International Transdisciplinarity Conference 2021

Creating Spaces and Cultivating Mindsets for Learning and Experimentation

Online, 13–17 September 2021

Co-organised by the Network for Transdisciplinary Research and Transdisciplinarity Lab, ETH Zurich, Switzerland

Conference Program (Version 2, 8 August 2021)

For registration and further info, please refer to the td-net homepage: bit.ly/itd21

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Tokyo	Sidney	Rio de Janeiro	Lima	Zürich	Day 0	Day 1	Day 2	Day 3	Day 4
7	8	-5	-7	local time	Mo, 13.9.2021	Tu, 14.9.2021	We, 15.9.2021	Th, 16.9.2021	Fr, 17.9.2021
		PST/ Latin America	EST/ Latin America	CET/ Africa					
ASEAN	AEDT								
14:00	15:00	02:00	00:00	07:00	Pre-crafted (free)	Pre-crafted (free)	Real-time RT-3.x (Asia/Australia)	Pre-crafted (free)	Pre-crafted (free)
14:15	15:15	02:15	00:15	07:15					
14:30	15:30	02:30	00:30	07:30					
14:45	15:45	02:45	00:45	07:45					
15:00	16:00	03:00	01:00	08:00					
15:15	16:15	03:15	01:15	08:15					
15:30	16:30	03:30	01:30	08:30	Global Apéro	Global Apéro	Global Apéro	Global Apéro	Global Apéro
15:45	16:45	03:45	01:45	08:45					
16:00	17:00	04:00	02:00	09:00	Early career session (ECS) 1 -	General opening	Panel discussion 1 (1b)	Panel discussion 2 (2b)	(Tandem) keynote talk 3 (3a)
16:15	17:15	04:15	02:15	09:15	What is TD?				
16:30	17:30	04:30	02:30	09:30		Keynote talk 1 (1a) (tbc)			
16:45	17:45	04:45	02:45	09:45					
17:00	18:00	05:00	03:00	10:00			SHAPE-ID - Building a Culture of TD in Europe (open session)		
17:15	18:15	05:15	03:15	10:15	Break				
17:30	18:30	05:30	03:30	10:30	ECS 2 - TD	Break	Break	Break	Break
17:45	18:45	05:45	03:45	10:45	Worldwide: Same				
18:00	19:00	06:00	04:00	11:00	Same but	Pre-crafted (guided) PC-1.x	Real-time RT-4.x	Real-time RT-5.x	Real-time RT-7.x
18:15	19:15	06:15	04:15	11:15	Different?	Break			
18:30	19:30	06:30	04:30	11:30			SHAPE-ID - Building a Culture of TD Research in Europe (closed session)		
18:45	19:45	06:45	04:45	11:45		Pre-crafted (guided) PC-2.x			
19:00	20:00	07:00	05:00	12:00	Lunch				
19:15	20:15	07:15	05:15	12:15					
19:30	20:30	07:30	05:30	12:30		Lunch	Lunch	Lunch	Lunch
19:45	20:45	07:45	05:45	12:45					
20:00	21:00	08:00	06:00	13:00	ECS 3 - Capacity building and				
20:15	21:15	08:15	06:15	13:15	networking for transdisciplinary				
20:30	21:30	08:30	06:30	13:30	early-career researchers	Real-time RT-1.x	Pre-crafted (guided) PC-3.x	Real-time RT-6.x	Real-time RT-8.x
20:45	21:45	08:45	06:45	13:45					
21:00	22:00	09:00	07:00	14:00					
21:15	22:15	09:15	07:15	14:15			Pre-crafted (guided) PC-4.x		
21:30	22:30	09:30	07:30	14:30					
21:45	22:45	09:45	07:45	14:45	Break				
22:00	23:00	10:00	08:00	15:00	ECS 4.1 -	Global Apéro	Global Apéro	Global Apéro	Global Apéro
22:15	23:15	10:15	08:15	15:15	Publication of TD	ECS 4.2 - Writing and publishing as			
22:30	23:30	10:30	08:30	15:30	research	an ITD ECR	Real-time RT-2.x (North/Latin America plus CET)	(Tandem) keynote talk 2 (2a)	Panel discussion 4 (3c, saguf event)	Real-time RT-9.x (North/Latin America plus CET)
22:45	23:45	10:45	08:45	15:45	Break				
23:00	00:00	11:00	09:00	16:00	ITD Alliance Information and				
23:15	00:15	11:15	09:15	16:15	Exchange Event (public)				
23:30	00:30	11:30	09:30	16:30					
23:45	00:45	11:45	09:45	16:45					
00:00	01:00	12:00	10:00	17:00		Global Apéro	Global Apéro	Global Apéro	Global Apéro
00:15	01:15	12:15	10:15	17:15					
00:30	01:30	12:30	10:30	17:30		Keynote talk 1 (1a) (alternative time slot)	open slot	Pre-crafted (guided) PC-5.x	Panel discussion 3 (3b)
00:45	01:45	12:45	10:45	17:45	Break				
01:00	02:00	13:00	11:00	18:00	ITD Alliance General Assembly (for				
01:15	02:15	13:15	11:15	18:15	members only)				
01:30	02:30	13:30	11:30	18:30		END of Moderated day/ Break		Pre-crafted (guided) PC-6.x	
01:45	02:45	13:45	11:45	18:45					
02:00	03:00	14:00	12:00	19:00		open slot	END of Moderated day/ Break	END of Moderated day/ Break	OFFICAL CLOSING
02:15	03:15	14:15	12:15	19:15					
02:30	03:30	14:30	12:30	19:30			open slot	open slot	
02:45	03:45	14:45	12:45	19:45					
03:00	04:00	15:00	13:00	20:00					
03:15	04:15	15:15	13:15	20:15	Pre-crafted (free)	Pre-crafted (free)	Pre-crafted (free)	Pre-crafted (free)	
03:30	04:30	15:30	13:30	20:30					
03:45	04:45	15:45	13:45	20:45					
04:00	05:00	16:00	14:00	21:00					
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04:30	05:30	16:30	14:30	21:30					
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05:30	06:30	17:30	15:30	22:30					
05:45	06:45	17:45	15:45	22:45					
06:00	07:00	18:00	16:00	23:00					
06:15	07:15	18:15	16:15	23:15					
06:30	07:30	18:30	16:30	23:30					
06:45	07:45	18:45	16:45	23:45					
07:00	08:00	19:00	17:00	00:00					
07:15	08:15	19:15	17:15	00:15					
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08:30	09:30	20:30	18:30	01:30					
08:45	09:45	20:45	18:45	01:45					
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13:15	14:15	01:15	23:15	06:15					
13:30	14:30	01:30	23:30	06:30					
13:45	14:45	01:45	23:45	06:45					

EC-1: Early career session 1 - What is Transdisciplinarity?

Time: Monday, 13/Sept/2021: 9:00am - 10:00am
Session Chair: Irina Aglaia Dallo
Session Chair: Stefan Markus Müller

What is Transdisciplinarity?

Irina Aglaia Dallo, Stefan Markus Müller

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Have you ever struggled to explain to your colleagues, friends, or family what Transdisciplinarity (TD) is? Have you ever asked yourself how your own TD research is situated in the greater landscape of research?

SPOILER ALERT: There are many answers to these questions rather than a few single ultimate definitions. In this session, we will first elaborate together on what we mean by TD. Then we will hear from two experts – Dr. Bianca Vienni Baptista and Prof. Dr. Dena Fam – about diverse perspectives on TD and how these perspectives can be situated in different research fields.

After this session, you will have further guidance to explain to any person what TD can be and a basis to put your research into perspective and situate it in the greater landscape of research.

EC-2: Early career session 2 - Transdisciplinarity Worldwide: Same Same but Different?

Time: Monday, 13/Sept/2021: 10:30am - 12:00pm

Transdisciplinarity Worldwide: Same Same but Different?

Irina Aglaia Dallo[1], Stefan Markus Müller[1], Aymara Llanque[2], Danny Nef[1], Léon Späth[1], Mélanie Surchat[1], Agnes Kreil[1], Ariane Wenger[1]

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Transdisciplinarity (TD) and TD research in different corners of the world are only very partially comparable – is that really the case? How much does TD indeed differ across social-cultural borders, and what commonalities might be shared worldwide?

Let us explore these questions together and take the discourse of TD across social-cultural borders beyond the traditional, often deficient Global South-North comparison. In this session, we will get to know four case studies of TD research in different corners of the world, reaching from the co-production of knowledge in the Pacific to the co-creation of Swiss mobility hubs. Members of the case studies will further share how they deal with the challenges and limits of TD approaches.

As a panel, the members will contrast their experiences and, together with you, try to carve out contextual differences and shared commonalities, considering specific social-cultural values and dynamics, power relations, and other key elements when conducting TD research. Learn how diverse TD (research) can be – and yet how specific patterns may keep all of us busy, no matter the social-cultural context, and provide us with opportunities to learn even more from each other.

EC-3: Early career session 3 - Capacity building and networking for transdisciplinary early-career researchers

Time: Monday, 13/Sept/2021: 1:00pm - 2:30pm
Session Chair: David Patrick Michael Lam
Session Chair: BinBin J. Pearce

Capacity building and networking for transdisciplinary early-career researchers

David P. M. Lam[1], Josefa L. Kny[2], BinBin J. Pearce[3]

[1]tdAcademy, Leuphana University, Germany; [2]Zentrum Technik und Gesellschaft, Technische Universitaet Berlin, Germany; [3]Transdisciplinarity Lab, ETH Zurich, Switzerland; bin.pearce@usys.ethz.ch

Transdisciplinary research is a challenging research practice as it aims for both societal and scientific effects. Many early-career researchers struggle with the complexity of this research practice, for example, due to its high context embeddedness and diversity of methods applied from different disciplines. To this workshop, we invite early-career researchers to exchange their experiences concerning capacity building for transdisciplinary research and to connect with each other. The aim is to provide a space to jointly reflect and discuss structures that can support early-career researchers on their transdisciplinary journey. This seminar is jointly hosted by the *Swiss Young Academy* and *tdAcademy – Platform for Transdisciplinary Research and Studies*.

EC-4.1: Early career session 4.1 - Publication of TD research

Time: Monday, 13/Sept/2021: 3:00pm - 3:45pm

How to publish in an inter- and transdisciplinary journal - The example of GAIA

Tobias Mickler, Martina Blum

oekom verlag, Germany; bin.pearce@usys.ethz.ch

GAIA is a peer-reviewed inter- and transdisciplinary journal for scientists concerned with the causes and analyses of environmental and sustainability problems and their solutions. A member of GAIA's Editorial Office will give insights into the aims and scope of the journal as well as the review process.

(max. 20 participants)

EC-4.2: Early career session 4.2 - Writing and publishing as an ITD ECR - helping each other

Time: Monday, 13/Sept/2021: 3:00pm - 3:45pm
Session Chair: BinBin J. Pearce

15:00- 15:10 Introduction (Sharing of personal challenges with writing and publishing, Introduction of ITD Alliance ECR Working Group, presentation of commentary about ITD ECRs and publishing challenges)

15:10-15:30 Challenges of writing and publishing that you are facing (plenary, chat collection of challenges)

15:30-15:45 Overcoming challenges together (brainstorming about what are immediate next steps we can take - formation of writing circles across institutions - break out rooms depending on # of people)

SHAPE-ID-1: SHAPE-ID - Building a Culture of Transdisciplinary Research in Europe (open session)
Time: Monday, 13/Sept/2021: 10:00am - 11:30am

This parallel event organised by the SHAPE-ID project will showcase impactful transdisciplinary research projects and explore how best practice can be encouraged by European policymakers and funders. Following an introduction to the SHAPE-ID project, we will be joined by experienced transdisciplinary researchers who will present and discuss their projects and recommendations.

This first session is open to all conference attendees. Following this, invited policymakers and experts will participate in an evaluation masterclass to learn from SHAPE-ID recommendations on evaluating transdisciplinary research and co-design evaluation guidelines.

Draft Agenda (all times CEST)

10.00 SHAPE-ID key findings and recommendations - Professor Jane Ohlmeyer

10.15 Showcasing impactful inter- and transdisciplinary research projects: 3 x 5-minute project presentations from invited guests (x 5 mins) followed by a conversation with SHAPE-ID PI Professor Jane Ohlmeyer to explore impact, challenges and recommendations for funders and policymakers.

Project showcase:

• Food Smart Dublin

Dr Cordula Scherer

Trinity College Dublin: https://www.tcd.ie/tceh/projects/foodsmartdublin/

• Climate Art Project

Dr Andrea Conte

Andreco Studio: https://www.climateartproject.com/

• DIGNITY

Dr Silvia Gaggi

ISINNOVA: https://www.dignity-project.eu/

SHAPE-ID-2: SHAPE-ID - Building a Culture of Transdisciplinary Research in Europe (closed session)
Time: Monday, 13/Sept/2021: 11:30am - 1:00pm

This parallel event organised by the SHAPE-ID project will showcase impactful transdisciplinary research projects and explore how best practice can be encouraged by European policymakers and funders.

This second session is closed. Invited policymakers and experts will participate in an evaluation masterclass to learn from SHAPE-ID recommendations on evaluating transdisciplinary research and co-design evaluation guidelines.

Draft Agenda (all times CEST)

11.30 Evaluation masterclass with invited research funders and policymakers – chaired by Dr Christian Pohl

• The SHAPE-ID toolkit guide for evaluators

Professor Catherine Lyall

• Considering qualitative and quantitative approaches to evaluation

Dr Maciej Maryl

• Identifying evaluators with the right expertise

moderated breakout groups to discuss and identify keywords

13.00 Close

PC-1.1: Pre-crafted contributions - session 1.1

Time: Tuesday, 14/Sept/2021: 11:00am - 11:45am

Visualizing A Highly Coordinated Transdisciplinary Team for Precision Sustainable Agriculture

Jennifer Jo Thompson[1], Heather Darby[2], Brian Davis[3], Rob Myers[4], Meredith Niles[2], Hanna Poffenbarger[9], Ankita Raturi[5], Chris Reberg-Horton[3], Alison Robertson[6], Matthew Ryan[7], Resham Thapa[3], Steven Mirsky[8]

[1]University of Georgia, USA; [2]University of Vermont, USA; [3]North Carolina State University, USA; [4]University of Missouri, USA; [5]Purdue University, USA; [6]Iowa State University, USA; [7]Cornell University, USA; [8]USDA ARS-Beltsville, USA; [9]University of Kentucky, USA; jjthomp@uga.edu

Global environmental challenges are experienced locally and in heterogeneous ways. Although there is increasing recognition of the need to respond to challenges like climate change at a global scale, there continues to be major gaps in coordination of research, development, and policy-making. Further, in the context of agriculture, management decisions are made at the individual field or farm level—even if that increasingly means at the scale of thousands of acres. Since 2015, we have been developing a transdisciplinary team of farmers, researchers, modelers, technology developers, extensionists, and educators—known as Precision Sustainable Agriculture (PSA)—to tackle this "wicked" problem of supporting effective decision-making at scale. In particular, our work has focused on expanding the effective adoption of cover crops (plants grown between cash crops to provide specific ecological services, e.g. grasses and legumes) as the cornerstone of sustainable agriculture in the United States.

The long-term benefits of cover crops on the health and sustainability of agricultural ecosystems—including soil structure and health, carbon sequestration, water quantity and quality, nutrient cycling, and pest management—have been well-established. Nevertheless, the adoption of cover crops by U.S. farmers, while increasing, is still only 5.1% nationally. Low adoption rates have been attributed to the complex knowledge and management demands, additional cost, labor, and effort with uncertain short-term benefits, and inconsistent financial incentives. Maximizing the benefits of cover cropping in the shorter term requires sophisticated management that takes into account a wide range of factors, including soils, climate, genetics, and management (both cover crop and cash crop). It also requires a policy environment that effectively incentivizes the most impactful management practices while also recognizing the complexity of the system. Thus, furthering cover crop adoption requires developing scientific knowledge in tandem with societal solutions to support farmers in managing cover crops to maximize short- and long-term benefits.

Within PSA, we have assembled a transdisciplinary network that is (1) expanding basic scientific knowledge through on-farm, experimental, remote-sensing, and social science research; (2) constructing a resilient technical infrastructure to coordinate and manage data flow across teams; (3) building robust predictive models to broaden our scope of inference; (4) developing farmer-focused decision tools to support cover crop management; (5) partnering with extension, non-profits, and other outreach agents to develop and deliver tailored strategies to support farmers in cover crop adoption and management; (6) collaborating across institutions to train the next generation of cover crop researchers and extensionists; and (7) investigating the impact of our information ecology on cover crop adoption.

Here, we visualize our network structure and process to argue that the future of sustainable agriculture will require (a) highly-coordinated teams committed to practicing transdisciplinarity—the key characteristics of which are openness, translation, and co-creation; (b) co-designed, values-driven, open-source technologies that mediate coordination and collaboration across our network; and (c) partnerships in service to the public good.

Educating for Sustainability-Oriented Business Model Innovation: More collaborative, inter-, and transdisciplinary approaches with students and organizations are needed.

Ananda Wyss, Michael von Kutzschenbach

Fachhochschule Nordwestschweiz, Switzerland; ananda.wyss@fhnw.ch

Our action research project aims to provide theoretical and practical insights into innovative inter- and transdisciplinary educational initiatives for sustainability-oriented business model innovation (SBMI). The project follows a design-based approach and is focused on the Upper Rhein region.

Developments such as sustainability and digital transformation raise considerable challenges and opportunities for organizations. These developments make it imperative for organizations to rethink their business models to not only ensure their competitiveness but also contribute to solving societal issues (Foss & Saebi, 2017; Geissdoerfer et al., 2018). Therefore, the importance of SBMI has increased and strives to enable organizations to operate within planetary boundaries while increasing their long-term success (Steffen et al., 2015). Higher education institutions (HEIs) can help organizations meet these

challenges by educating responsible future leaders who see business as a means to transform and serve society (Hoffmann, 2018). Moreover, by providing spaces where imaginations can be stretched, and creative experimentation can take place in collaboration with business. However, although several learning collaborations between HEIs and business exist, only few give specific focus to SBMI. Furthermore, while the literature on *Higher Education for Sustainable Development* (HESD) contribute greatly to competences and learning methods (Mindt & Rieckmann, 2017; Wiek et al., 2011), research on the practical implementation thereof for SBMI appears weak. Overall, despite the rapid increase in research on SBMI (Foss & Saebi, 2017; Geissdoerfer et al., 2018), the educational facet in building SBMI capabilities of students and supporting organization's transitions to sustainable business models remains under-researched.

Our work is both exploratory and action-oriented, aiming to provide both theoretical and practical insights. It follows a design-based research approach that builds on McKenney & Reeves's (2012) core phases of educational design research. This includes, 1) analysis and exploration of the formats, content, processes, and success factors of existing initiatives, 2) the co-creation, design, and construction of pilot projects to actively experiment with different formats, and 3) evaluation and reflection to continually redesign and gradually institutionalize the offering. The project aims to be institutionalized into formal structures as an ongoing experimentation platform and think tank for innovative inter- and transdisciplinary action-learning for SBMI.

The preliminary findings confirm that only few educational initiatives focus explicitly on SBMI and thereby emphasise a need for more research on appropriate educational initiatives for collaborative, inter- and transdisciplinary SBMI with students and organizations. Promisingly, however, there appears to be an overall trend towards inter- and transdisciplinary approaches that include students from different faculties and utilize methods and tools from various disciplines. The findings also reflect the increased popularity of design approaches and creative thinking tools in the literature and further emphasize the use of systems thinking and stakeholder discovery to better understand the broader context.

The results of this ongoing action research can support educational practitioners with practical insights and a better understanding of the processes, methodologies, and practices that facilitate inter- and transdisciplinary co-creation for SBMI to enhance students' and organizations' capabilities to navigate towards more sustainable practices.

