



Changing the world for whom? Some thoughts about trans*dis- ciplinarity, feminist epistemolo- gies and Participatory Design

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ABSTRACT: This is a two part paper about aspirations and obstacles for transdisciplinary research. The first part is a theoretical reflection on what it means to take transdisciplinarity serious and how it might help to change our worlds through research in a responsible and socially inclusive manner. With the first part, I suggest thinking about how we construct our publics, alliances and relations in our research practices. The second part of the paper adds reflections on a practical exercise of transdisciplinary intra-action among the Changing Worlds 2014 Conference participants. The hope of the overall paper is to inspire more tools, moments and interventions of transdisciplinary intra-action in the social sciences and beyond.

KEYWORDS: transdisciplinarity, Participatory Design, publics, intra-action, diffraction

Part I – Changing Worlds with Transdisciplinarity?

“Why is life short?” Connie asked. “Your old people are healthy, sure, they live with everybody else. But they age. And they die, not much later than we do. Why not live longer?”

“We decided not to try.”

“Who’s ‘we?’”



“The councils. The town meetings. That’s how general questions of direction of science get decided.”

“You mean by people like me? How could I decide if they should build an atom bomb or something?”

A conversation between Connie (from past/present) and Luciente (from the/a future), in: *Marge Piercy: Woman on the Edge of Time* (1976, 271–272)

I wanted to take up some utopian vision for this article, although I am rather ambivalent about utopias. Therefore I chose Marge Piercy’s *Woman on the Edge of Time* as a great example on how utopian visions unfold their full potential when they are entwined with a dystopian counterpart. In the above conversation, set in an utopian future, science and science policy are embedded in people’s every day practices. This utopian world still holds environmental and social issues to be solved, but it seems the people have found better ways to deal with these issues, than those which seem to be available to us today. But yet, this future is only one specific future, always in danger of being replaced by its dystopian counterpart in which technoscientific development and agency is amassed in the hands of few, while their worst consequences are spread across those who are the most and have the least. Both visions are extrapolations of where we could go from here and now ... well, these visions have been written 40 years ago.

At about the same time a discourse on transdisciplinarity in science arose and since then was intensified. The central issue was, that if contemporary science cannot solve certain social and environmental problems, a different sort of science is needed. Scientists should work across (here the *trans* comes in) different disciplines. In one version of *transdisciplinarity* (because a lot of different understandings of this term ¹) this also encompasses not only working with scientists from other disciplines, but with non-scientists and the general public². Throughout all of the reconfigurations of what *transdisciplinarity* could mean and all its different approaches, a common promise of transdisciplinarity is, to solve issues that cannot be solved by traditional disciplinary science, and to change science itself towards more responsible research approaches. Certainly all the different actors within this discourse have some sort of vision where to go, and what this place and time looks like.

But I will come back to these approaches later. First, since this special issue is about *changing worlds*, I want to say something about what I think this issue and

last year's Changing Worlds Conference is about. The utopic introduction above serves to provide some background about my own vision of a better science – that is, a science which is self-reflective and inclusive of those perspectives and positions that are not necessarily its main protagonists, but nevertheless affected by its worldly workings. Of course we can always try to hide our aspirations and ideologies, but that does not save us from being partial, and it does not make science better or more aware of all the contingencies we have to face³.

What is all this *Changing Worlds* stuff about?

Well, actually, everyone is changing worlds – whether we are cooking a nice meal for friends or members of our living collectives or we do science. In one way or another we are interacting with other people and the material artefacts around us. Or, rather we should say, we are intra-acting, for we all are constitutive parts of those systems and apparatuses through which we interpret and analyse the world⁴. So, we, as scientists, are changing worlds too, no matter if we accept it or make it explicit. At the Changing Worlds Conference 2014 we have been rather explicit about it – or, have we?

We were talking and listening to each other, differentiating us by our approaches and scientific disciplines, critiquing each other for naïve perspectives, applauding each other for seeing what others don't see. We were able to do so because, indeed, some people seemed to listen to us – or, because they now read our papers.

