appendix II: MAZI Self-reflective exercises

MAZI Self reflective exercise #1 (May 2016)

Part I: Shared vocabulary - DIY networking

1. From your knowledge and experience, what do you understand by DIY networking?

2. Do you imagine real-life situations in which DIY networking would play the role of a catalyst, and others in which it would not serve such purpose?

3. What are the characteristics, capabilities, and / or limitations of DIY networking?

4. What is from your perspective a strong potential impact of DIY networking? (Please elaborate)

a) strengthening the community ties

b) improving communication between strangers in proximity

c) facilitate individual expression in hybrid space

d) providing the alternative to commercial Internet providers

e) building related skills and knowledge in localities

f) other?

General comments

5. Have you participated in an event around the topic of DIY networking? If yes:

- What details and conversations do you remember?
- Did DIY networking play the role of a catalyst / "boundary object" and in what way?
- What was specific about the context in which it was implemented?
- Which misunderstandings and/or revelations took place during interactions between people with different backgrounds?
- How did it impact the local community?
- Was there implied any innovative solution?

General comments

6. In a diverse group of people an interesting discussion topic would be on (and why?):

a) applications

b) technical characteristics

c) scenarios for implementation

d) political dimensions

e) social implications

General comments

7. What aspects of this topic do you master?

8. What related knowledge would you like to deepen through interdisciplinary conversations and experiments?

Part II: Initial (speculative) scenarios

I. Project Management Updates

A. General Context of the pilot - political, social context

B. Activities held during reporting period

>> Have benchmarks/activities been met/done?

C. Have any changes been made to the project plan?

>> What are the biggest challenges and how are you planning on resolving them?

II. High-level knowledge relevant for toolkit conceptualization

Building on existing resources

>> To what extent is your pilot applying FLOSS software and open hardware?

>> Which software/hardware components are you applying?

>> What kind of adjustments are necessary or possible in order to adjust existing solutions to MAZI purposes?

>> Which components or principles seem valuable for inclusion into the toolkit at this point?

User Experience

>> How is the current state of your pilots' MAZI zone perceived by users in regards to comprehensibility?

>> What are learnings and experiences to implement into the design of the toolkit as being used by non-experts?

>> What are current ideas/options in regards to framings, wording, visualization, physical representation?

>> How are you proceeding with user data? How transparent is the collection of data?

>> How could your current considerations for your pilot be translated into templates to be applied in the toolkit?

III. Community

A. Community Outreach general situation

>> How do you involve local actors and communities in the processes of your pilot?

>> How do you involve external researchers and the wider consortium into the pilot?

B. Community Needs

>> What community needs are being identified / have been filtered out to work with MAZI?

>> How were they determined as being grounded in real life/specific community settings?

>> Which community specific constraints are you experiencing in your pilot?

C. Expectation Management/Goal Setting: How are expectations towards the pilot developing?

>> What are expectations towards MAZI by the local community?

>> How do they relate to your team's expectations?

>> How do you set and discuss goals with the local communities?

>> What are the top-3 goals for your pilot?

D. Ownership

>> How do you deal with owner-/authorship in your pilot? Who is and who feels responsible?

>> What are issues in regards to trust and sense of ownership with local communities?

IV. MAZI/Interdisciplinarity

A. Communication between different stakeholders within the consortium

>> What are emerging fields of shared interest?

>> Which difficulties occur in cross-consortium communication?

>> How did inputs from consortium partners from other fields inspire/alter your pilot work?

>> What language/disciplinary barriers are you encountering and how are they being dealt with?

B. Self-Reflection

>> How does your own disciplinary background inform/advance/hinder your work both within your pilot as well as in the consortium?

C. Interdisciplinarity

>> How does the interdisciplinarity of MAZI relate to dissemination in your field?

>> To which degree do you have to translate and how do you manage that?

V. Dissemination & Outreach

>> How do you carry the proceedings of MAZI into and beyond your own discipline?

>> What are current topical possibilities for joint publications/writing projects?

VI. Individual criteria for success

>> What criteria of success is not yet listed?

MAZI Self reflective exercise #2 (January 2017)

Part I. Shared vocabulary

1. From your knowledge and experience, what do you understand by:

P1: place?