Water scarcity book for children: How to produce significant knowledge in the context of climate change in Chile

Sofia Vargas[1], Matias Taucare[2], Claudio Pareja[3]
[1]CEGA University of Chile and Td Lab, ETH; [2]University of Chile, department of geology; [3]Universidad de Los Lagos; sofiavargas@fcfm.uchile.cl

In arid regions, groundwater plays a key role in the development of socio-economic activities and human well-being. However, the increasing anthropogenic and climatic pressures critically impact the availability of groundwater resources. Latin America has been experiencing an uninterrupted sequence of dry years and Chile is not an exception. Since 2010 with precipitation rates and rivers discharge deficits up to 45% and 90%, respectively. The rising withdrawals and the drought caused an alarming decline in groundwater levels. Consequently, this scenario demands the integration of collective practices, projects and frameworks to better improve awareness of water use.

The project "Water: an (in) finite journey" aims to create an interactive children´s book to increase public awareness and critical thinking about groundwater and its role in the water cycle. Based on a transdisciplinary approach, it crosses academic knowledge (risk communication, hydrogeology, sociology, and pedagogy), art, and empirical knowledge. Societal actors from rural water cooperatives and school children are part of the process. This project has two goals. On one hand, to analyse how a transdisciplinary approach could promote a better understanding of water scarcity, providing an opportunity to integrate different styles and rationalities. On the other hand, to reflect this process of knowledge co-production in an interactive children book.

In 2021, a series of workshops took place in Santiago and Putaendo. Although they were planned as traditional workshops, they were transformed into online format due to the Covid pandemic. During the process 25 children from 8 to 12 years and three societal organizations (six participants) participated. "Multi-stakeholder discussion groups", "story wall" and "nomadic concepts" among other Td tools were used. Identifying social perception about ground water and integrating ideas and practices about water scarcity were key parts of the process. Building from this, Water: an (in) finite journey book was co-designed. After building a base line information, by a several rounds of critical conversation, children and societal actors provided feedback and inputs about the topic, first, and then to the visual and text content for the book.

This applied project offers an opportunity to describe some challenges and benefits of integrating empirical into science knowledge.

Among the challenges, we can find a common one regarding the different languages between the disciplines and societal actors, and how to engage the process of integration, making everyone feel involved and reflected in the process and the final product. The Covid-19 health measures affected the functioning of the project and the relationship with societal groups and co-designers. In this sense, the call, for children's activities, more than their schools, was for to their families, as family support is required to be able to carry out the activities. We adjusted the activities to online format, sending a toolbox to participant's homes to explore interactive experiments. The biggest challenge was the connection to them. For instance, some participants were not very receptive to turning on their cameras, which made emotional connection difficult. The timing was another challenge. We tried to ensure that the workshops did not extended more than 60 minutes, therefore we included the participants carried out activities before the workshop.

Despite the challenges presented by Covid, one of the benefits of including Tdtools was producing more relatable results. Besides, the workshops were a learning process for the children, their families and the research group about the water stories and narratives. Including civil society made the political aspects of the water management evident, propelling discussions within the research team about the scope of the project.

To sum up, Td process turned out to be crucial for creating a relatable and a social relevance groundwater book.

Disruptive Architecture through collaborative practice

Marco Luis Paladines Valarezo[1], Freddy Mamani[2]

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Collaborative practices of attentive design-in-construction constitute the weavings and elementary heterogeneous activities that give rise to the innovative buildings of Neo-Andean Style, an architectural form that incorporates social and aesthetic elements from indigenous pasts to a proposal of functional and identity-generative architecture for the future.
Instead of resulting from detailed pre-designs off-site, Neo-Andean Style emerges from collaborative, creative action in dynamic engagement with the constructive possibilities, available resources, material constraints, and aesthetic preference on-site. This results in constructive practices that do not merely execute pre-ellaborated plans, but which carry on materializing through tinkering, and trial and error.

The historical drift of the neo-Andean style in architecture shows an open process, where each work functions as an apprenticeship for the next. The impact of this architecture has gone beyond the urban sphere, which has provoked the development, at the same time, of an architectural theory that explains and summarizes the buildings. This has given rise to transdisciplinary collaboration between architects, social scientists (anthropologists, sociologists), and artists for the elaboration of a social and architectural theory capable of accounting for the aforementioned disruptive phenomenon.

The field of sociology, for this matter, has to be also opened to transformation and incorporation of architectural ways of doing and thinking. This allows an architectural practices which is sociologically informed, and a sociology with architectural thinking tools. The making of architecture is a tool for intrpreting social phenomena and for trnaslating them, the sociology and anthropology of architecture is able to shape how architecture's impact is considered.

Beginning with an approach of negotiation and trade, the present research aims to analyze the social conditions and the consequences that certain forms of knowledge and architectural-artistic expression have on them. Finally, the possibilities of an approach of conceptual systematicity is raised, where the concepts of type, style, form and formation are useful both in architecture and in the social sciences. The present work has an STS and anthropological perspective.

PC-1.2: Pre-crafted contributions - session 1.2

Time: Tuesday, 14/Sept/2021: 11:00am - 11:45am

Lessons from ID and TD Institutionalization in Socio-ecological Research in Brazil

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The trajectory of the Center for Sustainable Development (CDS) of the University of Brasília (UnB) - one of the three top-ranked interdisciplinary centers in Brazil- can be seen as a laboratory showcasing the difficulties and possibilities of ID institutionalization in socio-ecological research in the country. In 2008, 13 years after the Center's creation, a group of interdisciplinary researchers designed a first project to study land-use and climate change policy synergies and trade-offs. Since then, several research projects using both transdisciplinary (involving academics and non-academics in the production of knowledge) and interdisciplinary (integrating different disciplines) approaches have been conducted at CDS. We propose to analyze this pioneering experience by exploring how an initially epistemologically marginal ID/TD community in a university traditionally organized in disciplines gained room in a graduate program in Sustainable Development. Additionally, we will show a series of *ad hoc*, "circumstantial" factors contributing to the consolidation of this bottom-up ID initiative, including the growing national and global concerns on the Amazon conservation and climate change. Brazilian and international funding agencies started to promote R&D proposals on socio-ecological issues proposing ID/TD approaches. Furthermore, CDS's projects were consolidated by its strategic geographical location: it is placed in the federal capital of Brazil (Brasília), just meters away from national government and research-financing agencies. In this politically favorable wind, the CDS' ID research group developed nation-wide scientific collaboration networks and international projects. Additionally, the team adopted a flexible governance model combining the natural turnover of master's and doctoral students with the presence of a more stable core team from a variety of backgrounds (Humanities, Natural Sciences, Engineering). This structure contributed to maintaining an institutional and epistemological identity combined with creativity. Results included the development of an interdisciplinary theoretical-conceptual framework leading to national and international publications, and the refinement of TD methodologies in interaction with non-academic actors, including knowledge co-production activities and products. This epistemological "freedom" within CDS was limited by Brazil's unique and very strict accreditation and evaluation system for post-graduation programs, which holds sometimes obscure definitions of ID.

The experience of CDS's ID/TD activities is a unique combination of top-down, government-led evaluation standards and *ad hoc* factors, including the initially favourable political context and the personal determination of a few scholars to promote ID/TD approaches in Brazil. Although it is impossible to draw any general lessons about ID/TD institutionalization in the University environment, some general features can be identified. First: ID/TD approaches are not antagonist to existing disciplines, but rather complementary; they should not be seen, either, as sources for "academic" or funding competition, but rather as opportunities for innovative collaboration. Second: scientists from disciplinary backgrounds and government education agencies evaluating ID/TD efforts need to develop skills to better communicate between each other and with non-academic actors at large.

The rise of transdisciplinary boundary organisations - a framework and case study from the University of Technology Sydney

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This presentation outlines a conceptual framework to explore the role university-based boundary organisations (BO) play in institutionalising transdisciplinarity in higher education. We use the Institute for Sustainable Futures (ISF) at UTS in Australia as an example of a transdisciplinary university-based boundary organisation (TD-BO) as a case study to test the framework.

Adopting theories on boundary organisations (Guston, 2001; Miller, 2001; Gustafsson and Lidskog, 2018; Cvitanovic et al, 2018) we developed a tripartite framework to explore the characteristics that enabled ISF to operate as a TD-BO across three dimensions: (1) structure and organisation, (2) practices and function and (3) strategy. We highlight key challenges and opportunities for TD-BOs and conclude by considering the value of TD-BOs for institutionalising transdisciplinarity within universities.

TD-BOs have been established in higher education institutions over the past 40 years in regions such as Australia, South and North America and Europe (to name a few) to facilitate TD research and teaching while preserving the disciplinary based structure of universities. They function as legitimate hybrid spaces where diverse stakeholders and types of knowledge converge to work on complex challenges and co-create new knowledge together. Often, accountability and evaluation mechanisms for TD-BOs prioritise conflicting goals, creating numerous challenges for recognition and longevity. Furthermore, TD-BOs engage in boundary work requiring more time for integration and reflexivity which is often not accommodated in disciplinary university structures. In short, university-based TD-BOs function in 'landscapes of tension' (Parker and Crona, 2012) within disciplined universities, yet they offer the unique possibility for traditional universities to embrace inter, multi and transdisciplinary research and teaching.

We adopt the TD-BO framework to identify enablers and barriers for institutionalising TD research and learning within ISF - UTS and the wider Australian Tertiary education sector. Identified characteristics of the TD-BO framework would benefit from further conceptual development from a TD perspective, along with expansion of the model through further case-study analysis. We offer the framework as a work in progress, to seek feedback, encourage further investigation and studies to fill conceptual gaps and refine its robustness.

The presentation structure includes:
1. Brief background on university-based BOs in the Australian tertiary education sector
2. Phases of ISF's development as a TD-BO between 1997 and 2021
3. Development of a TD-BO framework drawn from BO literature (including methods)
4. Key findings from using the TD-BO framework to analyse ISF and institutionalising TD within a traditional disciplinary-based university

The coordination of challenge-driven research programs: lessons from three case studies

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Transdisciplinary research can make a crucial contribution to challenge-driven innovation policies. Governments show an increasing ambition to mobilize scientific research for systemic change that is needed to address societal challenges (Kuhlmann and Rip, 2018). Challenge-driven policies will require the mobilization of a mix of policy instruments, such as research and innovation funding, legislation, career incentives and a range of demand-side policies. Given the need for new knowledge both for understanding wicked problems and developing solutions, research programs will be a key instrument. However, the traditional way of organizing research programs will not be adequate to make sure they contribute to societal transitions. The principles of transdisciplinarity can be very helpful. This paper will identify essential elements for designing and managing challenge-driven programs, building on the framework by Schneider et al. (Schneider et al., 2019). Based on the literature, we first characterize challenge-driven programs in terms of their theory-of-change.

Then, we explore the requirements of challenge-driven research programs in three empirical cases: DARPA/ARPA-E (USA), the challenge-driven innovation programs of VINNOVA (Sweden), and the Climate Change, Agriculture and Food Security program of CGIAR (global scope). The analysis of the three cases was primarily based on primary and secondary documents, complemented by a couple of in-depth interviews. Our paper will compare the program management approaches of the three cases, distinguishing between program management, project support and portfolio management, and then identify requirements for challenge-driven research programs.

Our analysis shows how a challenge-driven approach requires rethinking the design, management and governance of research programs through all stages of the program. In addition to the importance of coordination between program and project level, our cases illustrate the importance of continuous coordination between the program and the dynamics of the societal transition the program aims to contribute to. This requires a more active role of the management of the program. Because of the focus on a societal challenge, broad stakeholder participation and portfolio management, program managers have to play during the complete program cycle. They need to continuously keep an eye on the connection between project activities and program goals, and intervene when necessary, for example by forging connections between projects, facilitating dissemination and knowledge exchange, or deciding to end certain projects or lines of research. Finally, reflexivity will be at the core of challenge-driven research programs. Monitoring and learning processes are crucial to enable continuous alignment between project activities, program goals and transition dynamics.

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The institutionalizing of transdisciplinary research and the emergence of knowledge co-production at the national level in Finland

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Transdisciplinarity (TD) is one of the ways to describe the turn in science aiming to tackle complex societal problems using multiple types of knowledge. It refers to research that deals with real-life problems, involves a variety of actors from science and

practice to account for the diversity of perspectives, and creates knowledge that is solution-oriented, socially robust, and transferable to both scientific and societal practice (Lang et al. 2012). In such processes, science needs to integrate new ways of knowing into new ways of making decisions. Such integration can be enhanced through processes of knowledge co-production, which can be defined as "processes that iteratively unite ways of knowing and acting — including ideas, norms, practices, and discourses — leading to mutual reinforcement and reciprocal transformation of societal outcomes" (Wyborn et al. 2019). In Finland, the Strategic Research Council (SRC) has since 2015 provided funding for long-term research aimed at finding solutions to major challenges facing Finnish society. All funded research projects must include active engagement of stakeholders throughout the life cycle of the projects. The specific feature of SRC research is its explicit connection to topics of national level policymaking, which creates a base for engaging public sector officials and other policy actors, including the private sector, in knowledge co-production. This distinguishes the SRC-projects from many other co-production projects that tend to focus on more local-level actions and/or lay knowledge. The SRC-projects deal with issues of governance, and administrative or professional types of knowledge. In this paper, we describe the emergence of knowledge co-production in SRC research in the interface of science and policy, and explore its characteristics. We reflect on how the institutionalization of transdisciplinary research in Finland has contributed to its development.

Our analysis is based on a survey of 26 SRC funded research projects, which is more than half of all the projects funded to date. The survey questions covered the methods and depth of integration of research and interaction activities as well as background, processes and challenges of the conducted knowledge co-production activities. The results indicate that a majority of projects has joined interaction and research activities to become an integral part of the research approach, while the knowledge co-production displays in different "depths" and forms depending on the research topic, among other things. Several challenges were also identified such as ethical concerns and lack of methodological skills. A majority of the respondents considered that they will, also in future projects, use co-production approaches and that applying the approaches had changed their views on the role of research in society. We conclude that the institutionalization of transdiciplinary research through the SRC funding has created a demand for novel research approaches that can support societal decision making in dealing with society's grand challenges. The results do, however, also show the need for diversity in co-production. To ensure innovative development of co-production such diversity is needed within the overall framework of transdisciplinary research.

The new Swedish Research bill and the next: transforming terms for transdisciplinarity

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Trandisciplinarity research is getting traction in science policy with more countries now allocating funds to grant schemes which pursue mission-driven (UK, Sweden), or problem-solving scientific agendas (Slovenia, Croatia, Netherlands). It is generally accepted that science shall be working on contemporary, relevant, and pressing research problems as is sustainability for instance. Yet, despite a growing interest the **transdisciplinary approach** there are still unknowns about how research and innovation policy might be structured, and what institutional arrangements can be put in place to create the needed opportunities for different social actors to engage in transdisciplinary knowledge production, and action, for sustainability.

In this study we analyse the positioning on aspects of trandisciplinarity of the Swedish Bill for Research and Innovation which has been approved by the parliament in April 2021. The bill aims to support knowledge production for sustainable development as well as competitiveness for Swedish companies. It is structured around the ambitions for interdisciplinarity and strong cooperation between universities and societal partners. Interestingly, while societal actors are framed as partners in the production of scientific knowledge transdiciplinarity does not appear as a term, or approach, in the text proofing directives to the research and innovation funding agencies. Our analysis takes a critical stance and uses normative and empirical ideas/ tools?? from the sustainability sciences for a discourse analysis of bills for research and innovation over the last 20 year period. The discourse analysis will be further extended to the calls made by research councils and foundations and also supplemented by a systems analysis mapping the opportunities to engage different actors and the roles and relations that are allowed to emerge in the knowledge system.

It is interesting to note how the bill seems to be communicating about a type of prevailing policy discourses and power structures in this area of work. The proposed funding modalities are implicitly leaning towards university-industry linkages rather than to other multi-actor cooperation models. Municipalities and civil society organizations are rarely targeted as cooperation partners on reciprocal terms despite sustainability science literature emphasizes the need to include such social actors in transdisciplinary endeavours. While regionally localized university and colleges often collaborate with municipalities and regional agencies, the Swedish R&I system provides relatively few opportunities for larger transdisciplinary projects with these partners.

At the same time, other ministries and authorities provide action-oriented funding opportunities for municipalities and industry, and to some extent for civil society organizations. These rarely provide opportunities to connect to research or science-supported innovation. The division of funding opportunities for R&I and for action is not unique to the Swedish situation, the EU Horizon programs expose the same dichotomy. The bill does not position itself, or the research and innovation system, in the context of the various types of ongoing and planned regional development programs.

Neither do the bill refer to the academic debates on science and innovation policy and systems. Without explicit references, the bill attempts to promote mission driven research and innovation, paired with approaches for challenge driven and demand driven R&I. In this mixture of approaches, the bill is not acknowledging the possible shortcomings of the different approaches, nor the possible contradictions or complementarities between them. The analysis of the bill in relation to the academic debates provides insights for the academic debate as well as for the process leading up to the next bill to be taken in 2024/25 with just a half decade left to transform the world in line with the 2030 Agenda.

The 2020/21 bill provides an opening for a debate when advertising a review of the Research and innovation system. This is a challenge for the science policy research community and for transdisciplinary and sustainability researchers and partners to meet with critical analysis and constructive science-based arguments.

PC-1.3: Pre-crafted contributions - session 1.3

Transdisciplinarity on Tour: The "Mobilab" – a Mobile Tiny House as Transdisciplinary Tool for Participation

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Real-world labs (RwLs) tend to be stationary – but do they need to be? Based on several years of experience with a stationary infrastructure, a mobile lab tool has been designed and built to bring the lab to the people: Participants can now enter a dialogue just where the experiments take place.

The "MobiLab" is a mobile tiny house equipped with flexible interior, an open porch and outdoor furniture, solar panels, workshop equipment and up to date digital infrastructure. The design takes into account various uses, e.g. as a learning environment, as a workshop location, as a space for exhibitions and dialogical science communication, as a base for interview campaigns, and possibly as a hive for citizen science projects. It will be used primarily in the context of the "Karlsruhe Transformation Center for Sustainability and Cultural Change" and the ongoing Real-World Lab "District Future – Urban Lab", as well as in numerous other transdisciplinary projects and RwLs at KIT.

The presentation will firstly describe its conceptualisation as a spin-off from a transdisciplinary project course, in a collaboration with the Karlsruhe Tiny House Initiative to make their houses more sustainable. It will showcase some of the architectural and design decisions for the MobiLab in the light of its multiple forms of use to support transdisciplinary practice. Special consideration was given to a situation with numerous users who are neither familiar with the MobiLab nor with participatory methodology, making (digital and hands-on) information on the MobiLab and capacity building for transformative and participatory practices for KIT scientists key elements of the project. Finally, the presentation will briefly introduce possibilities for the evaluation strategy to analyse the impact of the MobiLab.

The presentation will be in the form of a short film, produced in the MobiLab as a newly delivered tool and – if Corona permits – its first applications. If possible, one of the presenters will attend the conference digitally from the MobiLab, to show more details during discussions and give every-day insights on its potential and limitations.

The MobiLab was funded as part of KIT's project in the German federal initiative "Universities of Excellence", and with the support of the KIT-Center Humans and Technology and the Institute for Technology Assessment and Systems Analysis.

It's a matter of practice: "Opening up" experimentation in Living Labs

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Following the trend in research policy and practice to tackle contemporary societal challenges by means of mission and impact-oriented knowledge creation, Living Labs have emerged as a prominent research method and platform. Next to other defining characteristics, transdisciplinarity is often heralded as a key feature of research conducted in and through Living Labs. However, the notion remains fuzzy and the actual work that is carried out bearing the label "Living Lab" includes a range of disciplinary, interdisciplinary and transdisciplinary research practices. Crucially, a Living Lab is considered a site for learning and the co-production of knowledge based on (co-)designed and (co-)evaluated interventions or experiments. At the level of the individual lab, the "opening up" or "closing down" of the social appraisal of science and technology can be observed at the micro-scale. In this context, "opening up" refers to a recognition of the normativity and directionality implicated in innovation which would warrant more sophisticated, comprehensive and robust decision-making processes (Stirling 2008a, 2008b).