So, yes, not only at the conference, but we authors and readers alike, are changing worlds. Critical and self-reflective as we are, we also know we have to think about why and what we do and what the consequences of those actions might be. Or, do we? At least we are demanding this from the material-discursive powerful natural sciences and technologies. Of course we are not the only ones. Mainstream organisations and big governance bodies, like the European Commission, are calling for *Responsible Research and Innovation*. For example, the IPPA project⁵ provides a “Public Participation Toolbox”⁶, which assembles diverse tools and methods of public engagement and citizen participation in technosciences.

Now, take a step back – or rather some paragraphs – and think about the utopic visions I mentioned. Are we already in this bright and shiny future of responsible, self-reflective and inclusive science? Or are we already on the path towards

it? Maybe the dystopic countervision, that is always looming around the corner, brings us to ask ourselves: but do *they* do it for real? What forms of participation are *they* really using and how transdisciplinary is this in practice? Questions, critical analysts of science and technology have to pose – but what is *our* role in all of that?

As you may have noticed I am fond of the term technoscience⁷. Why? Because it refers to the entangled assemblages of science and technology, which are nowadays a prerequisite to do natural sciences, engineering and medical sciences. But, *we* too – now referring to those of us who situate themselves in the social sciences and humanities – are part of the technosciences, because *we* too, rely heavily on technologies to do our work. So, what are *our* stakes in *their* research? When *we* are demanding responsible research from *them* – that is, research that includes all the perspectives of those who have to bear the consequences – *we* might want to participate in these technoscientific developments as well. And at the same time *we* will have to think about how and why publics have to participate in *our* own research – or as a first step, think about why *they* usually do not⁸.

... and who's those publics?

But what do I mean when I talk about publics? In my understanding, publics are diverse groups of people who are more or less affected by what we do. This reflects a more nuanced understanding of common versions of “*the public*” and the public sphere (cf. Dewey 1927/2010; Habermas 1964/1974). For that I rely on critiques and conceptual refinements by Nancy Fraser (1990) and Chantal Mouffe (1999).

Fraser makes it clear that there is no egalitarian public sphere where we could freely deliberate. Rather, for a post-bourgeois public sphere, we need spaces for all those *subaltern counterpublics* who first have to find their own voices and strategies to successfully participate in general public deliberation. “Successful” means that they are not just co-opted, to legitimize hegemonic practices, but that their own perspectives are actually integrated and lead to a transformation of social organisations and hegemonic practices. So it means that they really are able to change worlds towards their own needs. Chantal Mouffe, with her⁹ framework of agonistic pluralism, points toward the need for enabling dissent and contestation rather than to focus on generating consensus. Because, in a society of in-

equalities, to require consent at the end of any deliberation, privileges the powerful over the powerless, the literates over the illiterates, technoscientists over their publics.

Now that we have defined the *technosciences* and the *publics*, or *us* and *them*, or *them* and *us* (depending on our different situated positions in different contexts), how do we cope with all the differences, technoscientific-public entanglements and the social, ethical and ecological consequences of technoscience?

From the field of Science and Technology Studies, we often hear a call for participatory engagements of publics in technoscience, in order to make technoscience more democratic, or to enable responsible and accountable research. We also find a lot of critique on already established forms of public engagement within the technosciences, because they too often resemble mere forms of tokenism or pseudo-participation¹⁰. In other contexts, we hear calls for more transdisciplinarity, as a way to address these issues. But all of that is nothing new and not some innovation of (post-)modern 21st century science.

Transdisciplinarity, public participation in technoscience and Participatory Design

Already in the 1970s a discourse arose on transdisciplinarity as a solution to the increasing complexity of our world(s) and the problems therein. More inclusive science-society-relationships and interdisciplinary approaches to problem analysis and solving were called for, in order to tackle issues like climate change, sustainability, risk and emerging technologies.

At about the same time in Scandinavia, new approaches to technoscientific practices were developed within computer science. For the *Scandinavian approach to systems design*, or *cooperative design*, the participation of publics in concrete technoscientific practices is a key element in the design and development of technoscientific artefacts. This means, that publics are not just queried once or twice for their opinion, to then go on with the usual technoscientific practice, but that they are part of (at least some of) the daily processes of technoscientists, and they co-develop the artefacts that are being produced. Those artefacts often are material prototypes and tools or software, used in the working and living contexts of those affected – but these artefacts sometimes are also abstract concepts

or methods, demonstrating that public engagement could be applied to a broad range of technoscientific activities.