P2: participation?

P3: process?

P4: personal point of view / perspective in an interdisciplinary discussion?

P5: power relations in participatory processes / interdisciplinary projects?

2. What may be the role of DIY networking in each of these domains, and how could it either enhance or hinder them?

3. General comment: Please comment on the D3.6. Section 2 "Key concepts and individual perspectives".

Is your own view represented in this summary of the previous questionnaire?

And did it evolve since then and in what way?

Part II. MAZI Toolkit

4a. How do you imagine currently the MAZI toolkit?

This is the documentation of the Self-reflection Exercise 1 (D3.6, Section 7.2), in which all researcher and pilot (activist) teams reflect (and negotiate between the couples) on a speculative description of the MAZI toolkit as a 'boundary object' and reflect on the process of convergence to this commonly agreed outcome.

Some possible elements that could be part of the description include the following:

a) Introduction and overview

b) Structure of the toolkit

c) Guidelines and scenarios

d) Customization options for specific applications

e) Physical representations

f) Additional physical/hybrid elements

g) Power supply

h) Warnings

i) other?

Note that the description of the toolkit does not need to be exhaustive, but include mainly a variety of possible elements, from the very generic (like the welcome message) to the very detailed (like a small warning in the guidelines for the deployment of the toolkit in a specific scenario), from text to images or even description of physical objects (like method-kit cards), from expert users to novice etc. Also, the pilot couples could choose to follow an incremental approach and do first their individual descriptions of the toolkit before attempting to converge to a single description.

4b. Recording of the negotiation and the common outcome (when applicable).

MAZI Self reflective exercise #3 (December 2017)

Concept formation within the MAZI interdisciplinary framework relies on shared understandings shaped during practice in local pilot projects, on experiences at MAZI cross-fertilization events and on self-reflective exercises that document the understandings built from personal knowledge and experience, and exchanges within the project.

Part 1. Constructing a shared vocabulary

1.1 From your knowledge and experience, including the workshop with Deptford residents, please document your understanding of the following community aspirations:

- conviviality
- social cohesion
- knowledge sharing
- sustainable lifestyle

1.2 Please list and define some notions that you consider necessary to be included in the MAZI glossary:

1.3 FLOSS means free, libre, open source software

What means for you and why is it important or not?

- open / openness; - free; - libre

Part 2. Recording the pilot scenario

2.1 Please describe in one paragraph the MAZI pilot in which you are engaged.

Note that the purpose of this exercise is to compare each pilot's evolution over time, and not to 'evaluate' one MAZI pilot in comparison with the other three.

2.2 Is being "local'' important for the digital networking technology chosen for the pilot?

2.3 Please mention what elements of the toolkit are suitable for your pilot, and what else would you like to include. How do you consider the tension of "pushing versus pulling" the use of the MAZI toolkit?

2.4 Please describe different options of the use of technology in your pilot using as the main language the current elements available in the toolkit (and guidelines). Highlight concepts and/or functionality that you need and it is currently missing.

Part 3. Documenting the cross-fertilization events

Please reflect on the interactions in past MAZI cross-fertilization events and identify important moments and lessons learned regarding:

a) Your understanding of other partners

b) Your role in the project

c) The relationship between research and action

d) The design of your own pilot

e) Ideas for the MAZI toolkit in general

In particular regarding the recent cross-fertilization event in Deptford, June 2017 (and the same for selected previous events):

1. What was the highlight (or highlights), interesting moments, of the London XF event?

1a. During your interactions with the locals?

1b. During your interactions with MAZI partners?

2. What could be done differently to improve the next pilot XF event?

MAZI Self reflective exercise #4 (July 2018)

Roles played by each partner in the project

1) The role(s) that were expected from your personal perspective

- what did you think you would be doing

(2) Role(s) that had to be played during the project

- what roles did you actually have to play

(3) Adjustments that had to be made

- how did I have to change the way I was working, what new things did I have to do?

MAZI Self reflective exercise #5 (October 2018)

Please reflect on your activity in the MAZI project (2016-2018) and document your impressions, resolutions etc while collaborating on MAZI toolkit recording and analyzing:

1. particular points of view on the process
2. challenges faced, compromises to be made
3. new perspectives that opened up