This contribution addresses the question to what extent and in what ways commitment to "opening up" to participation can be detected in different types of Living Labs. To this end, in line with the overarching conference theme and following from the original purpose of the lab(oratory), this contribution maps and analyses the experimental setup and research practices for the (co-)production of knowledge that can be found in currently active Living Labs. Empirically, this contribution draws on semi-structured in-depth interviews with the project leads or principal investigators involved in 30 different Living Labs at or on behalf of the RWTH Aachen University. The analysis follows a two-step approach: First, the Living Labs are mapped by their experimental setup in terms of organisational and infrastructural arrangements, thematic focus, (inter-)disciplinary perspective, research methods and transdisciplinary approach. Second, the resultant map of experimental setups is scrutinised for institutions, actor constellations, research methods and processes that indicate an "opening up" or "closing down" of the social appraisal of science and innovation.

Preliminary results indicate a large range of Living Labs hosted at or affiliated with the RWTH Aachen University. The 'degree of transdisciplinarity' in terms of allowing, inviting or enabling participation (for example, based on institutional set-up and project management (Defila et al. 2006)) appears to co-vary with conceptions of innovation - or rather, of 'how to innovate'. While linear and deterministic notions of innovation and progress seem to prevail, there are strong signals that guidance and support on how to "open up" to more inter- and transdisciplinary research practices would be greatly appreciated. Also in this sense, "opening up" might be a matter of practice.

Changes in research practices towards increased transdisciplinarity could potentially be supported through a set of indicators to capture and assess determinants and mechanisms of successful transdisciplinary experimentation and knowledge production in Living Labs. In an effort to relate micro-scale findings to macro-scale developments, this contribution also reflects on the question whether and in how far such 'indicators of transdisciplinarity in Living Labs' might be able to support the "opening up" of the social appraisal of science and technology.

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Knowledge Co-Creation in Urban Living Labs facing Complexity

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The complexity of urban systems demands sophisticated approaches that integrate knowledge and methods from different disciplines, academic and non-academic experts, and citizens/non-certified experts. A way of conceptualizing complex urban interrelationships is the food-water-energy nexus (fwe) approach, introduced at the World Economic Forum in 2011. An initiative for bringing forward the FWE Nexus concept at the urban level and explore approaches and solutions for the urban FWE Nexus challenge is the joint initiative SUGI Nexus of JPI Urban Europe and the Belmont Forum (JPI, 2016).

A major objective and challenge at the same time is enhancing the visibility and understanding of the FWE nexus concept and of its manifestations across scientific disciplines and in society, e.g. regarding the locally involved stakeholders in transdisciplinary research projects.

This presentation is based on experiences in the Urban Living Labs (ULL) of the sugi nexus project Creating Interfaces - Building capacity for integrated governance at the Food-Water-Energy-nexus in cities on the water" (JPI Urban Europe and Belmont Forum 2018-2021, co-financed by the Horizon2020 programme under grant agreement No. 830254). Focusing on the ULL in Slupsk/Poland, it presents challenges, approaches and experiences when tackling transdisciplinary research and practice on a complex concept like the urban fwe nexus. Based on this, we will draw conclusions on how to facilitate inclusive and locally meaningful research.

Transdisciplinary Mentoring of Bottom-up Citizen Science Projects

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In scientific research, citizen science (CS) is widely regarded as an involvement of the general public initiated by universities, scientific organisations or research centres. In this top-down approach, participating citizens usually collect data or provide samples for research—i.e. they rather can be considered as volunteer research assistants who work in a prescribed manner. The bottom-up way of CS is based on local initiatives and constituted by community-led projects. For this type of CS, scientific organisations may provide with methodological and organizational frames, however, the idea and the implementation remain in the competence of the participants. For that reason, the bottom-up approach carries within itself a need for a more holistic policy toward CS. Identifying viable citizen-initiated projects and measuring their scientific and/or innovation potential, and integrating them in a CS mentor program are questions to be systematically discussed and solved. In this presentation, methodological challenges on mentoring bottom-up CS projects are addressed covering a mentor training concept for CS designed by the Institute of Transdisciplinary Discoveries.

Encouraging citizen research is needed for a new impetus to scientific discoveries. The perspectives of non-scientific people can advance a problem (e.g. the discovery of a green pea galaxy, solving biodiversity problems). CS may also be a solution for leveraging the knowledge of science leavers.

According to research by the Hungarian Academy of Sciences, 51% of young researchers in Hungary are thinking of leaving their field of interest, and the dropout rate in higher education is also significant. Thus, they do not, or if they do, promote only to a limited extent science and scientific thinking. However, the need remains for informal, extra-institutional support for scientific research and innovation. Pseudoscience, meanwhile, are also gaining ground.

On that basis, a mentoring program was prepared by the Institute of Transdisciplinary Discoveries. The unique characteristics of the program is that it considers both the bottom-up and top-down approaches as it support the applicants' individual research by mentoring, and provides institutional assistance, encouragement and incubation to the projects. The mentoring program is transdisciplinary because it combines methodologies of pedagogy, science communication, training and coaching, and demands no disciplinary restrictions of topics to be supported. The program also facilitates the transdisciplinary exchange of knowledge between mentees.

The program is promising, and the need for mentoring in an informal setting is emphasized by the fact that the majority of the 52 respondents to the preliminary survey would not conduct research in universities or other research institutions; however, they are interested in the offered non-institutionalized mentoring setting.

A Citizen Work Group as part of a transdisciplinary research project on nuclear waste disposal in Germany

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We report on a collaboration with citizens as integral part of the research within the transdisciplinary project on high-level nuclear waste (HLW) disposal in Germany. We recruited a citizen working group (CWG) of 16 German individuals (9 women, 7 men) according to the following characteristics: candidates are neither experts nor stakeholders; they rather represent society's moderate or middle faction without specific political ideology; thus, they likely resemble 'normal citizens' who are critical thinkers but not destructive in discussion. Furthermore, team-mindedness is required and people are able to engage during the project period of five years. The rationale of these selection criteria was to have a well working group that is able and willing to collaborate with scientists and to become their 'extended peer community'.

We designed a thorough stepwise recruitment process comprising various methods: a survey (N = 5'000), a second survey for interested participants (N = 700) followed by 30 personal interviews. We selected the final group according to educational background, gender and age. The group represents several German federal states. Thus, at the current stage, there is no focus on potentially affected regions.

The CWG's general mission is to critically reflect on the research pursued within the project. Together we defined an agreement on the working rules in a written 'working basis'- document. This document clarifies the frame of mutual expectations and increases commitment from all parties.

After a first kick-off meeting (in person) and an introductory workshop on transdisciplinary methods (online) we conducted two more workshops (online). Several insights resulted from these workshops. For instance, CWG-members were not aware of a trade-off between safety-gain and safety-reduction due to the monitoring technology. After researchers made visible that trade-off during the workshop, the CWG became more ambivalent. Furthermore, CWG members suggested potential technical solutions. Concerning trust in science, the CWG also put forth criteria for emerging trust, such as including all opinions without being condescending. Furthermore, neutrality, objectivity, and experience in the field are assets. Group members also showed different opinions about the role of social sciences and the humanities in nuclear waste disposal, addressed in subsequent interviews.

Summarizing, the project team has so far learnt that facts, appearing obvious to researchers, may not be so obvious for citizens. Responses may cover topics that are related to the citizens' experience and social life. However, they are clearly able to understand technical intricacies and engage in brainstorming concrete solutions. The CWG received insights how science works, in particular that science has to cope with uncertainties and trade-offs. Most importantly, in terms of trust, CWG members appreciated being taken seriously and offered no 'pure and perfect' solutions but insights where knowledge is still to be generated.

Until now, the Covid-19 pandemic forced us to work online. Participants nevertheless engage eagerly. Hence, we conclude that the carefully structured recruitment process contributed to establishing a well-working group. Both parties, researchers and citizens, have so far benefited from the collaboration and currently the satisfaction with the achievements is high.

Living Lab Eckernförde 2030

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The video would like to introduce the "Living Lab Eckernförder Bucht 2030". The Eckernförde Bay is located in the Baltic Sea near Kiel (Germany). The project "Living Lab Eckernförder Bucht 2030" has been running there since April 2021. In a dialog between science and stakeholders, perspectives for sustainable use of this marine area are to be developed. The overall goal is the protection of marine habitats and the development of a future perspective for the bay and its inhabitants

The pilot phase is intended to achieve five specific goals:

- The establishment of a network for stakeholder dialogue with agriculture, fisheries, tourism, municipalities, coastal protection and the marine sector;

- the development of a catalog of measures to reduce nutrient inputs from agriculture;

- an assessment of the potential for the use of nutrients from marine biomass in agriculture in the sense of a "cycling economy";

- the inventory of marine habitats in the Eckernförder Bucht;

- the examination of the possibilities of nature based coastal protection.

On this basis, the questions for the continuation of the real laboratory will be developed in co-design. All institutions from science and authorities with long-standing commitment in the region are represented in the project "Eckernförder Bucht 2030". The project aims to bring the existing knowledge into application. The combination of research and stakeholder dialogue aims at improving the ecological condition of the region and at the same time improving the perspective of the people living there. Thus, the project combines interdisciplinary research with transdisciplinary communication and participatory interaction.

In the video, the most important people will have their say, naming the challenges and addressing possible perspectives. An essential role will be the question of motivation: what brings scientists to deal with the perspectives of the stakeholders? What do non-university stakeholders hope to gain from contributing their time to a scientific project? Thus, the video may offer interesting insights into an ongoing process and promote the exchange with other living labs.

www.reallabor-eckernfoerde.de

Open spaces of university campuses as living labs for urban sustainable transformation

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The campus of the University of Applied Sciences in Rapperswil is situated between a historic town and a nature reserve at the lake of Zurich. It serves us as a living lab for sustainable urban planning and biodiverse and ecological green space design in teaching, research, and public outreach. Our interdisciplinary team consists of landscape architects, planners, gardeners, ecologists, conservationists, and sustainability experts, who work both at the university and in the practice world (e.g., landscape-architecture office or nature-conservation consultancy). We will present our living lab approach, i.e., how we integrate biodiversity in planting designs, envision sustainable futures of the campus through landscape architectural design studios together with our students, involve the public in interactive art installations on climate change, and collaborate with other disciplines including engineering and social work on campus-related projects. Transdisciplinary approaches range from realworld laboratory research to education for sustainable development and participatory arts.

PC-1.4: Pre-crafted contributions - session 1.4

Time: Tuesday, 14/Sept/2021: 11:00am - 11:45am

Design-based approaches to integration and knowledge co-production in transdisciplinary research

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Current problem situations in the world and especially in the field of sustainability are complex and often accompanied by uncertainty and unknowns. Transdisciplinary research approaches try to deal with this complexity and uncertainty by including various perspectives of actors who come from different disciplines, life worlds and cultural contexts. In this context, the co-production of knowledge with different actors as well as the integration of different forms of knowing and bodies of knowledge are considered key processes of transdisciplinary research. The creation of a multi-perspectivity for dealing with complex problems and the resulting multi-layered heterogeneity brings with it a multitude of challenges in collaboration. These are, for example, different forms of communication, distribution of power or epistemic approaches. Drawing on discourses of inclusion, mutual learning and co-production, we have identified six different interrelated challenges concerning (1) diversity, (2) communication, (3) power, (4) epistemology, (5) personal and team, and (6) focus. Due to their open character, design methods are discussed as particularly promising in dealing with these challenges and problems that involve a high degree of complexity, uncertainty and unknowns. Therefore, this article examines the application of a specific design-based method (design prototyping) using the example of a transdisciplinary case study belonging to a project aiming for sustainability transformation. The method was applied in four workshops that relate to different phases of a transdisciplinary research process and represent typical collaborative research activities. The results of a qualitative content and artefact analysis of the empirical case study data material are presented and qualities of design-based methods are derived. The results provide insights into the role that metaphors - manifested in material and visual language - can play in processes of collaborative knowledge production. Material metaphors translate and transport knowledge and build bridges to the knowledge of others. In doing so, they appeal to many senses and enable access to other levels of thinking. The translation into material breaks down disciplinary thinking and language by enabling an independent but cross-disciplinary form of expression through the emphasis on the visual-tactile. The various forms of material-metaphorical imagery provide insights into the visual structuring of human thought processes and facilitate mutual understanding of how people sort their thoughts and render them linguistically-textually. The presented research underlines the importance of the visual-tactile in collaborative knowledge production and for the communication of knowledge. The results hold insight potential for cognitive processes in general and the application of further design-based methods in transdisciplinary research processes. Design practice thus expands the canon of methods for knowledge integration and work in heterogeneous teams and helps to create conditions for future-oriented transformations and their prerequisites, such as trust, shared understanding and appreciation of others. Working with designs not only reveals epistemic aspects, but also unfolds transformative potential, as processes of change can be initiated and promoted through collaborative knowledge production. Furthermore, it enables a gradual and open approach to the uncertain and unknown of sustainable futures.

Grounding crossdisciplinary integration: Toward a theory of microintegration

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Many of us who think about crossdisciplinary research regard integration as its "primary methodology".[1] That is to say, the characteristic feature of crossdisciplinary research is a commitment to integrating insights drawn from different epistemological perspectives. There is no shortage of work on crossdisciplinary integration, from inter- and transdisciplinary theory to communication science to biology to the philosophy of science.[2][3] Much of this work focuses on identifying phenomena in various contexts that counts as *integrative*, while other contributions are more concerned with clarifying the concept of integration. We will begin this short video presentation by briefly canvassing the literature on crossdisciplinary integration in order to characterize the dimensionality of integration as a theoretical construct.

We will argue that much of this literature examines integration at a great remove from the particular actions of crossdisciplinary researchers. For example, some contributors examine integration as a way of clarifying what counts as scientific unification,[4] and others investigate the integration of disciplines.[5] Call the focus of these studies *macrointegration.* Other work comes closer to the action, focusing on the integration of research elements like explanations and data.[6][7] These studies focus on what we call *mesointegration,* i.e., they concern integrative phenomena as they manifest in research practices, but still discuss them in general as more abstract types. What is not often examined, let alone theorized, is what we will call *microintegration*, i.e., local moments of integration involving specific inputs such as contributions to conversations or particular data. We understand "local moments" to be specific, locatable, concrete instances of integration that ground higher levels of integrative activity. We will develop and illustrate this three-level hierarchy, suggesting along the way that there is good reason to think that instances of integration at higher levels emerge from or are reducible to integration at lower levels.

We will conclude our talk by presenting an account of microintegration that builds on an input-process-output (IPO) model of integration developed in O'Rourke et al. (2016).[8] This approach understands integration in terms of a certain type of relation that connects inputs in the production of an output. We will apply the IPO model to two specific conversational exchanges involved crossdisciplinary collaborators to demonstrate how this approach can systematically represent microintegrative phenomena and also provide a foundation for understanding higher levels of integration.

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Forks in the road: Critical design moments for transdisciplinary processes

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While the importance of transdisciplinary processes as a means to address societal problems is well-established, how these processes (i.e., joint problem framing and stakeholder engagement) can be designed to meet intended goals, under different conditions and contexts, remains under explored. We propose the concept of "critical design moments" (CDMs) to identify key elements in the design of a transdisciplinary process that affects the relevance and impact of its outcomes. We demonstrate how the identification of CDMs can reveal the intended and emerging goals of designers and participants of the process and provide a guide for how to better ensure that the methods and tools of transdisciplinary processes are directed towards these goals. Through studying the design activities of a transdisciplinary winter school, we identified five CDMs that influenced the design process of the two groups. These are:

- Choosing the overall theme for stakeholder engagement

- Clarifying the theme

- Choosing the activities

- Adapting activities to the context

- Activating reflection

Rather than a linear series of steps to check off, CDMs are "forks in the road" in the design of stakeholder engagement activities. We explain each CDP in more detail and how it can be applied in transdisciplinary learning and research settings for this pre-crafted submission. This submission will explore how transdisciplinary stakeholder engagement can be designed to meet the goals and needs of those involved. Within the setting of a transdisciplinary winter school, we identify CDMs in the design process of creating a stakeholder event. By comparing the process of how participatory activities involving stakeholders are were actually designed in two student groups, we make a first exploratory identification of the critical elements for designing stakeholder engagement that may serve as guideposts for discerning the quality of transdisciplinary design processes. By studying these processes, we make a contribution to the ongoing discussion of how to study, qualify and compare processes of design within transdisciplinary process. In this case, in a transdisciplinary learning and teaching setting.

Integrate the Integrators! A call for establishing academic careers for integration experts

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The pressing environmental and societal challenges of our time require interdisciplinary research that crosses boundaries between different disciplines as well as transdisciplinary research that crosses boundaries between research, policy, and practice in order to formulate 'socially robust' responses to meet such challenges. Integration is widely regarded as the defining characteristic of inter- and transdisciplinary (ITD) research. Given its importance, we call for establishing academic careers as 'integration experts'. These are researchers specialized in leading, monitoring, assessing, accompanying, and/or advising others on integration within ITD projects or programs [1-3]. In order to explore the careers of integration experts and the challenges they face in the current academic system, we organized a workshop at the ITD 2019 Conference 'Joining forces for change' in Gothenburg, Sweden, attended by 47 participants and 8 workshop organizers. The participants represented different disciplines and fields, different geographic regions, as well as different scientific communities. The latter included the Global Alliance for Inter- and Transdisciplinarity (ITD Alliance), the International Network for the Science of Team Science (INSciTS), the Network for Integration and Implementation Science (i2S), and the Association for Interdisciplinary Studies (AIS). The workshop addressed four main questions [4]:

1. What are integration experts and what are their roles?
2. What motivates integration experts to assume their roles?
3. What personal qualities and expertises do integration experts need to fulfill their roles?
4. What career challenges do integration experts face in academia?

In this pre-crafted video presentation, we present results from the discussion of these four questions. We use direct quotes from workshop participants to substantiate results and embed them in recent literature from the fields of ITD research as well as Science of Team Science (SciTS) and Science and Technology Studies (STS). Building on these results and our own experiences in leading and studying integration, we finally suggest three complementary ways to support the academic careers of integration experts:

1. Establishing an international Community of Practice (CoP) of integration experts under auspices of the ITD Alliance to foster peer-to-peer exchange among integration experts, to generate greater visibility and jointly develop ideas and steps forward on how to transform academic structures;
2. Studying the academic careers of integration experts to reveal their different careers paths, explicate their intellectual contributions to ITD projects and programs, and disclose differents ways of supporting such careers at individual and institutional level;

3. Entering in collaborative dialogue with funding agencies and home institutions to present and discuss results generated by the first and second suggestions and lessons learnt from other institutions on how to establish permanent academic research positions for integration experts.

The pre-crafted video presentation provides key insights for the conference stream of "Integrative TD" since it explores the careers of integration experts and the challenges they face in the current academic system.

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Fostering actionable knowledge for sustainability via social learning: roles of professional knowledge and narratives

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This contribution discusses why TD sustainability research would benefit from devoting more attention to professional knowledge and narratives. It presents concepts, empirical insights and methods on how this could be done. They are based on transdisciplinary case studies on governance and social learning processes in two river basins in Luxembourg (post-2000) that have concerned challenges at the nexus of water, environment and agriculture.

TD research has developed a wide range of concepts and methods to integrate local (or experiential) knowledge with scientific ´expert´ knowledge and to co-create actionable knowledge for sustainability. Integration and co-creation have been conceptualized in relation to systems, normative/target and transformation knowledge (Pohl & Hirsch Hadorn, 2007). However, occupation-based understandings and skills are rarely recognized as a knowledge type in its own right. Furthermore, what makes knowledge meaningful to practitioners is at present still underresearched. Most inquiries into metaphors and paradigms are conceptual; roles of narratives are rarely analysed beyond TD processes.