This approach inspired many other contexts within and around computer science to adopt such inclusive practices of design, research and development. As an umbrella term of the diverse approaches to public participation in computer science, “*Participatory Design*” emerged and since 1990, every second year, there is a Participatory Design Conference. At about the same time the discourse on transdisciplinarity was intensified and (in 1992) the journal *Public Understanding of Science* was founded – to mention just one example of the so-called participatory turn in Science and Technology Studies.

But until now, it seems, the example of *Participatory Design* was not noticed in many of those discourses on transdisciplinarity and public engagement in technosciences. I suppose this is due to a preoccupation with policy debates and public engagement in science policy discourses (cf. Klaura 2014). But while in these cases the inclusion of publics only pertains to the question of which technoscientific endeavours should be allowed and which prohibited, the inclusion of publics in Participatory Design serves concrete developments and reconfigurations throughout the research process. Their tools, notions and concepts are not so different from *ours*. Participatory Design even takes close looks towards Cultural Anthropology, Science and Technology Studies and Feminist Technoscience studies and theory. It is also inspired by Participatory Action Research approaches (see e.g. Arzmann, Wintersteller and Wöhrer, this issue). Participatory Design artefacts are used in a way that enables the participating publics to change these artefacts themselves or other artefacts under development. At the Changing Worlds Conference 2014, we even had a skype-in presentation by Tom Bieling, who showed us just one example of such a participatory design and development research, who told us how the technoscientific artefacts (in this case the LormHand¹¹) only emerged after and as a result of the participatory process (see e.g. Bieling, Martins and Joost, this issue).¹²

While in classical public engagement in technoscience, the publics are participating in order to change *the worlds* we live in (which usually means to *decide* between different, pre-framed versions of these worlds), in Participatory design they are participating in order to *change* the worlds we live in. The focus is not on choosing between some pre-framed option but on changing concrete processes, to change how science is done. And while Participatory Design researchers learn

from *us*, *we* too, as critical scholars of science and technology and feminist technoscience researchers, might learn some things about changing worlds by engaging with the world(s) of Participatory Design.

Whether or not we call this approach transdisciplinary, it brings me back to this broader notion or vision of how science could be done differently, and how we could change our worlds towards environments that are “friendly to earth-wide projects of finite freedom, adequate material abundance, modest meaning in suffering, and limited happiness.” (Haraway 1991, 187)

Conclusion Part I : What about the trans in trans*disciplinarity¹³?

Regarding this notion, or concept, or framework, or vision of transdisciplinarity, a consensus has nearly been reached that we need it in order to solve our worlds’ problems (cf. Jahn, Bergmann, and Keil 2012, 1). But much too often the *trans* in transdisciplinarity is just an ornament on the corners of research project proposals, there to appeal to funding decision makers’ ethical tastes. But this is not only true for the “others”, those technoscientists out there. *We* too will have to take the trans in transdisciplinarity serious. *We* have to not only analyse and vocalise dissent, but *we* have to actively intervene in each others’ work as well as in our own work to come to new insights.

In a recent publication Katrin Nikoleyiczik proposed a form of *diffractive transdisciplinarity*, to engage in technosciences. Diffraction here means to read and interpret different disciplinary approaches through each other and pay attention to the technoscientific practices and how they matter for the people involved and the artefacts which stem from the whole technoscientific project. Nikoleyiczik shows how this might be possible in the neurosciences, but this might just apply to other technosciences as well. A central question she poses is: “What sense does it make to deal with this field of research in our own scholarship on the one hand and deny trying to influence, interact and intervene on the other hand?” (Nikoleyiczik 2012, 241) She therefore suggests “framing and developing new transdisciplinary alliances.” (ibid). This will “contribute to processes of transformation; however, it also demands a readiness for change, for the dealing with ambiguities, and for agreeing to compromise.” (ibid) It is *us*, too, who will have to be ready for change.