This contribution shows how narratives can cast light on connections between professional cultures and paradigms (or "mindsets"), knowledge and practices. An analytical framework on actionable knowledge is presented that draws on the above concepts, on transformative sustainability science (König, 2018, Chabay, 2020), adaptive governance and management (Pahl-Wostl, 2015), professional learning (Schön, 1983) and Science & Technology Studies (Jasanoff, 2006). The framework serves to analyse contradictions and convergences that may emerge between diverse professionals in social learning processes: in terms of *purposes* (normative dimension), *factors* considered (systems dimension) and preferred *strategies* and *means* of social and material engagement (transformation dimension).

Case study methods have built on narrative and walking interviews, collaborative conceptual systems mapping, timelines and contradiction mapping. Actors included public authorities and water facility operators, farmers and conservationists.

Knowledge that is to foster joint action and changes in professional practices needs to resonate with and, at the same time, challenge professional knowledge and identities. Empirical findings suggest that personal meaning-making is interwoven with professional cultures that have been co-produced historically with technologies and infrastructures, with organizational and regulatory frameworks. The narratives of actors (interlinking present-past-futures) have revealed assumptions concerning human-human and human-environment relations that could be attributed to, respectively, productionist, command-and-control and managerial environmentalist paradigms. Changes in narratives along the above-mentioned dimensions thus served as indicators of social learning. Self-organised experiments - in interplays with *formal* governance processes - have been particularly conducive to fostering reflexivity, a shared sense of purpose, trust and converging understandings. Narratives of participating actors provided evidence of openings and *expansions* of established paradigms towards adaptive and integrated approaches.

Those actively engaged displayed particularly strong attachments to their professions, local contexts and/or nature in general. However, the case studies also suggest that many professionals feel confronted with growing regulatory, ecological and economic strains that reduce perceived spaces for learning and experimentation. Narratives of "being at the limit" or of having "no influence" hamper social engagement. Therefore, the contribution concludes by stressing that explicitly considering professional knowledge and strengthening narratives of self-efficacy among practitioners are key challenges for TD research – and beyond.

LET´S PUBLISH IT TOGETHER: ORIENTING QUESTIONS AND ANSWERS ON CO-PUBLISHING FOR CO-CREATION

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To address global challenges, effective collaboration of actors from various societal areas is needed. Co-creative research aims to navigate complexities around global challenges and improve research impacts towards sustainability. It combines different kinds of knowledge across academic, policy and practice domains and has grown towards the scientific mainstream. The integration of perspectives shall increase the social robustness and action-orientation of insights. Various approaches exist, including e.g. transdisciplinary, transformative, participatory action and place-based ecosystem research.

Co-creation equals a collective learning journey involving actors from science and society, both contributing knowledge and sharing ownership for the process and outcomes of research. Co-creation does challenge traditional ways of doing research.

Difficulties arise, e.g. due to differing interests of practitioners and researchers or forms of articulating knowledge. This made co-creation itself an intensely studied area, with targeted methods and guidelines being developed. Joint publication as way to communicate and harness the results of co-creative research has however received limited attention[1].

This article focuses a trend towards co-creative writing of academics and societal actors publishing collectively in peer-reviewed journals. This may be interpreted as a countermovement to the practice of extractive research. It questions legitimate ownership of published knowledge and may conflict with established standards of good scientific writing. Separate publication of insights continues to be the norm. High standards regulate what legitimizes authorship, which in consequence may exclude contributors from the ´fruits´ of the knowledge production process. Established practices for co-creative publishing are lacking.

Publishing practices are dependent on ontological and epistemological understandings as well as the aims of actors engaged. Decisions on if and how to co-publish need to be taken based on joint reflection and cannot be oriented along blueprints. Accordingly, the aim of this paper is to raise guiding questions related to central issues of co-publishing and to provide orientation for developing answers in a structured and context-sensitive way. This shall support informed decision making on co-publishing.

Reflecting the literature, we discuss co-publishing to draw out challenges in relation to established academic standards and explore the need to re-consider publishing notions and practices. Based on a collective reflection of our own co-publishing experiences in a broad range of cases, we present questions of central relevance for shaping the co-publishing process and its outcomes. Empirical examples are presented to illustrate different ways to answer questions in practice.

Key questions include: 1) *Why*: To which ends should co-publishing contribute? 2) *Who*: Which actors needs to be involved and to which degree? 3) *What*: What counts as knowledge, publishing and authorship? 4) *How*: What kinds of processes will help you achieve the purpose of co-publishing? 5) W*hich ones*: Which tensions remain and how to balance them? 6) W*ho is in charge*: What makes good leadership in co-publishing and to what and who are leaders accountable for?

Lastly, we discuss the value of broader, pluralistic notions of authorship for co-creative, action-oriented research and the need for transparency and reflexivity in co-creative publishing.

[1] Some notable exceptions are Kueffer et al. 2007; Pohl et al. 2015

PC-1.5: Pre-crafted contributions - session 1.5

Time: Tuesday, 14/Sept/2021: 11:00am - 11:45am

Transdisciplinary, trans-institutional Knowledge Creating Teams for the creation of transdisciplinary, challenge-driven educational programmes

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There is a growing consensus that inter- (ID) and transdisciplinary (TD) education is necessary to develop the skills of future researchers and sustainability experts to foster their ability to build effective partnerships with extra-academic actors for addressing complex societal and environmental challenges. These new educational approaches require knowledge of both system optimisation and system innovation (Sterling 2004, Kueffer et al 2012). While research into TD research practices is increasing (Hirsch Hadorn et al 2007, Klein 2014, von Wehrden et al. 2018, Baptista & Rojas-Castro 2020), there is a growing need for empirical research into system innovation and optimisation approaches for fostering these ID and TD educational approaches (British Academy 2016; Knight et al., 2013; Lattuca et al., 2017; Spelt et al. 2009).

CHARM-EU is a pilot European University alliance, funded by the European Union through the first call of the European Universities initiative. The alliance comprises five universities: Trinity College Dublin, Utrecht University, University of Barcelona, University of Montpelier and Eötvös Loránd University. In 2020, CHARM-EU formed Knowledge Creating Teams (KCTs), five groups of ten academics from multiple institutions and disciplines, for the inter-institutional, TD design of a Master's in Global Challenges for Sustainability. KCTs attended a series of collaborative content design workshops to produce a TD, sustainability-focused and challenge-driven curriculum for the Master's programme. The workshops and team meetings took place over a six-month period from July 2020 to December 2020.

This research presents CHARM-EU's curriculum design and KCT process as a case study. The aim of this research was to produce outcomes to inform university systems optimisation and innovation approaches that will support the TD educational experiences through two avenues:

- the use of KCTs;
- a two-phased TD curriculum design process.

Realist evaluation was used as an analytical tool (Pawson & Tilley, 1997) to frame exploration within the case study. The case study is informed by two phases of 11 semi-structured interviews with KCT members: one at completion of the first phase of the content design process and the second at the completion of the second phase of the content design process. Context-mechanism-outcome configurations were utilised to demonstrate the social and cultural context within which the KCTs formed, the resources provided to the KCTs, the responses to those resources and the outcomes.

This video presentation outlines the case study through a graphical representation of the KCT structure, the two-phased curriculum design process and findings from the data analysis. Based on the self-evaluation of KCT members perspectives and experiences, this research highlights potential elements that need to be considered when designing effective TD curricula. The findings demonstrate that the KCT environment and two-phase curriculum design process successfully created an experiential learning environment in which interviewees developed a shared understanding of TD and a curriculum ideology and artefact that connects TD to CBL. The presence of neutral facilitators was seen as integral to this process. The model could be replicated to support the design, development, implementation and evaluation of TD educational programs either within institutions or trans-institutional alliances. This is particularly valuable as an approach to helping higher education institutions

develop programs of change to support innovative and flexible educational models that develop the skills of future researchers and sustainability experts to address complex societal and environmental challenges.

Beyond All Discipline

Clive Holtham[1], Monica Biagioli[2], Allan Owens[3], Abdelfattah Abusrour[4], Osvaldo Garcia[5]

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Areas of focus: TD learning for transformation

- Personal transformation and development
- Navigating neutrality, activism, and emancipation

Motivation and purpose of the work

Our work collectively has been driven by the limitations of university education in preparing learners holistically to promote societies and enterprises which are:

- just,
- sustainable,
- civic

STEM and disciplinary excellence are essential, but are not enough. Eurocentric forms of production of knowledge are not enough. Educating individuals is essential, but it is not enough.

We draw on a body of our work covering more than two decades which has emphasised:

- Transdisciplinarity, if not indisciplinarity
- Interweaving ontologies from both the global North and global South
- Developing radical educational methods that serve society as well as individuals and institutions, and which also support the transformations needed in institutions, teachers and learners.

Conceptual approach

The fully transdisciplinary EU Erasmus Project "Beyond Text" (2016-19) produced a significant body of research and educational innovation, with a particularly important input from the Palestinian partner. There was an emphasis on art-based pedagogies in the teaching of any subject, and on indisciplinarity (a concept from art history) enabling needed disruptive change.

Since then, we are building on an impressive approach "CLEHES" (Garcia, 2018), developed in Chile, which also challenges conventional disciplinary and conventional pedagogic approaches to personal and organisational change.

Methods used

The educational innovation and transdisciplinary perspectives of the co-authors have been published in books, journals and conferences relating to art & design, education, management and cybernetics. This proposal is, however, the first to weave the work of all five co-authors into an integrated collective story wholly related to transdisciplinarity, with case studies primarily from three projects:

1. Beyond Text (a wide palette of largely art & design-based learning methods, applicable to education and research in any discipline internationally)
2. RIHPLA (long-running engineering leadership module in Chile built wholly on CLEHES)
3. Curriculum 22 (Reform project deploying CLEHES and Beyond Text approaches to decolonising a UK business school curriculum, 2020-)

Main results

The work of all authors has pointed to the feasibility of transforming education internationally through transdisciplinary collaboration and delivery. Alumni of these programmes particularly report on the career-long benefit of non-conventional approaches. Their experiences also point to the barriers faced by educational innovators, particularly in universities, and the ITD 21 contribution will address both opportunities and barriers.

Conclusions.

We believe pre-crafted contributions allow more leeway to showcase such innovations and encourage colleagues to consider them. They also allow the values and experiences of the authors around just, sustainable and civic approaches to be communicated expressively. We propose:

Short Video Presentation, which will emphasise the voices of participants combined with fragments of the radical methods in use on three continents; non-English language voices will have English sub-titles.

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Hybridizing science, design and local action: a new MOOC on Designing Resilient Regenerative Systems

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Climate change, biodiversity loss and pan-syndemics like Covid-19 are some of today's most pressing complex challenges we as society have to address. Much of our economies and societies prove to be not resilient and regenerative, but exhaustive, vulnerable, and unfair. Scientific knowledge and reasoning are the fundamental tools to base policy and management decisions on, especially in times of crises. We experience the limits of science when it comes to dealing with highly complex systems that are self-emergent, unpredictable, span across nested scales, depend on societal behavioral transitions, and lack data. The goal is to actively restore, to regenerate ecosystems and their services, while transforming our economy to become more circular and more just. We need new knowledge systems and cultures leading to transformative action since "the human impact on earth needs to be fundamentally redesigned".

Designing Resilient Regenerative Systems is an innovative and timely Massive Open Online Course (MOOC) that builds capacity in transformative systemic innovation through a combination of holistic consciousness, systems thinking, and cooperative design doing in illustrative real-world cases. This innovative MOOC provides participants with worldviews, systemic design tools, illustrations and translocal social co-design networks - for building their capacity to creatively tackle complex, real-world sustainability challenges. It provides nature-inspired creativity tools of design praxeology as complementary with science programs to actively take responsibility in designing systems that are resilient and regenerative. The governance and spatial scales of regenerative design span from the level of green chemistry via materials, products, architecture, communities, to cities, landscapes, bio-regional economies, to transnational cooperation.

The applied didactic MOOC concept fosters virtually nudged translocal people action through systemic design doing in illustrative real-world settings across cultural, political, climate and geographic transects, and on different governance scales, such as the MonViso Institute in the Italian Piedmont, Hemsedal community in Norway, the city of Annecy in France, and the Mediterranean Balearic Island region.

This MOOC builds on established teaching in engineering, planning, architecture and different science disciplines while introducing systemic design thinking and doing as topical, didactic and collaborative spearhead in inter- and transdisciplinary, real-world education on a Master level. Further educators in this MOOC are scientists, planners, designers and practitioners of leading European institutions in the field of systemic design, sustainability science, and transition studies, of local communities and large cities.

Scheduled to be offered via EdX for the first time from October 2021 on, this MOOC targets students who are eager to learn about the emerging transdisciplinary topic of regenerative systems design, and to develop their scope and skills in systemic design across governance and spatial scales. It equips participants with worldviews, motivation, tools, illustrations and translocal social co-design networks - for building their capacity to creatively tackle complex, real-world sustainability challenges - and foster systemic innovation.

Students who like to connect with potent translocal transition networks across Europe, and who are eager to help shaping future-ready didactic concepts in the real-world, while enjoying independence and self-organization, are welcome to sign up for this exciting educational offer.

Activating breakthroughs: An online transdisciplinary career development program

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How can TD concepts contribute to personal transformation and development?

There has been an increasing demand for online career development programs for people in transdisciplinary careers. Online career programs can contribute to personal transformation empowering both young people and experienced professionals making career and life transitions. This presentation will define and give examples of emerging transdisciplinary career pathways and the nature of transitions people have been experiencing, particularly in post-pandemic times. A new transdisciplinary career development program *Activating Breakthroughs* will be presented, featuring a narrative therapy approach blending online coaching and counselling techniques to activate broader transdisciplinary skill sets.

Recent research (Ji et al, 2021) has shown that online counselling programs are more effective in assisting people experiencing anxiety to retrain their brains to think positively and overcome inhibitions related to their negative thoughts, fears and self-doubt. Reducing this anxiety is also a key outcome of online career development programs and services, using constructivist approaches such as narrative theory as a tool to do this while tailoring sessions to specific individual or organisational needs.

This online program is based on the need for people to build and strengthen their self-concept, self-confidence and self-reliance, all of which underpin leadership, entrepreneurialism, wellbeing and resilience in navigating and managing non-traditional emerging transdisciplinary career paths. Narrative theory is about creating awareness of various meanings and patterns through life storytelling (Reid, 2015), which is also a vital first step towards facilitating transdisciplinary work (Miller, 2020).

Individual narrative counselling sessions are based on guiding people to craft their career stories which help them understand their personal values and professional identities and how they might align with their current and future career issues or goals. The career development practitioner facilitates and summarises the storytelling, reflecting the client's own words and collaboratively identifying potential patterns and themes.

Looking at how the client can move forward on a task or project that is important to them and their communities, they can engage in a series of regular coaching sessions using the GROW technique – talking through their goals, realities, opportunities and wrap-up with action steps – while making decisions informed by their new understanding of themselves, their evolving professional identity and values. Following the completion of their project, they can engage in informed reflection of the experience, considering transdisciplinary mindsets and skillsets towards sustaining long-term collaborations:

- Reflexivity through journaling habits;

- Fusion skills blending human and machine learning;

- Informed learning - how information from many different sources can contribute to personal change and creativity; and

- How their resilience and mental health has been experienced during the coached project, tracking any changes towards their desired transition or adjustment.

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Transforming Teaching and Learning Spaces for Sustainable Development

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This submission aims to present a fresh approach towards igniting leadership and change for a sustainable future, as an example of tangible transdisciplinary, cross-country, intercultural education scheme. Our initiative is motivated by the necessity to bring a new mindset through innovative solutions in meeting today's challenges and by the fact that youth should be part of key decision-making processes. The purpose of the program is to cultivate inclusive, creative and ethically focused problem solving mindsets that help to build stronger and more just communities, as well as provide participants the know-how and skills to make this happen.

"Maker Majlis" is a collaborative platform under the College of Islamic Studies at Hamad Bin Khalifa University, for youth to engage in United Nations Sustainable Development Goals (SDGs). The platform is inspired by the traditional notion of "majlis" in Qatari culture where people would gather and discuss important matters. Building on this tradition but with a modern twist, the initiative aims to create an innovative space of synergy, dialogue and connection; a space where the youth can create a collective vision for the future and contribute to achieving the Global Goals.

With the pandemic, Maker Majlis has been digitalized and transformed from an already innovative learning and teaching space into an even more expanded platform, i.e. the Design Post-COVID Humanity (DPCH) Program. DPCH is a multiplex educational space that runs over the span of six months to unleash the transformative power of motivated youth from around the world to collectively design and work on a sustainable post-COVID humanity.

As DPCH is a venue to systematically locate innovative ideas within SDG frameworks and transform them into actual projects. This initiative is transdisciplinary in nature with regards to its curricula, mentors, lecturers and participants. DPCH involves conceptual approaches and methods in the trainings, human-centered design training, creative problem-solving approaches, mentoring, academic lectures, interactive workshops, group activities and inspirational talks by key social figures. The activities are meticulously planned and designed around the three domains of learning objectives for the SDGs as outlined by the UN: cognitive (for knowledge and thinking skills necessary to better understand the SDGs), social-emotional (for social skills to collaborate and communicate better, allowing students to delve deeply into the complex factors connected to the SDGs) and behavioural (to create workable solutions to SDG related problems).

Up to date, with the participation of 229 students from 32 countries, 16 local and international partners, more than 50 lecturers and various globally recognized international speakers, the program perfectly demonstrated that a new teaching and learning scheme is possible. DPCH was mentioned by the Deputy Secretary General of United National, Amina J. Mohammed as a "good example" for such new learning and teaching spaces.

The presentation does not only introduce the initiative, but also covers key challenges and lessons-learned while implementing the project, and focuses on the impacts of the initiative on student experience and learning.

The submission will be presented by a short video.

PC-2.1: Pre-crafted contributions - session 2.1

Time: Tuesday, 14/Sept/2021: 11:45am - 12:30pm

Challenges and Opportunities for Implementing Transdisciplinary Case Study Approaches in Post-Soviet Academic Systems: Experiences from Armenia and Georgia

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In this contribution, we shed light on the potentials of transdisciplinary (TD) research and teaching integration in post-Soviet countries as a way to contribute to the complex societal problem-solving process. We draw lessons from specific challenges and opportunities for integrating and applying transdisciplinary approaches in the academic institutions of Armenia and Georgia. To meet this goal we conducted qualitative research using mixed methods: including analysis of scientific and legal documents, semi-structured expert interviews, and focus group discussions with participating students, teachers, and local stakeholders. Findings from this investigation discussed in an analytical framework for implementing transdisciplinarity in an academic system according to four interrelated dimensions: (1) the societal role of universities, (2) the internal structure of academic system, (3) practical organization of transdisciplinarity, and (4) societal conditions of governance. Within each dimension, we identified obstacles for TD implementation and provide recommendations for overcoming them. Despite many challenges, our results show that transdisciplinarity facilitates a new culture of collaboration between academia and society for the South Caucasus countries, affirmed by case-based research on integrating TD approaches into Armenian and Georgian universities.

This visual presentation will focus on the role of transdisciplinarity in the current national education and research policies and practices of Armenia and Georgia and will provide insights with respect to societal conditions of governance and the role of universities. Furthermore, the benefits and future perspectives of transdisciplinary research and teaching as a way to contribute to the social problem-solving process in the Caucasus region will be discussed. Based on our analysis and the lessons learned, we will provide general recommendations for successful TD case study research design and implementation in two post-Soviet countries.

Building structures to institutionalize TDR in higher education at TU Berlin

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The institutionalization of transdisciplinarity at universities has many facets. Essential issues are the selection of the right strategy for the very institution, the support within the institutional body, the implementation in teaching and research and breaking down of prejudices and common habitual influences.

Beyond necessary cultural changes, a central criteria for success is the development of structures that are suitable for enabling transdisciplinary work. To do so, universities can, for example, support service facilities that enable all interested scientists and students to work in a transdisciplinary mode.

As part of its institutionalization strategy of transdiciplinarity since 2014, the TU Berlin has chosen various approaches to build structures. To present here, three structure-building measures will be introduced including their benefits for broad anchoring of transdisciplinarity as well as the possibility of their transferability to other institutions will be discussed.

The first structure is the Science and Society Office at the Executive Board. This is where the already existing structures and initiatives at the TU Berlin are linked and pilot projects are acquired and carried out which benefit the entire university. With support of the Executive Board, transdisciplinarity as a research mode can be introduced and promoted throughout the university and are embedded in the overall Transfer-Strategy of TU Berlin.

The second structure presented here is the StadtManufaktur. It is a a platform for living labs that serves for scientific and non-scientific initiatives to network and become visible together. In future, this common platform is intended to generate transformation knowledge and ensure the transferability of results.

The third structure is the Research Forums of the Berlin University Alliance, which are being set up at the TU Berlin for the Berlin Universities due to its transdisciplinary profile. So, an overarching support structure for transdisciplinary research is build up, which is intended to promote in particular Grand Challenges Initiatives from Berlin.

In all new structures presented, three factors are effective that are important for institutionalization:

1. These are structures supporting the overarching goal to foster transdiciplinarity - they are independent of specific topics.

2. New professional careers are developed within the institution in order to meet professional standards for transdisciplinary work and research right from the start, in particular the profession of „Integration Experts"

3. Top-down and bottom-up strategies and experience should be mixed to open up a discourse space bringing newcomers and experienced researchers together. Support should be given by the institutional leaders.

Discussing this, we are particularly interested in whether these strategies and factors are transferable to other institutions and are kean to learn about experiences in different settings, institutions and countries.

Introducing Transdisciplinarity: Two Cinematic Approaches

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For some time now, the Technische Universität Berlin has been intensively pursuing measures to institutionalize transdisciplinarity – as a complementary approach to existing research modes – and to establish corresponding structures. Experiences from this approach but also from the newly founded Berlin University Alliance – the new excellence alliance of Freie Universität Berlin, Humboldt-Universität zu Berlin, Technische Universität Berlin, and Charité – Universitätsmedizin Berlin – show that scientists are quite interested in the transdisciplinary research mode. However, we have made the experience in our everyday work that they often lack the knowledge about what TDR actually is. We realized that we needed to take a whole step back to pick up the stakeholders we want to involve in the upcoming processes. For this reason, we decided to produce two films on TDR.

The film "Transdisciplinary Research – What is it?" explains the transdisciplinary research mode in a simple and understandable way while highlighting its scientific and societal relevance. It points out the strengths of this research mode compared to others and illustrates for which questions it is suitable. The film is an animated collage.

In the second film, participants of a TDR project share their experiences with the audience. The film "Transdisciplinary Research – How can we make it happen?" aims to motivate scientists and non-scientists to participate in transdisciplinary exchange formats. The film outlines the different roles and highlights the added value of participation. The film is realized in form of a reportage that links interviews with filmed real images of an TDR project that was focusing on questions of how food is sensually perceived and experienced.

Despite their different objectives, both films are aimed at scientists and especially young scientists as well as the interested public: in short, the actors we need for a transdisciplinary process. But why did we produce two different films if the target audience is the same? People feel differently addressed. Some would rather have something explained to them, others would rather be taken on a journey and inspired by real experiences. Presenting the films at the ITD21, we would like to discuss about specific target groups, preferences, and feedbacks from various audiences. We give insights in the variety of opinions and click rates we will have collected up to them and would link this with an online survey to ask the audience of the ITD21 which effects the films create. We are particularly interested in the following aspects:

- How do different target groups perceive the films?
- Which of the films is preferred and why?
- Which other channels can be used to distribute the films?

Both films are in German with English subtitles and have a length between 5 to max. 6 min. They will be available and free to use.

Facilitating a stronger role for the Science for the Carpathians network in the sustainable development of the Carpathian region

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The Carpathian Mountain ecoregion constitute an important hotspot of biological and cultural diversity and provide a living environment for people in seven countries. The Carpathian countries are parties to the Carpathian Convention – a regional treaty, which supports cooperation on protection and sustainable development of the Carpathians.

Activities of the Convention are guided by its articles, focused on different aspects of sustainable development in the region. The Carpathian Convention parties agree on the importance of awareness raising and public participation, reflected in Article 13 of the Convention "Awareness raising, education and public participation".

An important development with respect to the implementation of the Convention was the establishment of the Science for the Carpathians (S4C) network in 2008. The network aims, among its several objectives, at defining research priorities for the Carpathian region and linking research, policy, and practice. Among its main activities is the organization of Forum Carpaticum – a biennial scientific conference, as well as providing inputs based on the conference results to the Carpathian Convention Secretariat, and the Convention Conference of the Parties, the main decision-making body of the Convention.

While the S4C has faced challenges with attracting scientists focusing on interdisciplinary and transdisciplinary research, as well as promoting such approaches among its members and young scientists, the Steering and Executive committee, in cooperation with the Convention Secretariat, have made efforts to strengthen collaboration among the S4C, practitioners and policy-makers, and have achieved certain progress in this respect, thanks, partly, to funding provided by the Advisory Assistance Programme (AAP) of the German Environment Agency.

Specific efforts included introducing interdisciplinary and transdisciplinary sessions and speakers at Forum Carpaticum 2018, and a joint workshop with the Working Group on Biodiversity of the Carpathian Convention, focused on improving knowledge exchange among scientists and decision makers in Carpathians. The workshop, conducted in 2019, using the World Café method, brought together members of the S4C steering committee and Carpathian Convention Biodiversity Working Group (i.e. Convention focal points, and experts and practitioners in the field of nature protection), to integrate knowledge on: 1) urgent knowledge gaps for the Carpathian Convention; 2) important interdisciplinary areas and research questions, which can be addressed by S4C and 3) concrete ways and opportunities for scientists to cooperate with Convention Secretariat in order to support the implementation of the Convention in this field. This format has been considered successful - and a precedent to further strengthen cooperation among the S4C and the Convention Secretariat.

As a result, stronger collaboration has continued among the Convention Secretariat and the S4C network. During the recent Forum Carpaticum Conference, "Linking the Environmental, Political and Societal Aspects for Carpathian Sustainability", which took place virtually in June 2021, two workshops have been co-organized by the Secretariat and the scientific community. One of the workshops focused on institutionalizing transdisciplinary collaboration in Education for Sustainable Development. Moreover, a Plenary has been devoted to discussion about strengthening the role of Carpathian scientists and transdisciplinary approaches for sustainable development of the region. The following challenges have been identified: 1) lack of funds, 2) institutional challenges, 3) political environment, and 4) lack of experience and practice among the Carpathian actors. Recommendations and ways forward to address these challenges by the S4C network are now under discussion.

The authors will briefly present the process to-date and focus on the results of the exchange during Forum Carpaticum 2021, and the follow up ideas by the Carpathian actors to strengthen inter-and transdisciplinary approaches in the region. We would like to use the opportunity to ask for feedback and recommendations from the ITD 2021 community, as well as invite collaborations in the Carpathian region.

Transdisciplinary formats (TRAFOS) of TU Berlin for generating transformation knowledge

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The development of a transdisciplinary profile has a particular high strategic value for Technische Universität Berlin (TUB) in view of opening up science and major societal challenges - such as the digital transformation, climate change, urbanisation, the Anthropocene - as well as corresponding expectations for science to contribute solutions. To increase social relevance and to integrate practical knowledge, transdisciplinary research is to enable the integration of various stakeholders into research, including the definition of research questions and goals, participation in the research process and the discussion of research results. A prerequisite for its realisation is the linking of content and working methods of science as well as to make knowledge exchange tangible and structurally anchored.

With the institutionalisation strategy of transdisciplinarity at the TU Berlin, we have made use of existing structures, service units and platforms to promote structural development for the support of transdisciplinary research. Aiming to further institutionalise transdisciplinarity at TU Berlin transdisciplinary formats (TRAFOS), methods and processes are developed and

tested by the VP07 team in the Office of the First Vice President. How can these supporting structures stimulate and provide better transdisciplinary research?

In this session we will introduce exemplary TRAFOS oriented to the generation of transformation knowledge , e.g. for climate change research. Embedded in a broader framework of TRAFOS with the superior formats for long-term support in the context of cutting-edge research (Research Forums, Berlin University Alliance) and transformation science (real-world laboratories) they represent collaborative labs. For climate research, they are linked with transfer formats at the intersection of science, arts, design and society in partnership with Berlin University of the Arts (Doing labs and Master of Design & Computation). The TRAFOS represent following strategic operational orientations at TUB, with different emphases

01Framework for developing methods to accompany transdisciplinary research,

02 Processes to enable and promote knowledge exchange, integrated knowledge production and circular transfer between science and society,

03 Building blocks for structural development in order to establish transdisciplinary approaches to excellence research, sustainability research and transformation research in the long term and

04 Methodological concepts to support the transferability of transdisciplinary approaches.

The following collaborative public policy labs and interactive labs, some tested and reflected, others in the development phase, will be presented and discussed with the audience:// the **Climate Citizen Council** Berlin-Brandenburg and **stakeholder consultations** as methods for policy advice and opening up policy to integrated climate-relevant solution strategies and their application by the public

// the **real-world laboratories** of the TU Berlin platform 'Stadtmanufaktur' and **hands-on projects** as transdisciplinary approaches for generating urban and systemic transformation knowledge as collaborative and interactive labs

// the establishment of structures for **transdisciplinary teaching** for climate research, linking science with social problems

More specifically the TRAFOS represented here mirror methodologic ways *how* to provide and design transformation science while providing a transdisciplinary solution-oriented research culture by embedding human experience and behavior. They are a starting point in a conceptual phase for a method development, its testing and renewal by learning from failures. They can be adapted to changing conditions and processes within society and research, different topics or can be enhanced by new formats.

PC-2.2: Pre-crafted contributions - session 2.2

Time: Tuesday, 14/Sept/2021: 11:45am - 12:30pm

Understanding how climate information comes to matter. A dialogue on mutual learning about the role of co-production in urban climate governance in the cities of São Paulo and Hamburg

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Cities worldwide are both key contributor to and severely affected by climate change. In consequence, urban governance is considered to play a key role with regard to climate change mitigation and adaptation. While transdisciplinarity is advanced as instrumental approach to facilitate climate action and the co-production of climate services, the well-known science-policy gap widely persists. In our research, we aim to better understand and make aware of the complex dynamics in a multi-level governance context that eventually give meaning to climate facts. We explore the question, how the local context with its institutional, socio-cultural and material particularities affect the co-production and use of climate information in urban decision-making. Empirically, we analyse and compare the cities of São Paulo and Hamburg as case studies by looking at different governance arrangements (city-wide level, district level, and living labs) where the collaboration between science and policy happened to varying degrees. Through interviews and document analysis, we aim to reveal how perceptions of climate change, the use of scientific information and realisation of knowledge co-production shift over time and in relation to the different institutional or collaborative settings and, consequently, affect urban climate decision-making. The research aims to stimulate learning processes among and between researchers and city actors, as well as between the two cities in the Global South and Global North.

In our podcast-style video presentation, we aim to specifically illustrate and reflect on our personal learning process while engaging with the case studies. We – a sociologist from Brazil working on the case of São Paulo and a Geographer from Germany responsible for the case study in Hamburg – picture our ordinary online dialogue discussing our insights, thoughts and worries in the research process. Such digital dialogues, although not without facing structural challenges in the South-North context, represented the key moments of mutual learning in our research, as the pandemic also affected our project and prevented any possibility to meet and discuss in "real life". We will present, how our different disciplinary education and socialisation, as well as the individual insights from a systematic literature review and engaging with the case studies has led to different findings and assessments, and how our regular exchange on these insights has triggered mutual understanding and learning. Through these mutual insights, we increasingly understood how the local context with its specific practices, norms, narratives and framings affect climate-related activities and the use of climate information in decision-making. We will specifically highlight our recurring discussion on the role of social sciences in transdisciplinary climate research and how the analytical lens of co-production helped us to better understand the role of knowledge co-production in urban climate governance. In conclusion, our presented dialogue aims to picture the value of virtual exchange for learning across disciplinary and cultural divides, which in our case considerably contributed to better understand that and how institutional and socio-cultural factors matter when designing knowledge co-production in cities. We close our presentation with some questions to the audience aiming for a critical feedback and reflection of our insights.

Looking at the intersection of the housing and the climate crises in Boston, MA: a transdisciplinary approach

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Our team at the University of Massachusetts Boston has undertaken a multi-year research project that studies the complex and socially relevant intersection of urban housing affordability and climate change. Although urban housing challenges have received increased attention over last few decades, the potentially exacerbated effects from the intersection of these crises remain under-recognized and under-researched. On the housing crisis front, there has been efforts by communities, advocates, and engaged scholars and policymakers to design and implement innovative policy solutions in the Greater Boston Area. However, with increasing economic growth and inequality, the region maintains alarming levels of housing instability, displacement, and overcrowding of families living in hazardous conditions, particularly among low-income people of color. On the climate change front, projections regarding the intensity and frequency of various climate impacts in the region anticipate worsening conditions for affordable housing availability and livability. Despite local public efforts to address climate hazards and vulnerabilities, like the Climate Ready Boston initiative (City of Boston, 2016), the city has become an example of climate resilience privatization, where actions tend to focus on property protection and economic growth agendas, failing to meaningfully involve vulnerable communities in the policy process.

Our qualitative study is informed by different sources, including a community town hall, interviews and a seminar with advocates and policymakers. Initial findings highlight that place-based knowledge drawn from the lived experience of residents provides key insights into perceived risk associated with construction and location, adaptation of housing to different cultural lifestyles, and on the value of safe and stable housing for the wellbeing of families. Consequently, it has informed advantages and drawbacks of policy instruments targeting this compound crisis.

In light of these findings, this paper calls for an integrated, transdisciplinary approach to the intersection of the housing and climate crises. Instead of primarily relying on specialization and knowledge fragmentation to understand the phenomena, the approach steers the use of technical disciplines and focuses solutions on citizen-informed, value-driven strategies. We suggest structuring expert and traditional co-produced knowledge within the transdisciplinary pyramid of inquiry provided by Manfred Max-Neef (2005) and inspired by the disciplinary levels suggested by Jantsch (1972). The pyramid will be used to organize knowledge about the housing and climate crises in the hierarchical system, composed of empirical, pragmatic, normative, and value disciplinary levels. The Gaziulusoy and Boyle (2012) model will be used in tandem to link disciplinary levels of the pyramid into three levels of knowledge –systems, target, and transformation (Hirsch Hadorn et al., 2006)– and to determine existing system knowledge and target knowledge to be generated throughout the research project. The aim is to generate transformative knowledge that helps us understand the extent of the intersection and ways to access target knowledge to support the design and implementation of policies and plans addressing this joint crisis.

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Towards a co-design of adaptation measures to heat events in cities: examples from Heidelberg, Germany

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As one of the impacts of climate change, Heidelberg (Germany), like many other cities, is facing an increase in the frequency and intensity of heat waves. Extreme temperatures endanger human well-being and health. In particular, vulnerable demographic groups such as seniors, people with pre-existing conditions, and young children are negatively affected. Based on current inter- and transdisciplinary projects, our conference contribution provides reflective insights into our approaches to co-design appropriate adaptation measures to mitigate the impacts of heat waves in public spaces. The multidimensional concept aims at considering the interrelated scientific, social, and practical aspects.

The approach was developed in a pilot study (Foshag et al., 2020) and will be applied and significantly advanced in the project "HEAL – Heat adaptation for vulnerable population groups" starting mid-2021. In a short video-clip we present the concept, the results and the evaluation of the pilot study and discuss the integration of the outcome into the HEAL project. The video critically reflects on the progress and hurdles of the studies and takes the viewer on a virtual tour to the research sites in Heidelberg.

The design of the pilot study combines physical measurements, solar modelling, and public perception surveys to an integrated set of methods.Considering the complexity of challenges and diversity of perspectives of relevant stakeholders and user groups, the data set aims to develop practical solutions and advances basic research on climate change adaptation. The study shows what added value transdisciplinary approaches offer, what potential they have and thus describes a holistic approach supported by local stakeholders. While the focus of the pilot study was on the development of adaptation measures at the urban planning level, the HEAL project also addresses the individual level.

In the HEAL project, we aim at implementing the transdisciplinary design by involving affected groups of people (seniors, people with pre-existing conditions, families with young children) and the organized civil society (senior citizens' clubs, family networks). In addition to information and adaptation concepts on heat stress in general, the project's goal is to develop

strategies to support and ensure everyday life and the mobility in the city even under extreme temperatures. To this end, the project will use real-time sensor data to identify and model areas of increased heat stress. Based on the sensor data and existing climate analysis maps, statistical prediction models will be developed. The results are to be incorporated into a navigation along shaded routes to enable heat-stress-adapted mobility. The information obtained will be processed and made available via an application and analogue and digital information services and maps.

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Energy citizens for inclusive decarbonization – Operationalizing transdisciplinarity within the Horizon 2020 framework

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The European Union (EU) is at the forefront of implementing a vision to limit global temperature rise to 1.5℃ based on the accords of the 2015 Paris Agreement on Climate Change and the IPCC 1.5 special report. In pursuit of this goal, the EU has set out a net-zero greenhouse gas emissions target by 2050. The forthcoming European Green Deal and the Just Transition Mechanism highlight the intention and recognition by the EU Commission that parallel efforts must be made in changing the paradigm of energy use and the role that citizens can play in making such a change possible.

The role of citizens to help realize such an ambitious goal has been acknowledged within the strategic and legislative framework of the EU as a part of the Clean Energy for all Europeans Package. Yet, which citizens to involve in this process, how to do so fairly and effectively, and when to involve them remain largely unanswered questions to both academic experts and policy makers. In this respect, the overall vision of the Energy Citizens H2020 project for Inclusive Decarbonization (ENCLUDE) is to help the EU to fulfill its promise of a just and inclusive decarbonization pathway through sharing and co-creating new knowledge and practices that maximize the number and diversity of citizens who are willing and able to contribute to the energy transition.

Reaching ENCLUDE's objectives relies on both a scientific methodology which enables us to integrate existing theories and frameworks across different disciplines for a better understanding of energy citizenship and a practical means by which we can put this new knowledge to use in collaboration with citizens themselves. This linkage between scientific and practical need is why we will rely on a participatory approach to research and innovation.

This project concept is applied to three key thematic areas (mobility, renewable energy deployment and energy efficiency, including energy sufficiency (i.e. conscious reduction of overall energy and resources use through behavior changes) which are of particular relevance to citizens within EU policy framework under the Clean Energy Package and the Green Deal. The ENCLUDE concept has three core components:

- **Transdisciplinary "quintuple helix" approach** as "a model of cooperation where, with stakeholders from the public and private sectors and academia, a strong emphasis is placed on citizens and their needs"[1]. ENCLUDE integrates the *inclusive* involvement of citizens with scientists, policy makers and business leaders, specifically for decarbonization throughout its *entire* research cycle.

- **Interdisciplinary needs-based research design** – ENCLUDE uses a qualitative and quantitative mixed methods approach that is determined by project objectives, rather than dictated by disciplinary habits and comfort zones. This pragmatist approach to research means that the researchers do not judge an approach by whether it is qualitative or quantitative, or on one's personal biases for particular methods, but rather by choosing the methods which best achieve the aims of the project.

- **Impact driven and ready-to-use and adaptive knowledge for policy making and innovation** – ENCLUDE's research outcomes are continuously informed by new discoveries during the research process; however, we believe that our responsibility is to make this output easily understandable and directly applicable for policy makers, citizens and relevant businesses.