This is something which in diverse feminist theories and practices was/is experienced for several decades. We would do good to take some inspiration from there on what it means to act transdisciplinary. For Catherine R. Stimpson the “multiplicity [of perspectives within feminisms] creates two needs” (Stimpson 2000, 1009):

1. “for a way of thinking about differences and their consequences” (ibid)
2. “to find some commonalities, some shared beliefs and commitments and principles” (1010)

When we think about all those differences, *we* – which means especially *us* in academia – might tend to think from supposedly detached positions. The dangers of essentialising difference loom around every corner we pass in our theoretical wanderings. But we have to think about those differences nonetheless, for we want to engage in changing worlds. For Stimpson, a way of thinking about differences that helps to avoid these pitfalls is to actively *transition* through and across those differences in our own thinking. Whether we notice it or not, in our academic practices we are permanently *translating* and *transporting* diverse concepts, notions and actors. And we are also permanently *transacting* with them. Within diverse feminist approaches to technoscience and theory we even find a *transgendering* of research, a going beyond gender to sensitize towards interdependencies of diverse forms of oppression and marginalisation.

It is this active component of thinking about differences, one’s own transition to other states and positions in our entangled webs of intra-active relations within and across technosciences. In Stimpson’s words “Feminists must be transminded” (1010). This means to be “constantly aware of the many differences among women and men [and I would add: all those other dichotomies] and then able to act among, with, and on these differences.” (ibid)

And to act across those differences, Stimpson proposes “Bread, roses, [and] keyboards [as] rubrics for a unifying vision of the future” (1011). These rubrics are hir guides to a metaphorical image of a feminist (or we could also say: a collective emancipatory) future:

It is first a place of sufficient bread where all of us have enough to eat and where all of us are physically secure. It is next a place of roses where all of us have

a sense of self, the ability to participate in democratic communities, and the capacity to love fully and freely. Finally, it is a place of keyboards where all of us have access to literacy, education, and the technologies that will shape the twenty-first century. (1010–1011)

I want to further propose that, if we want to partially change worlds towards futures of sufficient bread, roses and keyboards, we have to take our *transmindedness* serious and develop trans*disciplinary research settings which allow for alliances beyond single issue politics/research. It is a trans*disciplinarity that has to radically go beyond the common practice of inter- or multidisciplinary research with some forms of exchange with the media and singular participatory moments in which the publics may have a peek on what it is we technoscientists do. But can we wander beyond those disciplinary demarcations?

Irene Dölling and Sabine Hark suggest that we can: “by a continual examination of artificially drawn and contingent [disciplinary] boundaries and that which they exclude.” (Dölling and Hark 2000, 1197)

So not only we natural scientists and technologists have to do so, we feminist technoscientists and critical scholars of science and technology, too, have to ask ourselves how we are maintaining our borders to the diverse (other) technosciences and our publics. We have to move beyond those borders and wander around to find the right places where the bread, roses and keyboards for our promising futures may grow.

And while, in the opening keynote to the Changing Worlds Conference 2014, Els Rommes talked about how the media are focusing too much on adventurous, heroic scientists, who are usually white males, we can further reflect that we too, as critical scholars of science and technology, are often focusing on adventurous and heroic scientists and their practices. So, maybe it is time to focus on “the others”¹⁴, the marginalized actors within technoscience, and on their practices. If we follow those, we will anyway encounter the “heroes” too – those encounters might just look a little different. In highlighting marginalized actors and practices within technoscience, we then would allow our audiences and ourselves to imagine different approaches to technoscience, and it certainly would encourage some of us to try out new approaches and interventions.

It will not be an easy Sunday afternoon stroll to change our technoscientific

pathways and practices. But we should encourage each other to leave the main streams of technoscience and to wander around the messy and beautiful landscapes of intra-action and activism, within our current sciences and around our diverse publics.

In the end it is always about changing worlds.

Part II – Trans*disciplinarity in practice?

Now, you could of course stop reading here. It was a nice ending, vague enough to perhaps inspire more reflections and questions to follow, maybe best while conducting a Sunday afternoon stroll. But of course you could also think that this is all nice and cosy theory talk. What does it mean, what could we really do? Well, this is up to us all to find out. I pointed in some directions where to look for inspirations, but what those directions are in your concrete situation, you will have to define yourself. Reflecting on your practices and how you construct yourself as a researcher/activist/* and your different “others” and publics is a good starting point.

In my concrete case, having finished my MA thesis and with the opportunity to give a talk at the Changing Worlds Conference, I wanted to try and do something differently at the conference and in the process of writing this paper. This second part of the paper is for those interested in a short story of what an ad-hoc method/experiment in our own contexts could do to trans* our practices.

Intra-acting with/in STS

After I was accepted as a speaker to the Changing Worlds Conference 2014, I was soon puzzled on how to present my “talk”, how to perform. Should I just stand there and talk about how the world is changing? What’s the change in that? So, with a little ambition and a small amount of creativity, I came up with a ‘Reflective Collective Positional Mapping’ exercise, which I integrated into parts of my talk and the conference setting.

It really wasn’t a big thing. Actually, I came up with the fancy name only a day before my talk. It was some form of ad-hoc method, to enhance the intra-actions of this conference setting and to visualize our heterogeneous (or not-so-heterogeneous) assemblage of conference participants. The idea was to introduce some

other forms of connectedness than the usual talking-and-critiquing. Maybe it was an attempt to highlight that, despite our differences and commonalities, there are actual opportunities to engage in trans*disciplinary action and to really change our material-discursive surroundings. So what did I/we actually do?

Before the panel started, I put three index cards on each chair in the audience. In the back of the room, with some help of the conference organizers, I put up an empty poster wall and a flip chart containing a diagram. The diagram had two axes, one (pointing left) labelled 'analysing modes of production & technoscience', the other (pointing down) labelled 'producing technoscientific artefacts'. As a third layer, I added a legend with coloured stickers, green for 'activist', red for 'social science & humanities', yellow for 'technology / natural sciences', an empty circle for '...' and a green-red-yellow-mixed circle for 'hybrid'. The diagram was intended to be modified by those intra-acting with it. In image 1 you see the final result. But before this final artefact was co-developed, I presented my talk, on which this paper is based. At the end, I invited the audience to break out a little of our established

conference habits and to participate in this exercise. Everybody was invited to write 0 to 3 cards with topics, issues or obstacles, which hinder them to engage in trans*disciplinary practices. After the panel they should cluster their cards on the empty poster wall and position themselves on the flip chart diagram¹⁵.

At least 20 people participated in this little experiment. I didn't count and it was not supposed to produce any quantitative result. All in all the flip chart and the cluster wall did provide space for additional intra-actions. Actually it is a good example of why I am (thanks to Karen Barad (2007)) talking about intra-action and not interaction. This little instru-

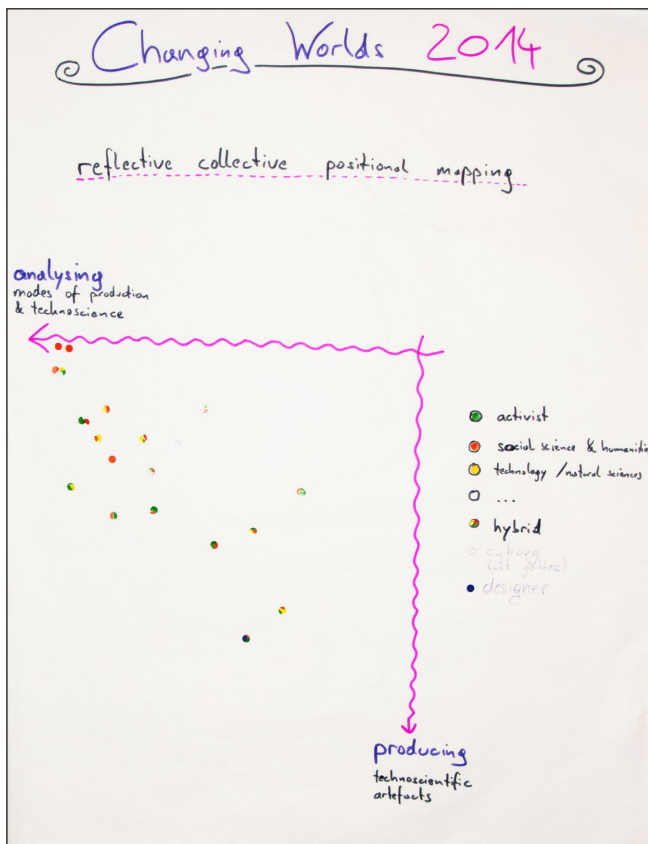


Image 1: Reflective Collective Positional Mapping of our technoscience landscapes. (A heterogeneous assemblage of CW 2014 participants 2014)