We would like to use the opportunity of the ITD conference to introduce our project and its aims, as well as explicitly point out the contributions of transdisciplinarity research to decarbonization processes taking place in the EU.

#climatechallenge – Real-world experiments to empower change agents in sustainability transformation: Shifting from footprint to handprint actions.

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To rise to the challenges of the climate crisis, a transformation of all areas of society is required. This also includes changes in individual lifestyles. Decisions by individuals for more sustainable consumption to reduce their personal CO_2 footprints are one part of this. But in addition to private footprint actions, structural changes in society are decisive for the socio-ecological transformation. Traditionally the domain of politics, structural changes can and must be promoted through individual actions. These socially and political effective actions, in contrast to private footprint actions, can be labeled as handprint actions.

To empower change agents in the sustainability transformation, the team at the Department of Sustainable Economics of the University of Applied Sciences in Constance developed the transformative workshop format #climatechallenge.[1] The university course consists of two 30-day real-world experiments: The starting point is a footprint-experiment for more climate protection in one's own everyday life (nutrition, consumption, mobility, living). Building on the experience gained in the footprint part, the participants launch a self-selected handprint-experiment with the aim of having an impact beyond the private sphere

that contributes to the overcoming of inhibiting, unsustainable structures in society. At the end of the #climatechallenge the participants reflect and document their personal experiences by writing short texts (method: storytelling).

An initial survey with #climatechallenge participants revealed the problem that the shift of activity towards the handprint has failed in most cases – despite mostly successfully accomplishing the footprint-experiment. We consider this as the footprint-handprint-gap. The question is therefore whether and how this gap can be bridged: How can handprint action can be empowered though transformative workshop formats like #climatechallenge?

From 16 storytelling-texts of the participants in a #climatechallenge-course in 2020, a preliminary theory of the postulated footprint-handprint-gap was developed, using the Grounded Theory methodology. The results suggest: Starting with the private footprint actions, it seems to have the potential to trigger a deeper reflection on political or social engagement options for climate protection (handprint). It seems possible that this leads to a self-reinforcing process. At the core of the preliminary theory is a strong positive experience of the participants who draw so much energy from their footprint experiment that they are confident that they can also exert influence at higher levels in society and create sustainable structures for others.

The presentation will highlight more of the results and outline further research. Better understanding the footprint-handprint-gap will help to empower change agents in the sustainability transformation and improve transformative formats with real-world experiments like #climatechallenge.

[1] Open-source material for the #climatechallenge can be downloaded on: https://www.climatechallenge.cc/

PC-2.3: Pre-crafted contributions - session 2.3

Time: Tuesday, 14/Sept/2021: 11:45am - 12:30pm

Collaborative Introspection as a Methodological Tool of Reflexivity - from multidisciplinary to transdisciplinary co-production

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This paper explores reflexivity through "collaborative introspection" as a methodological tool for transcending a multidisciplinary dialogue and achieving transdisciplinary co-production of knowledge. Reflexivity is argued to be applicable for critically addressing assumptions and ideologies of the research team (Popa et al., 2015), joint problem framing (Pearce & Ejderyan, 2019), experimentation (Popa et al., 2015), or more generally as a focal area to be used for addressing challenges in transdisciplinary projects (Jahn, et al., 2012; Polk, 2015). However, discussions on reflexivity rarely place focus on how a reflexive dialogue can be used to gather empirical material in a collaborative manner, making use of the participating researchers' subjectivity, personal experiences and understandings of a specific topic.

The authors of this text are part of a transdisciplinary research team exploring the role of tourism in multicultural societies. The team involves researchers from the fields of design, marketing, tourism studies, human-computer interaction, and migration studies. In the project we collaborate with each other across disciplines in different case studies. However, we have experienced a tendency to fall back into our disciplinary silos, where we explore the same topic from our own disciplinary lenses.

As an attempt to bring ourselves together we decided to go personal. Instead of looking at the role of tourism in multicultural societies from our disciplinary viewpoints, we dug into our memories of acting as tourists ourselves in a reflective session. More specifically, inspired by the tool *Tell your story by means of an object* (td-net, 2021)*, we shared and reflected upon our own tourism experiences through our core project concepts, which are diversity, inclusivity and integration. The dialogue that emerged forced us to focus on our research topic not as researchers who are expected to maintain objectivity but rather as individuals allowing ourselves to be subjective. This created a feeling of working 'together' instead of 'with' each other. The reflections created genuine and honest dialogue highlighting our national, cultural, gender and racial differences.

The differences and similarities of our personal experiences depend on the social categories and identities that we are part of.Thus, by bringing our personal stories as empirical material, we created an opportunity to listen to each other beyond our disciplinary boundaries. It made us understand the layers of hierarchy, privilege and disadvantages that we face in our lives as individuals, and to understand instances of inclusion and exclusion in tourism at a deeper level.

From our experience, we propose what we term "collaborative introspection" as a reflexive methodological tool for transdisciplinary research and practice. Collaborative introspection exercises challenge the commonly held idea of neutrality. It can be used as a tool for a transdisciplinary group to come together, transform thoughts and develop empathy and ethics in research.

Facilitation of Transformative Learning Networks Through Paradox Management

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Over the past three years, the Netweaver Network has been convening dialogues among experienced "netweavers" who were eager to learn from others who share their passion for organizing networks that catalyze systems transformation (see https://www.netweavernetwork.org/netweaver-dialogues). These netweavers promote both place-based learning and systems-side change in multi-sited learning communities that focus on a range of critical issues, including reef resiliency, urban sustainability, ecological fire restoration, and food security. Netweavers perform many tasks, including facilitating information flow, building social ties that facilitate co-learning, and forging a common identity and voice across a diverse and dispersed

community of practice. During this presentation, I will share some of the core theoretical insights that emerged from analysis of these dialogues, which addressed network design and facilitation, techniques for evaluating network processes and results, and strategies for network improvement. I will organize our discussion around the idea of netweaving as paradox thinking and management. Paradoxes are contradictions that persist over time, require on-going responses, and are not solvable by compromise or by adopting simultaneous viewpoints (Lewis 2000; Smith & Lewis 2011). I will suggest how the paradoxes described by the netweaver's highlighted core tensions within their networks (Provan and Kenis 2008), including stability versus flexibility, inclusivity versus efficiency, and fostering reflective capacity along with the ability to act in the moment to bring about significant and lasting change. Rather than attempting to solve these paradoxes, we will explore how netweavers turned them to their advantage by accepting the contradictions and learning to cope with them (e.g., Lüscher & Lewis 2008) and integrating the contradictory poles of the paradoxical tension while maintaining and leveraging their differences (Andriopoulos & Lewis 2009). I will explore how netweavers approached these leadership paradoxes not as a problem to be overcome, but rather as a core characteristic of nurturing social innovations with the potential to transform. As Charles Handy (2002) observed, "the more turbulent [the] times, the more complex the world, the more the paradoxes."

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Dialogue between transdisciplinary and action research: modus operandi and what we can learn from it

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We need research leading to timely, meaningful, contextually appropriate solutions for society's wicked sustainability challenges. Though transdisciplinarity (TDR) is thought to be sustainability sciences' modus operandi, there are many long-standing traditions of socially engaged research applied in sustainability, e.g., applied research, citizen science. Clarity about differences and similarities, and whether/how they can be used together enables researchers to learn from different traditions and make informed decisions about the best approach for their context. Here, we explore bibliometric differences between action research (AR) and TDR in the field of sustainability, and how concepts from AR can complement TDR. To do this, we conducted bibliometric analyses of peer-reviewed TDR and AR articles from Scopus (found searching for 'sustainability' and its derivatives, in combination with either 'transdisciplinarity' and its derivatives, or 'action research'). We then considered the main procedural differences between the two approaches, and how Heron and Reason's 'extended epistemology' and Herr and Anderson's (2005) insider-outsider continuum could be used by TDRers.

We identified six times as many AR as TDR publications, indicating AR is a more mature field. The most cited TDR publications did not overlap with those in AR, with the exception Kates et al. (2001). In co-citation analysis, we also found that publications in TDR cited similar sets of articles, creating networks, whereas the reference lists of AR publications were more varied, and there was only one co-citation among the 40 most frequently cited articles. There were several publications that both bodies of literature cited, e.g., Wiek et al. (2011).

Methodologically, AR is typically modelled as 'spirals' intertwining action and reflection. There is less consensus about how to 'do' TDR, although researchers have proposed processes and ideal-types. Through comparing the spiral and TDR ideal-types/processes, we explain that AR emphasises action-for-knowledge, making it best-suited to contexts where action is a priority, and TDR emphasises knowledge-for-action and is best-suited when reflection is needed. To avoid siloing into 'research-practitioners' and 'practitioners-who-research,' we suggest a relational approach is needed, which could be supported by Heron and Reason's (2008) 'extended epistemology.' They urge that four different ways of knowing are needed to ensure (1) action is rooted in our reasoned, subjective and tacit understandings, and (2) our truth claims align with both our experience and theories.

Reflexivity has received considerable attention in both TDR and AR. As scholarship on roles/identities in TDR often fails to problematise positionality regarding contextual embeddedness, we suggest that Herr and Anderson's insider-outsider continuum (2005) can help TD researchers better articulate and reflect on their positionality, especially when their positionality varies between stakeholders/shifts during the course of a project.

In summary, we found the main differences between TDR and AR are TDRers seem to be in conversation with one another more than ARers, and while AR emphasizes action-for-knowledge, TDR emphasises knowledge-for-action. In order to avoid siloing of the two approaches, TDR can draw on AR's extended epistemology and learn from AR work on insider-outsider positionality to enhance reflexive work in TDR.

Philosophical Background Assumptions in Science-Society Interactions: Mapping the Landscape of Arguments

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The relation between science and society is complex. This is not only due to the diversity of ways in which scientists and non-scientists interact in different contexts; the complexity also stems from philosophical background assumptions that different actors may bring to the table. Some of these assumptions refer to the scientific side of a given science-society interaction. These include questions such as: Is the problem at hand "wicked" – and if so, what does this imply for scientific authority? Is science "value-laden" – and if so, what role should social values play in the research process? Should science focus on "important" problems – and if so, what constitutes importance in a given epistemic context? Another type of assumptions refers to the societal side. These include, inter alia, questions of legitimacy (e.g. who may represent whom in a decision process?), aspects of action theory (e.g. does/should knowledge compel action?), and structural understandings of society at large (e.g. are boundaries between science and other societal spheres rather fixed or fluent?).

When it comes to these and further questions, scientists, regulators, citizens, practitioners, or product users may have different perspectives on how science-society interactions should look like. This diversity is further increased by the fact that such philosophical assumptions vary not only between, but also within the various scientific and non-scientific actor groups. While this may have implications in any context where scientists and non-scientists interact, it can be particularly relevant in *transdisciplinary research* (TDR). In a TDR project, assumptions are needed to determine, inter alia, who counts as a legitimate project partner, how much influence these partners should have in the different project stages, or what is considered to be sound science. However, discussing the underlying philosophical assumptions may be difficult for several reasons: first, they often touch upon people's core beliefs; second, they are often held implicitly; and third, many of these issues are contested in the academic literature, which is why participants of TDR projects cannot simply refer to an expert consensus.

In this paper, I present a framework to systematize the background assumptions that shape interactions between scientists and non-scientists in TDR and beyond. I differentiate six dimensions of assumptions and give examples for controversial claims within each dimension. I show how these controversial claims can be grouped by using stylized models of the science-society relation. Rather than prescribing (or presupposing) an epistemological or social theory, the framework represents a conceptual "map". This is similar to an approach employed by the Toolbox Dialogue Initiative (https://tdi.msu.edu), but with a different conceptual and pragmatic perspective (e.g. it is not restricted to TDR, it combines individual background assumptions with overarching science-society models). The categories used in this framework are derived from an interdisciplinary literature analysis, using methods of ideal-typical reconstruction inspired by Max Weber. A unique feature of this framework is its flexibility: contrary to many other systematization schemes (e.g. "linear" versus "pragmatic" models), it treats background assumptions as a semantic web that allows for various configurations, which then give rise to various science-society models.

Towards a relational values-based stakehold-ing approach to integrative transdisciplinary research with stakeholders

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Transdisciplinary research brings together diverse perspectives, drawing on multiple fields of knowledge and incorporating them with stakeholders' practical knowledges and lived experiences. Researchers and practitioners typically begin the process of transdisciplinary research by identifying relevant stakeholders to ensure that a diversity of perspectives is represented and considered. Stakeholder mapping and stakeholder analysis tools are established approaches commonly used in transdisciplinary research. The dominant focus of a typical stakeholder analysis is on categorising and representing stakeholder relevance to the challenge at hand, which privileges stakeholder roles and formal affiliations. As a result, the complexity of stakeholders' histories, affective dispositions, relationships to the place and other emergent factors are rarely considered in stakeholder mapping. Further, while transdisciplinary research aspires to create a more integrated and holistic understanding of issues, oftentimes, the plurality of stakeholder perspectives is consolidated through consensus-seeking research practices that strive to produce a shared outcome.

In this paper, we, as transdisciplinary researchers and practitioners, explore and extend our current understanding of stakeholder involvement in transdisciplinary research by drawing on the relational paradigms emerging from across various fields like posthumanism, new materialism, and systems and complexity theories. In particular, we advance an argument for a shift towards a stakehold-ing approach, which frames participation as building participants' stake in a given problem situation. This involves three strategic shifts away from current stakeholder analysis practices: (1) a shift from an outcomes-led to values-based approach to stakeholder engagement; (2) from representational to relational logic structuring stakeholder engagement; and (3) from constrained to expansive approaches to time and space. Stakehold-ing is an inclusive process that explicitly acknowledges stakeholder entanglements with layers of meanings, discourse, social values and wants, rules, political views, and histories, as well as relationships to the place, material infrastructures and socio-material practices among other things. By focusing on relationality, we highlight how stakeholder engagement tools and methods shape the nature of, and relationships within, transdisciplinary initiatives.

We identify a spectrum of tools and methods used by transdisciplinary researchers to capture and convey stakeholder relationships. We compare these tools and methods against the stakehold-ing framework, identifying and augmenting gaps, by drawing on examples of stakeholder engagement as documented in the feminist, new materialist, transition design and systemic design literature. We put forward the concept of stakehold-ing as an additional concept that transdisciplinary researchers can draw on when bringing together diverse perspectives in research. The paper advances transdisciplinary methodologies and practice by highlighting the importance of relationality to the integration of knowledge.

Values as leverage points for sustainability transformation: reflecting on the underlying assumptions

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The rapidly growing literature on sustainability transformation agrees that values play a role on the transformation research agenda. Recent literature drawing on systems thinking associates held values with deep leverage points (Abson et al. 2017), defined as system properties where interventions can lead to transformational change in complex systems. This presentation argues that the current debate around values as leverage points needs to be discussed in the context of understanding the

characteristics of a mode-2 science perspective on the relationship between science and society. A mode-2 perspective moves from producing knowledge in order to improve understanding, towards linking knowledge to action; it moves from knowledge extraction to knowledge co-production and knowledge experimentation; it moves from considering practitioners as knowledge holders to seeing them as co-creators and change agents; finally it moves from the implicit inclusion of values towards their explicit transparent making in the research process. With regard to sustainability science, some authors also make a distinction between a knowledge-first approach and a process-oriented approach (Miller 2013), between a science for sustainability and a science of sustainability (Spanegenberg 2011), or between a descriptive–analytical and a transformational mode (Wiek et al. 2012). These distinctions are especially relevant today for considering the role of held and assigned values for sustainability transformtion.

A mode-2 perspective can enable meaningful and solution-focused ways of combining existing methods across different disciplinary fields and corresponding practices. For example, in the case of values as leverage points, theoretical traditions such as behavioral economics, environmental psychology, social psychology or organisational culture (among many others) come at the forefront of the debate. I argue that failing to apply established traditions also from a mode-2 science perspective undermines the potential of such disciplines to contribute to sustainability transformation. In particular, technical solutions stemming from a knowledge-first approach to science risk to ignore or downplay the social complexity of transformation processes. To develop my argument, I identify the main characteristics and dimensions of a mode-2 science perspective. In particular, I focus on the reflexivity, agency, non-linearity and I emphasize transdisciplinary research as the research mode of transformational sustainability science. I then describe the dynamics of potential processes of change involving values in relation to the mode-2 perspective, for achieving deliberate change towards sustainability transformation. From a mode-2 science standpoint, the understanding of values as leverage points seems to point less to a dynamics of changing values, but rather to capitalising on already existent sustainability values, such as solidarity or responsibility or on place-based values. Processes such as removing the institutional of systemic barriers that are blocking the expression of sustainability aligned values and instead enable it, also fit under this part of the spectrum. Especially in situations of weak governance or weak social capital, a range of enabling processes might enliven values at community level, enabling individuals to reflect, question and challenge assumptions, and experiment.

PC-2.4: Pre-crafted contributions - session 2.4

Time: Tuesday, 14/Sept/2021: 11:45am - 12:30pm

Transmedia Storytelling: Camilla Plastic Ocean Plan

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As a professor, you definitely learn from the students as well. In 2015, a seminar participant pointed out garbage patches to me. I felt that the immense plastic pollution of the oceans was burning under the nails of the young generation. I got deeper into it. But all the documentaries left me perplexed and depressed. I would have preferred to quickly distract myself again. I thought about using the expertise of my field - scenography - and the resources of the Filmuniversity Babelsberg to find a more creative approach, one that circles the topic with imagination, offers new spaces for thought and involves many people.

Since the media often rely too much on fear as an attention grabber, it was essential for me to be able to win the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research as a partner. The scientists were willing to cooperate with us because they are convinced that you need a multidisciplinary space to tackle complex issues.

Armed with scientific input, I worked with a scriptwriter to develop the story around Camilla. This was recorded as an audio book and now forms the thread of the project.

Artistically researching, I further developed the method of transmedia storytelling. Students, graduates and professionals are invited to visualise parts of the story using a variety of media. Meanwhile, more than 300 international participants are involved and have delivered impressive artistic contributions ranging from drawing, painting, concept design, short film, wearable art, scrollitelling to VR experience and 360-degree film.

In 2019, an international masterclass with an introductory symposium was funded by the EU. In the same year, the project was invited to Los Angeles. There we sat on a panel with Captain Charles Moor, the discoverer of garbage patches, among others.

With the web-exhibition www.camillaplasticoceanplan.com, the project became accessible to a worldwide audience. For this purpose, the story was divided into 6 parts like a TV series. Each part is opened in the context of partner events: e.g. at a symposium on artistic research in Oslo, at Ars Electronica, etc.

In each part, the story is told, new artworks are shown, results of the international master class are presented and a scientific-documentary theme is explored in depth. There is also material to download. In the meantime, the site has 80,000 clicks, about 10% of the visitors have looked long and hard. Analogue exhibitions in museums are planned for 2022.

The story ends with the invitation to the audience: "Do you have an idea how to make it better? Become part of the story. Become part of history." The continuation therefore consequently takes place in the ArtForFuture Lab. You are invited to get part of the ITD-ArtForFuture-workshop at 14th septembre 1:30 - 15:00pm.

At ITD, a guided live tour of the web exhibition will be offered. Afterwards, selected scientists and artists will be available for Q&A.

Viewers can then explore the content independently at www.camillaplasticoceanplan.com.

Principles for designing and implementing learning modules for transdisciplinary and transformative research competencies: Insights from the Transformative Innovation Lab.

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Education is considered a key driver for sustainability transformations. Over the last decades, a growing number of research practices have been put forward that emphasize the role of science in engaging with these transformations. However, higher education has been slow to develop and implement dedicated transformative education programs and learning modules.

In this paper, we present a framework of design principles for transformative learning modules in higher education. The design principles to guide teachers in building learning modules that are aimed at enabling students to become engaged in collaborative research fostering sustainability transitions in local and urban contexts.

We then use the Transformative Innovation Lab (TIL), a learning course developed and implemented at two German universities, as a model to show how the design principles can be realized. The two-semester course supports Master's students in their process of developing real-world laboratories and exploring sustainability transitions through collaborative experimentation with local practice partners.

Based on both the design principles and our experience and insights from implementing and teaching in the TIL, we discuss how transformative education can help universities take responsibility in collaboratively fostering sustainability transitions in their local contexts. Moreover, we discuss enabling and limiting factors for implementing transformative learning modules. Based on our teaching experience in the TIL, we outline aspects of the novel roles teachers assume in transformative teaching environments.

With our article we contribute to the special issue's topics in two ways. By presenting a framework of design principles, we engage in the discussion around the types of inter- and transdisciplinary educational approaches collaboratively fostering sustainability in the urban contexts surrounding many universities. These principles provide theoretical guidance for teachers in higher education to build educational modules that enable students to contribute to urban transitions through by developing intervention-oriented research projects.

With the Transformative Innovation Lab (TIL), we present a practical learning module that serves as a model for implementing the design principles. Through the detailed presentation of the TIL curricular design, we showcase a number of exercises that enables students and involved actors from the urban context to collaboratively "think outside the box" and address sustainability issues through mutual learning and joint experimentation.

Based on our theoretical and practical considerations we address the question of how to include transformative approaches in current higher education programs. Based on our insight from implementing the TIL in two universities, we share our perspective on enabling and hindering factors in this context.

Furthermore, we discuss the role of educators in such novel learning formats. The TIL was a valuable experience not only for our students to experience transformative research as part of their own research. Also, teachers face new challenges and have to adopt new roles that enable them to create spaces in which students can safely gain experience in the challenging task that is transformative sustainability research.

The Articulator A pedagogical device to deal transdisciplinary complex problems at the University

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Purpose

At the beginning of the National School of Proffesional Studies Iztacala, UNAM, unsuccessful attempts were made to integrate the traditionally fragmented medical curriculum. 30 years after emerged the *Articulator*, an analog device that links diverse disciplinary contents in relation to a complex problem. The emergency happened at the intersection of pedagogical and collaborative work with students and professors from different universities of the Mexican Association of Faculties and Schools of Medicine, and the theoretical work with multiple authors by Dr Gilberto Hernandez Zinzún. The purpose of this communication is to share it with academic communities interested in transdisciplinary integration. .

Conceptual approach and methods used

An *Articulator* is an analog statement. Hologrammatically integrates content from various disciplines in relation to the intertwining of a complex problem in which human life occurs.

The transdisciplinary articulation occurs when the general analogical statement, obtained by abductive inference, (Peirce), is capable of expressing itself in terms of the various regions and/or levels of organization: sub-atomic, cellular, sociocultural, evolutionary, and so on; and vice versa: when all disciplinary specificities can be expressed in the general analogy.

Process

A participatory, creative and constructive process of problematization begins (Bachelard). The problem is not outside the investigation field of the researchers, but rather they, with their own practices, are giving life to the device (Foucault).

Each member of the group reviews a disciplinary view of the problem, and presents it to those who reviewed other views. Then, argumentatively, the participants elucidate whether they perceive a general similarity between the diversity of the views displayed. Finally, a general look arises where all the particular looks fit. A look of gazes that can involve the visibility and even questioning of the very epistemic framework or paradigm (Piaget, Morin) in force.

The functionally invariant process emerges through *intra-inter-trans* stages (Piaget and García) in the acquisition of new knowledge. The intra inter trans series do not consist of simple, linear overshoots, but are continuous overshoots of the overshoot instruments themselves, in a pedagogical process of singular potential for future professionals and researchers.

At the moment of that creative discovery, an exhilarating life experience arises. Of unveiling, of encounter, emergence, connection between subject and object, of a transit through that zone of non-resistance, described by Nicolescu in his development of the hidden third.

Results and conclusions

This process is transdisciplinary by articulating:

• planes of practices: students and teachers, among themselves (pedagogical); articulate the object and with the object of study (epistemic), with the socio-cultural reality of the problematization (socio-historical-cultural), with humanity, with life and the cosmos, where their professional praxis (pragmatic) takes on meaning (existential, axiological, transcendental).

• time plans: (present), evolution (past), enables a prospective vision of a desirable and/or possible action strategy (future), and supports decision-making, planning and government levels. In short, medium and long duration processes.

• spatial planes: local, regional, global Creativity, discovery, require the propitiation of a space that welcomes exploration, productive error, collaborative learning, incisive and self-critical questioning even of the instruments and paradigms themselves, of which the *Articulator* is testimony itself.

Embracing TD and experiential learning to develop resilience in secondary schools

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Transdisciplinary learning and practice has great potential to transform secondary school systems which are struggling to suppor the mental health, resilience and wellbeing of students growing up in a context of uncertain futures and climate disruption. This presentation explores the transformative potential of transdisciplinary and experiential learning through a participatory research pilot being co-designed with secondary school teachers and students in Sydney, Australia.

The events of the past eighteen months have seen a series of 'peak resilience' challenges in Australia including COVID-19 and climate induced events such as the 'Black Summer' bushfires, droughts and floods. These events have disproportionately impacted young people's mental health, sense of wellbeing and certainty about the future. (Headspace, 2020; YoungMinds, 2020).

A current literature review and series of exploratory interviews with educators, young people and youth mental health practitioners has found significant challenges for young people in terms of their mental health and resilience and identified number of key themes in relation to this including identity/image, boundaries, changing pathways and structures, uncertainty and dealing with mental health. It is critical to explore new approaches to transdisciplinary and experiential learning to support young people's resilience and wellbeing. In this case resilience is defined as the ability of a young person to define themself as healthy despite adverse circumstances (Ungar, 2004).

This research explores a set of core meta-competencies that can support young people to develop greater resilience and wellbeing; interbeing, adaptability, agency/autonomy, creativity, empathy and self-awareness and reflexivity. A series of experiential learning modules for secondary school students were designed to focus activities on developing these meta-competencies including place-based learning, mental health and personal agency, storytelling and perspective, systems thinking and futures thinking. These learning modules have been developed with input from teachers and students at the school.

A pilot project commenced in February 2021 in a Sydney secondary school with a group of 14 students aged 15-16 using a co-design methodology and participatory action research. Both students and teachers have contributed to the design and evaluation of a series of five full day workshops. All of these workshops are highly transdisciplinary incorporating curriculum learning outcomes from Science, English, History, Art, Personal Development, Health and Physical Education. The students work in teams to create change to create a change in the situation at school that might improve the resiliencea and wellbeing of younger students. Through systems and futures thinking methods and drawing on the students' own wisdom and lived experiences the pilot aims to develop personal and collective agency for the participants.

Initial findings from this pilot are being compiled from surveys data, interviews, artefacts and observations during the workshops and will be presented at the conference. The aim of the research is to develop a framework for experiential learning for secondary school students in particular those students who may have disengaged from learning.

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Will technology safe our future? Teaching technology assessment and sustainability.

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Today we face grand challenges that have been mostly communicated to the public in course of the UN SDGs as well as challenges connected to climate change and energy resources. Reading the newspapers, the solution is often based on technological development like electric mobility, renewable and more efficient energy sources, process automatization, AI or IoT. The list of new technologies is long, and thus we might assume we are fine out. Technology will save the future. In technology assessment we try to take a neutral stand and assess opportunities and risks of new technologies and their applications for the future of human and nature. The precautionary principle is close to principles of sustainable development as a normative concept, based upon values and needs of todays and future generations.

At Albstadt-Sigmaringen University (Germany) from autumn 2021 onwards a new bachelor study program on sustainable engineering should prepare students for the development of environmentally friendly and sustainable products that can only emerge if the whole Development and production process takes the aspect of sustainability into account from the outset.

The transdisciplinary seminar on technology assessment and sustainability will be an integrative part of the new study program and was introduced two years ago. The seminar tries to take a transformative stand to change the wide spread belief of a basically future saving technology. Students from different disciplines (textile and clothing technology, mechanical engineering, and business administration and engineering) choose their technology of interest (related to their study program) and get in contact with stakeholders representing a variety of opinions. Students apply scientific methodologies like literature analysis, system-, stakeholder- and scenario analysis, narrative interviews and online questionnaires to acquire a broad variety of opinions. They are facing different viewpoints on the interpretation of knowledge by different stakeholders. Finally, students develop scenarios for the future of selected technology as well as recommendations to different stakeholder groups on how the technology needs to be applied, regulated or incentivized to support a global sustainable development.

The experience of the students in many cases transforms their understanding of the role of technology for sustainable development. It offers a new sight on the technology and the view that technology is not per se sustainable, but it depends on how we apply or implement the technology. Who has access to the technology and who doesn't? What conditions cause rebound effects? What are not only efficient but also sufficient ways for solving the initial problem that the technology should serve for? How comes there can be so many opinions on the application of a single technology?

As a final assessment, students present their outcomes in a group presentation, they work on a final group report and fill in an individual learning journal. In the learning journal, students reflect their experiences, learnings and individual mind-shifts. A student said: "I was surprised at how much changing the methodology can change the perspective on a topic and how many relevant insights can be found even by asking questions that are not exclusively technical."

Enabling systemic innovation through experimentation in real-world laboratories

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End of 2019, the UN announced the Decade for Action on Sustainable Development: to mobilize for local and people action, embedding the needed transitions in local practice and generating an unstoppable movement pushing for systemic innovation. The complexity of global environmental change with its regional and local impacts on society require continuous adaptation and innovation processes to build and maintain resilient ecosystems, communities, and bioregional economies. Such innovation processes are of systemic nature and include social and technical innovation, while adhering to interrelated geographical scales, with place-based local solutions reflecting regional and global dynamics, and scalability. The complexity in enabling place-based systemic innovation requires a new set of hybrid methods, since analytical and explanatory tools of science have reached their limitations when it comes to the social complexity of cooperative regeneration and implementation in the real world. We present a next generation of tools for enabling systemic innovation and mainstreaming the transition to a more sustainable society, from research towards impact. We provide scalable tools for enabling local people action through the interplay of science and design in real-world laboratories - transcending the logic boundaries of science and tapping into different types of knowledge through mutual forms of learning, cooperation and co-design.

The MonViso Institute (MVI) is a place and state of mind as an evolving open innovation ecosystem - a real-world laboratory for research, education, entrepreneurship and new living - on sustainability transitions and regenerative design for a more resilient and just society. MVI's mission is to re-think and re-design how we want to live now and in the future. Resilient, regenerative, blending local traditions, regional resources, and global openness. MVI's vision is being lived in real time: while it is evolving as an Institute - state of mind independent from place – it is as well evolving as a place, a mountain campus, where the state of mind is lived and experienced in real life. The MVI "Systemic Design Principles" guide the experimental work on testing and applying "Tools for Change" (towards a more sustainable, just and regenerative society) and developing illustrative "Seeds for Systemic Innovation" in real, that enable and scale social and technical transitions. These core concepts guide MVI's research, education and events, with the goals to evaluate, spread and scale their impacts to other systems. We believe that design is at a pivotal movement to confront complex challenges of global scale with place-based inclusive responses at the intersection of science, creativity, and systemic innovation. The evolving MVI is a pathway of experimentation in the real world, guided by a set of goals, such as experimenting with resilient community models, anticipating crises as triggers of shaping new opportunities, building capacity through mutual exchange on experiential seeds for systemic innovation, and incubating entrepreneurial sustainability by balancing local identity and international inspiration

The last years of developing this lab have provided valuable experiences on how place-based systemic innovation (dis)functions, and where further research to fully understand, transcend, upscale and employ derived tools is required.

RT-1.1: Experiences and challenges of digital transdisciplinary formats (td-formats) in complex and contested research fields

Time: Tuesday, 14/Sept/2021: 1:30pm - 3:00pm

Experiences and challenges of digital transdisciplinary formats (td-formats) in complex and contested research fields

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General aim and subject outline

The workshop aims to initiate an exchange of experiences on the application of digital tools and methodologies for the transdisciplinary research in fields that are complex and contested (or "wicked"), such as socio-technical or interregional/intercultural research fields.

Research fields on socio-technical issues are characterized by complexity, long-term dimensions, risks, conflict and uncertainties. The acceptability of planning and implementation of infrastructures in these fields of action is therefore a central aspect of research. Hence, transdisciplinary research aims e.g., at integrating aspects such as the different risk perceptions, the trust in scientific expertise, the comprehensibility of technical models or complex and long-term processes into the co-design and co-production of research results by involving practitioners (e.g., stakeholders and citizens). Research fields on interregional or intercultural issues are also characterized by complexity and can involve divergent/incommensurable perspectives, historical struggles, hierarchies of knowledge or conflicting traditions on the one hand and different scales and global dimensions, on the other. In these cases, transdisciplinary research aims to bridge different perspectives, stiles and values in a plural context where tensions and expectations can be present.

What are the challenges when the different phases of transdisciplinary work with practitioners can only take place in digital space (their recruitment and involvement as well as joint problem-framing and knowledge co-production)? How can digital methodologies meet these challenges in research fields that are characterized by ambiguity, several conflicting interests and interest groups as well as strong expectations or emotions, while still enabling exchange about complex contents and agendas? What are the benefits but also limits of digital transdisciplinarity?

Particular objectives and target communities

With our workshop, we would like to initiate an exchange between researchers and practitioners who have applied or plan to apply transdisciplinary methodologies and techniques in digital space, or who are involved in transdisciplinary research on complex and contested research fields and want to integrate digital tools in their designs. The objective is to address problems of td-research in the above-mentioned contexts and discuss how researchers need to adapt td-research as well as which digital td-formats might be suitable to involve practitioners in a proper way. Based on this, participants might be enabled to develop new alternatives for transdisciplinary research in digital space given the thematic challenges of the considered research fields.

Structure of the workshop

The workshop will start with three to four short impulses on exemplary experiences and challenges of digital td-formats in selected fields of action (among others: design thinking, multi-stakeholder discussion group; soft systems methodology, three types of knowledge); each impulse will be held in about five minutes followed by five minutes for questions and discussion. After that, participants will be distributed into three to four parallel breakout sessions with a duration of 30 minutes to discuss various experiences with similar or alternative digital formats and develop methodological approaches to the identified challenges. Results will be presented in a joint plenary session (30 minutes). The guiding questions for the impulses and breakout sessions are:

1. *General Challenges of digital transdisciplinary research*: Which methods are fit for transdisciplinary research in digital space? What kind of topics or research questions can or cannot be elaborated in digital space? Which specific challenges exist for transdisciplinary research in digital space? How can they be overcome? How are practitioners integrated best and what are their needs? How can I reach target groups virtually?
2. *Challenges of digital transdisciplinary research on conflict prone issues*: How can practitioners with different/divergent perspectives be engaged in digital transdisciplinary work? Which digital td-tools can help to achieve a common understanding of problems with different/diverging perspectives?
3. *Challenges of digital transdisciplinary research on risk issues*: Do knowledge forms such as target knowledge become more essential in risk issues because risk perceptions primarily influence target knowledge? Which formats are suitable to take up risk technologies as a subject of transdisciplinary research? How can risk perception and "real" risk be dealt with in transdisciplinary formats?
4. *Additional challenges*: Other questions or topics proposed by the participants in the Workshop can be discussed in a fourth breakout session.

Interested participants can give a short notice of background, experiences and topics of interest in order to structure breakout sessions beforehand.

RT-1.2: Requirements for sustainability science from the perspective of non-governmental organisations – the example of BUND/Friends of the Earth, Germany, and the platform 'Forschungswende'

Time: Tuesday, 14/Sept/2021: 1:30pm - 3:00pm

Requirements for sustainability science from the perspective of non-governmental organisations – the example of BUND/Friends of the Earth, Germany, and the platform 'Forschungswende'

Benjamin Nölting[1], Benedikt Jacobs[1], Ulrike Kallee[1], Joachim Spangenberg[1], Rudi Kurz[1], Katharina Ebinger[1], Steffi Ober[2]

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This workshop is explicitly aimed at non-governmental organisations and researchers engaged in such organisations.

Sustainability transformations call for the cooperation of societal actor groups such as politics, administration, business, science, and civil society. Non-governmental organisations (NGO) from civil society, e.g. associations, unions, foundations, religious organisations etc. represent their interests and advocate for partly private and partly public goods such as public healthy, nature conservation, environmental protection, or good conditions for car mobility; only some of these interests are in line with sustainable development. Their work is based on voluntary commitment, on social networks and they are confronted

with the challenges of collective action and self-organisation. Thus, they pursue a logic of action beyond market competition and state hierarchy bringing in an important additional perspective to the process of sustainable development.

In doing so, they are just as dependent on scientific findings as the other groups of actors. However, according to their logic of action and preconditions for action, they have divergent requirements for scientific knowledge and cooperation with research (and teaching). So far, NGOs have received very little attention from politics and science regarding their needs and requirements. There are hardly any institutionalised interfaces for NGOs with science, only very few funding possibilities and NGOs are seldom involved in transdisciplinary research. Business and industries have a far better access to research, better funding opportunities for research and much more influence on research and innovation policies.

Against this background the guiding questions for the proposed session are:

- What are requirements for sustainability science from the perspective of non-governmental organisations?
- What are their possible contributions to td research for sustainability?
- What are organisational structures and interfaces that foster NGOs' involvement in td sustainability research?

These questions will be discussed in the, often neglected, perspective of NGOs, sharing experiences of NGOs with td research and research policy.

Starting point for the session will be the perspective and experiences of the Bund für Umwelt und Naturschutz Deutschland (BUND)/Friends of the Earth Germany, one of the largest environmental and sustainability association in Germany. According to the BUND the science system does very little for civil society organisations, since science pursues specific goals such as, above all, specific disciplinary knowledge and aligns success criteria solely with scientific structures. Furthermore, economic interests are very dominant and often push the content and goals of research and teaching in an unsustainable direction. Funds for research and higher education are largely spent on maintaining the status quo.

In the proposed session, the needs of civil society actors for scientific knowledge and cooperation with research (and teaching) will be presented at different levels with short inputs, using the example of BUND and the civil society platform Forschungswende:

- Project level: Requirements for research cooperations supported by civil society using the example of the joint project Ressourcenwende (Input Benedikt Jacobs, Rolf Buschmann, Ulrike Kallee, BUND) (https://www.ressourcenwende.net/)
- Association level: The work of the BUND Scientific Advisory Board as scientific quality assurance (Input Joachim Spangenberg, Marta Mertens; Board of the BUND Scientific Advisory Board) (https://www.bund.net/ueber-uns/organisation/wissenschaftlicher-beirat/?wc=24073)
- Association level: What science policy does BUND need for a sustainability transformation? Presentation of BUND's science policy demands (Katharina Ebinger, Rudi Kurz, Benjamin Nölting, BUND Science Policy Commission) (https://www.bund.net/fileadmin/user_upload_bund/publikationen/bund/bund_wissenschaftspolitik_nachhaltige_entwicklung_forderungen.pdf)
- Inter-organisational cooperation of NGO: How can NGOs bring their interests into science policy and the science system? The example of the civil society platform Forschungswende (Dr. Steffi Ober) (https://www.forschungswende.de/)

Inputs from other NGOs are welcome!

There will be two rounds of short inputs followed by discussions (in breakout rooms as well as in the plenary) on the following questions:

- What are needs from the point of view of NGOs regarding td science for sustainable development?
- How works td research (and teaching) from the perspective of NGOs?
- How can NGOs contribute to a sustainability research and to a turnaround towards a sustainability orientation of the science system?

The workshop addresses NGOs that are involved or want to be involved in research for sustainable development as well as researchers and research organisations interested in td (on equal footing).