ment, the Reflective Collective Positional Mapping exercise, is an apparatus to gain insights into the reality of the Changing Worlds Conference and its connected contexts. At the same time as the instrument was changed by its users and their perspectives, it changed how the users interacted not only with the instrument, but with each other. The reality we tried to observe through this tool was a little bit transformed through its use. And now I am writing about this instrument, the ideas behind it, and I will try to provide some interpretations of what we might produce with it. But while I facilitated the initial development and application of this tool/method, in fact it was a cooperative work of a heterogeneous assemblage of Changing Worlds 2014 participants. Therefore, its first documented results are collected at <https://jackie.diebin.at/2014/cw> under a Creative Commons license, provided by *A heterogeneous assemblage of CW 2014 participants* (2014). Everyone is welcome to reconfigure the tool and its interpretations as long as they share along their results on the same conditions.

But now, what are actually my interpretations of these intra-actions?

Issues on Transdisciplinarity

In image 2 you see the clustering of issues and hindrances towards transdisciplinarity. As the clustering effect was limited due to time and space at the conference, I did a re-clustering of all the cards and transcribed them to digital plain-text¹⁶.

The result of the (re-)clustering shows that there is a clear motivation to act transdisciplinary. Those who would prefer to not engage in transdisciplinary research out of onto-epistemological reasons, seem to have not participated. Only one card, labelled “personal prejudice”, could be interpreted in this way. Yet, it can also be interpreted as a hint towards identity issues and the ability to trans* one’s own position – as highlighted above with reference to Catharine Stimpson (2000).

Of course the invitation to this exercise and its framing did some pre-selection work. But the whole point was not to gain insights into how transdisciplinary ‘we’ are or are not, but what the issues and obstacles are that hinder those of us, who would like to trans* hegemonic academic practices¹⁷.

Most of those stated hindrances refer to structural circumstances and the normative processes of disciplinary science. In a 2008 paper in *Organization*, Susan Meriläinen et al. present a common form of such hegemonic academic practices



Image 2: Ad-hoc clustering of obstacles to transdisciplinarity. (A heterogeneous assemblage of CW 2014 participants 2014)

(2008). Their perspective focuses on publishing issues and this was also highlighted in some of the index cards. Its main point is that it is hard to publish from disciplinary peripheries, and without publishing it is hard to gain acceptance in (a) disciplinary core(s) – taken together, a rather unfortunate position to foster transdisciplinary research. But beyond publishing patterns, there are many other normative, even hegemonic practices in academic institutions, which put transdisciplinary approaches at a disadvantage. Even in those fields which use transdisciplinarity as a key-notion in science policy, the normative use of a framework of transdisciplinarity provides obstacles to actually trans*ing disciplines (cf. Felt et al. 2013). The main problems seem to stem from working in academia itself, which demands a certain commitment, regarding disciplinarity, time and other resources as well as career decisions. This is addressed by the two biggest blocks in the re-clustering of all the index cards (cf. A heterogeneous assemblage of CW 2014 participants 2014).

But as Ulrike Felt et al. highlighted, there are opportunities to manoeuvre our 'epistemic living spaces'. When we search for our individual potentials for manoeuvre, it becomes rather frustrating to focus on the structural conditions, as these are

the most hard to change, especially for young researchers. So it might be more fruitful to focus on other aspects, which are more easy to address and change from an individual (young) researcher's perspective. Two of the cards complained about "lack of networking platforms for students in the very beginning (bachelor program)" and "missing contacts/connections". This we could address by making our approaches (or rather our desires for different approaches) visible and to bring different actors in our institutions together. Another block of cards addressed "language" as a general obstacle. While we speak different disciplinary languages, they still are academic languages. We can rather easily learn from each other, especially if we bring together different actors in our institutions. Much harder will it be to learn all those activist and/or non-academic languages, which we need if we want to engage in transdisciplinary practice¹⁸. Of course, all those things take time, and as long as the structural conditions do not change, engaging in such activities only is an "add-on" to our disciplinary work. Yet, these aspects are pointers to where we can manoeuvre to within our 'epistemic living spaces'.

Most important to highlight seems another card, which was singled out in the re-clustering of the cards and read "incapacity to be trans enough myself". This might be based on normative visions of transdisciplinarity. But while there are several perspectives on transdisciplinarity and how it has to be enacted, there actually is no real option to "be trans enough". One can try to settle in any of the different frameworks, but even those change. Rather to ask ourselves if we are trans enough, we should ask ourselves if we trans enough? It is the verb, the process that seems important here – to permanently trans transdisciplinarity.

Who are we talking to?

And what does all that mean for our social science contexts? Who do we encounter here and which fruitful connections can we gain from these assemblages? While the Changing World Conference was open to diverse approaches and invited activists and artists, it nevertheless situated in a broader social science and humanities context. The RCPM diagram was an experiment to highlight the assemblage of actors within this context.

While the majority of participants in this exercise situated themselves more closely to the "analysing modes of production & technoscience" axis in the dia-

gram, there still were people who were closer to the “producing technoscientific artefacts” axis. But in both cases we find hybrid identities, marked by the colour coded dots. Only three people situated themselves solely in the realm of “social science & humanities”. One marked himself as “cyborg (not goddess)”, supposedly aspiring a hybrid position beyond the given categories. This category was one of the two which have been introduced by the participants themselves. The other one was the category of “designer”, used by one person, who also put some strains of “activist” and “social science & humanities” into his identity. Besides six “activist”/“social science & humanities” hybrids (one of them with half his circle filled with the empty “...” category) we find two “technology/natural sciences”/“social science & humanities” hybrids and one “activist”/“technology”/“natural sciences” hybrid. And finally, there were five people who situated themselves in a triad between “activist”, “social science & humanities” and “technology / natural sciences”.

So, we found a lot of hybrids, or a lot of people who did not want to commit to one of those realms solely. What the diagram shows at this point is, that we are not lost in a realm of material insignificance, withdrawn to mere reflection and critique, which is usually blocked by those materially powerful realms which we try to address. If we start to take more serious the non-disciplinary and non-academic identities of our social science and humanities fellows, we might start to realize that indeed we would have opportunities to shape the concrete making of technologies¹⁹. We only have to start to listen to all the other languages our fellows speak, beyond our common social science vocabularies. And we also might encourage ourselves to wander around in the technoscientific landscapes. Of course the labelling of the two axes put some constraints on how people could position themselves. And for some, it seemed easier than for others to break up the provided notions and to enable shifts towards other identities. But this is a process that can only happen if we do engage with each other on this level.

Conclusion Part II: How to change our worlds?

But where to wander now with these limited, yet opening views of the social technoscience landscape? Can we really change our worlds significantly? There is no easy way, and while the burden to change most of the structural inequalities and

hindrances should lay on the powerful actors within the disciplinary centres of technoscience, we individually have some agency in all of that.

Maybe we should think about how to be unconventional, how to resist the norm. This does not guarantee that we will be unconventional, resisting the norm and creating something substantially new. But it is a good reference point where we can take a rest on our wandering through the technosciences (while wondering how live and manoeuvre with/in them). And it helps us to focus on what people say and not only where they come from (or: how they are situated).

While I wrote this paper, my thoughts constantly jumped between “Nah, it’s all crap” and “Ok, there actually is an argument”. But where does all the doubt come from? Did I use too few references? Did I place too few important names? Cited too few of the important journals? Might people find that I am not humble and modest enough, to just come up with this ‘ad-hoc method’ instead of relating to established methods by renowned people in the field?

All those doubts nearly lead to my throwing away the whole paper and not making any argument at all. But then I thought about how much it would be worth to settle in an institution that encourages me to think about all the ills in the world, while at the same time restricting me to not change my own circumstances and practices. I just do not want to only think about intra-actions with/in technoscience, I want to intra-act! Maybe these thoughts can encourage others to try out unconventional things and methods, to tie them back to their different disciplinary backgrounds and to interweave the diverse contexts in order to change practices and institutions towards more inclusive research and living spaces.

Endnotes

- ¹ For a review of the diverse strands of transdisciplinarity and how transdisciplinarity is understood among different sciences see for example (Thompson Klein 2004) and (Jahn, Bergmann, and Keil 2012).
- ² Of course this “general public” becomes more and more specific throughout a research project. In the end, usually, only a varying numbers of specific publics are engaged, as the concept of public(s) is one that is constructed and shaped through the research process itself (cf. Klaura 2014).
- ³ If you would like to see more of this background vision, take a look at Marge Piercy’s *Woman on the Edge of Time*. Alternatively you can take a look at my master thesis which i finished last year and which is available for download (Klaura 2014). But beware, the former is probably more fun to read.

- ⁴ For details on intra-action and the entanglement of researchers with their material and analytical apparatuses of measuring and observing nature-culture, take a look at Karen Barad's framework of agential realism (Barad 2007).
- ⁵ "Implementing Public Participation Approaches in Radioactive Waste Disposal"
- ⁶ <http://toolbox.ippaproject.eu/index> (last accessed: 2014-10-20)
- ⁷ Depending on fields and perspectives there are different notions of *technoscience*. Often this term is used to refer to natural sciences and technology and their close entanglement. In a more self-reflective notion we can use it to refer to the increasing technological dependencies of most of the sciences – including the social sciences. Or in Judy Wajcman's summary of Donna Haraway's stance on this "*technoscience is a cultural activity that invents Nature, and constructs the nature-culture axis as a classificatory process.*" (Wajcman 2004, 88) For some recent introduction on this notion take a look at the European Journal of Women's Studies 2010 special issue on feminist technoscience studies, especially it's editorial (Åsberg and Lykke 2010), which is publicly available online.
- ⁸ By now you might have realized that my use of *we* and *they*, *us* and *them*, is not coherent and sometimes quickly shifts depending on context. This is, because there is no clear 'us' and 'them' in the matters of our interest here. The importance is to think along different dichotomies, which are established in our thinking as well as in our scientific and activist communities. The important thing, when thinking along those dichotomies, is to stay tuned to the shifts of these constructions and on our own positions. As scientists, or technoscientists, or natural scientists, or social scientists, or as activists, or even as hybrids of all of those, we have to think about what our agency is and whom we are excluding and including when we do science/technoscience/technosocial science/activist science/*.
- ⁹ As for most researchers I don't know by which gender pronouns they want to be called, I use the pronoun "*hir*" instead of "her" or "his" and "*ze*" instead of "she" or "he" to highlight potential ambiguities of gender assumptions.
- ¹⁰ See Sherry Arnstein's ladder of citizen participation for a classification of different forms of public engagement or participation and its participatory quality (Arnstein 1969).
- ¹¹ For some detail about this artefact visit the project website: <http://www.design-research-lab.org/?projects=twitter-hand> (accessed: 2015-03-15)
- ¹² If you are interested in concrete examples of how Participatory Design can be enacted, take a look at (Wagner et al. 2009), who explain how they supported community engagement in urban planning processes. A lot more examples can be found in the International Handbook of Participatory Design (Simonsen and Robertson 2013).
- ¹³ I am using the * in trans*disciplinary as a sort of highlighting marker, which should make us think about the many things between and across the "trans" and the "disciplinary". This way we might remind ourselves that "transdisciplinarity" is not just a new mode of scientific practice, but actually a trans-scientific practice, one that includes social, ecological and political issues as well the social dynamics of research projects themselves.
- ¹⁴ By now it should have become clear that I base my propositions on the premise that we are always constructing some "others" as well as our "publics". I cannot tell you which

your “others” are, because your circumstances are maybe rather different from mine. The point is to pay attention on how we do construct our respective “others” and how this influences our actions.

- ¹⁵ I also announced that the results will be distributed to everyone. You can look at it (and the exact make-up of and invitation to this exercise) at <https://jackie.diebin.at/2014/cw/>.
- ¹⁶ For pictures of the re-clustering and the plain-text transcript see the web archive.
- ¹⁷ An important side effect was to make individual struggles visible and to create a feeling of individual and community ties among the participants. The Changing Worlds conference already created a space for caring, community engagement and participation. I wanted to add on that, by creating an opportunity where not only individual achievements could be celebrated but also individual problems could be made visible, because they also often can be seen as collective (or community) problems then. Trans*disciplinarity after all has a lot to do with communities and caring for each other.
- ¹⁸ One attempt of accomplishing this is the Changing World Conference, which tries to move even more beyond academia in its second edition in November 2015.
- ¹⁹ This, of course, includes all broader techno-social arrangements. The important point is, that we might start to see opportunities to shape things we otherwise would have thought of as too complex or too far away from our own abilities in order to engage in changing those things.

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