In the workshop, participants (especially from NGOs) share their experience with – intended – involvement in sustainability research, their prerequisites, their potential contributions, restrictions, organisational challenges etc. The participants collect and structure requirements of NGOs regarding td research (and teaching) and the structures for NGO-science interfaces. Further, the workshop may serve for networking between NGOs and research and maybe as a starting point for developing a declaration of NGOs on td sustainability research.

RT-1.3: Potentials and limitations of Theory of Change (ToC) - Systematizing experiences and ways forward

Time: Tuesday, 14/Sept/2021: 1:30pm - 3:00pm

Potentials and limitations of Theory of Change (ToC) - Systematizing experiences and ways forward

Martina Schäfer[1], Lisa Deutsch[2], Silke Kleihauer[3], Rachel Claus[4], Brian Belcher[4], Kora Kristof[5], Sabine Hoffmann[2]
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Transdisciplinary research (TDR) projects aim to contribute to solving complex and wicked real-world problems by intervening in and supporting processes of social change. Obtaining a joint understanding about: (1) the character, success factors, and barriers of change processes, and; (2) the logic of expected research contributions to change through activities, outputs,

outcomes and impacts are major challenges for TD- and transformation research. Theory of change (ToC) is an important starting point for successfully bringing about change. It has been used in various thematic contexts (e.g. research for development, sustainability research, research on regional innovation processes) and with different purposes to reflect, initiate, monitor or evaluate interventions in change processes (Deutsch et al, 2021[1]).

A ToC is a process and a product. Developing a ToC is an inherently dialogic and reflective process (Vogel, 2012[2]). A ToC process uncovers the viewpoints, basic ideas, and assumptions of researchers and actors from policy and practice about the key mechanisms and conditions for creating change in a specific context and documents them as a set of theories describing the assumed causal relationships between project/program interventions and (un-)intended outcomes. The ToC "product" is a narrative and/or visual model that illustrates the causal logic between the main activities, outputs, actor-specific outcomes, and impacts, as well as the assumptions underlying the change process in the short, medium and long term (Belcher et al., 2020[3]; Deutsch et al. 2021). The ToC approach recognizes that socio-ecological and socio-technical systems are complex, and that causal processes are often non-linear with multiple interactions and feedback loops (Belcher et al., 2020).

Envisioned goals

Recently, the ToC approach has gained a lot of attention and has been increasingly applied in TDR contexts. Experience shows that, despite useful overarching guidelines to develop ToCs, there is no universal approach. Different researchers have different purposes in mind when developing ToCs with their teams, and therefore apply ToCs in different ways and/or in different stages of TDR (Koleros & Mayne 2019[4]). In recognition of this diversity, the workshop aims to exchange experiences from different contexts and systematizing the different purposes and functions of developing ToCs, as well as the challenges, strategies and remaining questions for further developing the ToC approach and link it to transformation research. Based on two workshops that were carried out in the context of the project "system innovation towards sustainable development"[5] and facilitated by the German Schader Stiftung in 2021[6], the organizing team wants to introduce and discuss first ideas regarding the following questions:

1. For what purposes are ToCs useful?
2. At what stages of TDR can ToCs be developed with which functions?
3. What is the experience with combining ToC with other methodological elements (e.g. actor analysis, scenario technique, indicator development, etc.)?
4. What challenges did participants face in developing ToCs and how did they cope with them?
5. How can the ToC approach be further developed for: a) facilitating its practical application; b) outlining and explaining the mechanisms and conditions for creating social change processes/transformation processes, and; c) understanding the role of TDR projects in transformation processes better?

Intended target audiences

We invite scholars from all disciplinary and thematic backgrounds to share their experiences and join a process of clarifying the potential and limitations of the ToC approach. Active participants are asked to provide their experiences with the ToC approach in a power point presentation (maximum 5 slides), addressing the questions posed above. The slides will be shared with all participants in advance of the workshop. The organizing team will systematize the inputs and suggest topics for break out groups within the conference session.

Workshop structure and design

The workshop will be structured in four steps:

- Presentation of the organizing team with first ideas about systematizing the purposes and functions of developing ToC (15-20 minutes)

- Plenary discussion (15 minutes)

- Break-out groups addressing aspects of the above-mentioned questions (purpose, stage of development, limitations, potentials, challenges, coping strategies, opportunities for further development of the approach), oriented at the inputs that were submitted beforehand
(35 minutes, documentation of the discussion via miro board)

- Discussion in the whole group bringing together insights from the break-out groups and agreement on follow-up activities (20 minutes)

Please send your slides **till 19th of August 2021** to schaefer@ztg.tu-berlin.de

[1] Deutsch,L., Belcher, B., Claus, R.,Hoffmann, S. (2021): Leading inter- and transdisciplinary research: Lessons from applying theories of change to a strategic research program, Environmental Science & Policy,Volume 120,

2021, Pages 29-41,https://doi.org/10.1016/j.envsci.2021.02.009.

[2] Vogel, I., 2012. Theory of Change. Retrieved from https://assets.publishing.service.gov.uk/media/57a08a5ded915d3cfd00071a/DFID_ToC_Review_VogelV7.pdf

[3] Belcher, B., Davel, R., Claus, R., 2020. A refined method for theory-based evaluation of the societal impacts of research. MethodsX 7. https://doi.org/10.1016/j. mex.2020.100788.

[4] Koleros, A., Mayne, J. 2019. Using Actor-based Theories_Of Change to Conduct Robust Contribution Analysis in Complex Settings. Canadian Journal of Program Evaluation. https://www.researchgate.net/publication/331458372

[5]For the project approach see https://sne.h-da.de/; for the application of ToC-elements see https://sne.h-da.de/en/implementation-project/more-sustainable-chemistry-in-the-leather-supply-chains.

[6] The following scholars have participated at the first workshop in March 2021 and contributed to first ideas of systematizing the experiences with ToC approaches: Regina Bendix, Michèle Bernharnd, Kilian Bizer, Bettina Brohmann, Lisa Deutsch, Martin Führ, Stefan, Hilser, Sabine Hoffmann, Silke Kleihauer, Josefa Kny, Kora Kristof, Karen Lehmann, Alexandra Lux, Melanie Mbah, Emilia Nagy, Laura Pauli, Jonas Rehn, Martina Schäfer Julian Schenten, Charis Stoica, Anna Wasmer

RT-1.4: Transdisciplinarity in Digital Health and AI: From misconceptions to co-conception and production

Time: Tuesday, 14/Sept/2021: 1:30pm - 3:00pm

Transdisciplinarity in Digital Health and AI: From misconceptions to co-conception and production

Peiling Yap, Flavia Schlegel, Amandeep Gill

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The **International Digital Health & AI Research Collaborative (I-DAIR)** is a Geneva-based global platform to enable inclusive, impactful, and responsible research into digital health and Artificial Intelligence (AI) for health. I-DAIR's mission is the transformation of personal and public health through collaborative research and development of digital technologies. Together with our partners, we strive to develop and maintain a new generation of global public goods for the inclusive, innovative and responsible deployment of data and AI in health. At I-DAIR, we see digital technology as an enabler and understand that by simply throwing technology at a problem, we will not be able to solve health challenges globally. It is therefore imperative that we embrace multidisciplinary and transdisciplinary approaches in our work going forward.

For ITD21, we are proposing a panel session to explore the use of transdisciplinary approaches in digital health and AI research. The panel will consist of researchers from various disciplines, such as the health sciences, social sciences and computer sciences, and also stakeholders from non-academic sectors, such as policy makers and civil society groups. We will start with understanding the misconceptions the different research and practice communities have for each other and discuss ways to overcome them, in particular how transdisciplinary approaches can help bridge these communities together. Through presentation of research projects undertaken by the panelists and I-DAIR, we will highlight existing multidisciplinary and transdisciplinary practices taking place on-the-ground and examine potential opportunities where transdisciplinary approaches can allow for the research, development and deployment of digital technologies for health to be more inclusive, equitable and responsible. In particular, we will look at the type of data infrastructure and cooperation frameworks that need to be in place for an effective and productive collaboration between the various research and practice communities. Finally, we will also discuss the current limitations of transdisciplinary approaches in progressing this field and the type of capacity development efforts needed to cultivate the next generation of transdisciplinary researchers for digital health and AI for health.

The panel session will consist of short presentations by the panelists and a moderated question-and-answer session among the panel and participants. We expect an interactive discussion and believe that through the panel session, attendees will gain a better appreciation of the role that transdisciplinary research can play in the development and deployment of digital technologies in health and how one can put this approach to practice.

RT-1.5: ArtForFuture-Lab/ Co-creative Online-Workshop

Time: Tuesday, 14/Sept/2021: 1:30pm - 3:00pm

ArtForFuture-Lab/ Co-creative Online-Workshop

Angelica Böhm[1], Nicole Loeser[2]

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"If you want to build a ship," advises Antoine de Saint-Exupéry, "don't round up men to collect wood, assign tasks and divide up the work, but teach the men to look for the vast, endless sea to crave. "

Due to the complex socio-economic, cultural and ecological challenges of the 21st century, value-based visions and strong imaginations are required in which people can reflect in order to be able to steer a positive future. AFFL is based on artistic research and delivers conceivable climate-positive utopias based on scientific scenarios by Scientists for Future and on concepts by futurologist Matthias Horx. It refers to his ideas from New Greening / Technotransformation World and The Great Transformation from the Wuppertal Institute (Schneidewind et al., 2019). These concepts and scenarios are conveyed in the AFFL and linked with extensive libraries of role models and existing innovative (bioeconomic) solutions.

By means of co-imagination, the sharing of common values and the interest in the design of positive living environments of the future are core elements of the AFFL. We identify the aggregation and synthesis of knowledge as well as the expansion of the range of solutions as important goals of the AFFL and its stakeholders and experts.
Optimistic future narratives are created collaboratively through citizen power and exchange with multidisciplinary networks. The focus of our social innovation approach is the integration of different communities that actively participate in our co-creation workshops.

In order to meet the global ecological challenges, we believe in the power of conceptual, interdisciplinary art and look together for answers to current questions such as: How do we want to live in the future? Which technologies can support mankind in coping with anthropogenic challenges? How can transformations towards a circular society be implemented?

The innovative, participatory developed works of art serve as a prelude to long-term oriented processes in which diverse formats for exhibition, internet, print, book and TV are to be used across media. E.g. social media clips are a way of telling visionary solutions in an exciting, informative and inspiring manner in series format.

Cinematic science fiction visions of the future are mostly dystopias. The ArtForFuture-Lab is developing an international online museum of the future, which interactively and co-creatively faces the challenges of the 21st century. Due to the complex socio-economic, cultural and ecological issues, strong images and value-based visions are required in order to be able to steer towards a positive, sustainable future.

We work with modified methods from world building, design thinking, re-gnosis and future prototyping. Based on an interdisciplinary and scenographically designed online play area, scenes for the year 2050 will be developed.

At the beginning, researched archives provide knowledge about already existing solutions. Then the participants choose dramaturgical specifications for acting characters, locations and relevant challenges. The scenes and narratives to be developed together are based on utopias such as the "Technotransformation World" (relies on solutions through technological progress) and the "New Greening World" (relies on natural life and product concepts such as bioeconomy or a circular society).

The future scenarios can afterwards be artistically visualized.

We strive for a creative high-tech cooperation platform for collaboration with research institutions.

RT-1.6: Transforming academia: visions and pathways for a radical redesign

Time: Tuesday, 14/Sept/2021: 1:30pm - 3:00pm

Transforming academia: visions and pathways for a radical redesign

O. Care[1], Michael Bernstein[2], Mollie Chapman[3], Isabel Diaz Reviergo[4], Gunnar Dressler[5], Maria Felipe-Lucia[6], Cecilie Friis[7], Sonja Graham[8], Jamila Haider[9], Monica Hernández-Morcillo[10], Maria Kernecker[11], Poppy Nicol[12], Hannah Pitt[12], Caroline Schill[13], Verena Seufert[14], Vivian Valencia[15], Julie Zaehringer[16]

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The role of science and knowledge generation is seen as key to advance urgently needed sustainability transformations. However, the current academic system discourages the type of leadership required for sustainability transformations. Its focus on output-based metrics and internationally-mobile careers favours individuals able to pursue prestige and promote personal excellence within specific disciplines. We, The Careoperative[1], argue that, instead, enduring sustainability challenges require a new model of collective leadership that embraces critical reflection, inclusivity and care (Care et al. 2021). Most notably, this includes fundamental changes in the structure of academia: from metrics- to merits-based rewards, from a focus on career to care, and from disciplinarily-bounded to inter- and trans-disciplinary research. Academic organisations need to reorient their training programs, work ethics and reward systems to encourage collective excellence and to allow space for future leaders to develop and enact a radically reimagined vision of how to lead as a collective with care for people and the planet.

Achieving such a radical transformation of academia requires various actors linked to the academic system to cooperate and co-design creative pathways to change. To this end, we will organise a roundtable discussion, bringing together established leaders in sustainability science, with funding agencies, as well as engaged and inspired advocates for a transformation of academia. The live session will start with a short input presentation (10 minutes) by the session hosts, The Careoperative, to set the scene by outlining what we consider the main problems in current academic practice and evaluation, preventing transdisciplinary research from flourishing. We will then invite the five roundtable participants to envision a radical transformation of academia guided by three key questions (20 minutes per question): The first question will focus on "what would be key features of an "ideal" academic research and evaluation system in 2050"? From there we would backcast to "what are small steps individuals in research and their institutions and funding agencies can take, and what are big structural changes needed to transform the current system?", and finally, we will move to "how do we enable cross-scale synchrony to navigate transformational change?", and question whether academic leaders need to be scientists. Towards the end we would also open up to invite further questions from the audience (20 minutes). The roundtable discussion will be facilitated by one of the session hosts.

As roundtable participants, at this point the following people have confirmed their participation:

- Prof. Dr. Gabriele Bammer, Australian National University, Canberra, Australia (Host of the Integration and Implementation Insights Blog https://i2insights.org/)

- Dr. Oyvind Paasche, Bjerknes Centre for Climate Research, Bergen, Norway (Author of the "Unsustainable Science" Paper)

- Prof. Dr. Thomas Breu, Centre for Development and Environment, University of Bern, Bern, Switzerland (Director of CDE and President of the Commission of Research Partnerships with Developing Countries)

- Dr. Samantha Saville, Department of Geography, University of Cambridge, Cambridge, UK (Author of the "Towards humble geographies" Paper)

- Prof. Dr. Jeroen Geurts, Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands (Member of NWO (The Dutch Research Council) Executive Board)

Organising this roundtable discussion within the 2021 International Transdisciplinarity Conference will raise awareness and foster debate on this important topic among academic and non-academic actors. As concrete outputs the audience can take away from this roundtable discussion, we expect 1) a deepened understanding of the challenges of the current academic

research and evaluation system, hindering transdisciplinary research, 2) a list of ideas on how to advance the transformation of academia through concrete actions by individuals and institutions, 3) identified opportunities for collaboration between researchers and research funders to advance this agenda. These outputs will be the stepping stone for a scientific publication and / or communication in a blog post on the https://i2insights.org/ blog.

[1]A leadership collective of individuals from multiple organisations and sectors with the mission to explore, embody and pollinate transformational sustainability and transdisciplinary research.

RT-1.7: Lessons learnt, future perspectives and capacity building pathways of SHAPE-ID

Time: Tuesday, 14/Sept/2021: 1:30pm - 3:00pm

Lessons learnt, future perspectives and capacity building pathways of SHAPE-ID

Isabel Fletcher[1], Catherine Lyall[1], Christian Pohl[2], Sibylle Studer[3], Bianca Vienni-Baptista[2], Keisha Taylor-Wesselink[4], Wallace Doireann[4]

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Interdisciplinarity (ID) and transdisciplinarity (TD) denote a diversity of practices and expectations and present extra challenges to collaboration in knowledge production processes. One of these challenges is the integration of Arts, Humanities and Social Sciences (AHSS) disciplines into collaborative research within EU framework programmes (H2020 and Horizon Europe). While policy reports frequently advocate for the contribution these disciplines can make to solving societal challenges, there is often a perception that Arts, Humanities and Social Sciences researchers have little to offer and their contributions are difficult to understand and integrate.

To address this problem, we present results from a H2020 project entitled "Shaping interdisciplinary practices in Europe (SHAPE-ID)". This is an EU-funded project that addresses the challenge of improving inter- and transdisciplinary cooperation between the Arts, Humanities and Social Sciences and other research fields, particularly Natural Sciences, Technology, Engineering, Mathematics and Medicine/Health disciplines (STEMM). The project seeks to establish a comprehensive knowledge base for policy making and the understanding of the value of AHSS research and its potential for integration in framework programmes.

One of the main outcomes of the project is an online toolkit that offers pathways to develop or support interdisciplinary and transdisciplinary research with the Arts, Humanities and Social Sciences, Science, Technology, Engineering and Mathematics, and societal partners. The toolkit provides a gate way to new and existing resources based on key activities in inter- and transdisciplinary collaboration, – such as funding and evaluating ID/TD research. It addresses four roles – researchers, research organisations, funders/policymakers and societal partners – and offers several entry points depending on the user's role, interests, and search strategy. Resources cover a variety of existing formats (papers, reports, blogposts, videos), but we also developed additional formats such as downloadable topic guides, reflective tools, top ten tips. The toolkit was launched in June 2021 (for more information, see https://www.shapeidtoolkit.eu/ and https://www.shapeid.eu/toolkit-launch/

In this interactive workshop, we want to discuss insights from the project with a view to developing future collaboration and capacity building pathways.

Goal of the online interaction

The aims of this interactive workshop are to:

- Share the main lessons learned by SHAPE-ID
- Discuss the implications for future inter- and transdisciplinary collaboration
- Create a space for mutual learning

By first sharing our insights and lessons learned from SHAPE-ID, we want to invite participants to reflect on and discuss how they could build on the resources developed by SHAPE-ID, and to learn what is further needed to increase dissemination and use of the toolkit among the attending research community and beyond.

What could attendees of your interaction take away from it?

We share the main lessons learned from a research project on the integration of AHSS into interdisciplinary and transdisciplinary research (IDR/TDR) and provide participants with a guided opportunity to directly use the SHAPE-ID Toolkit. Participants can engage in discussions about future capacity building and collaboration pathways. Participants will thus become familiar with:

- a general overview over the main domains (goals) to foster AHSS integration in IDR/TDR with STEMM (and IDR/TDR capacity building in general)
- different perspectives on the AHSS integration challenge
- the navigation of the toolkit for future use
- ways to engage in future capacity building and collaboration pathways

What communities do you want to reach?

- ID/TD researchers and teachers, especially
  - AHSS researchers involved in or leading IDR/TDR
  - Early Career Researchers
- IDR/TDR funders & policy makers
- (ID/TD practitioners: This group we intend to reach by inviting discussants).

The conveners have already started to activate their networks to identify discussants who will provide a short input to the workshop. **Three individuals have already agreed in principle to act as discussants** (their actual participation will depend on the final time slot for our session) **- artist and curator Ariane Koek, researcher Monica Berger Gonzalez (ETH) and toolkit developer Yuko Ogawa Onishi (RIHN).**

In addition, the conveners may directly address potential participants – e.g. representatives of AHSS disciplines – based on the preliminary conference programme. Individual invitations to participate in the workshop may also help the conveners to further specify the guided mutual learning session (workshop part III).

Description of the preliminary structure and design of the online event

I. Introduction & Lessons learnt (15 minutes)

Speakers: SHAPE-ID members will briefly present the rationale and insights of the project using the following guiding questions:

- What are the aims and objectives of SHAPE-ID?
- What are the main challenges for AHSS integration in IDR/TDR?
- What is the SHAPE-ID Toolkit? How does it aim to overcome such challenges?
- What are the most surprising/relevant findings?
- What are did we learn from the process?
- What do we think needs further exploration?

After the presentation of the speakers, the conveners briefly make sure that questions of clarification are answered and comments to be further discussed are harvested for the next workshop step.

II. Discussion (30 minutes)

Discussants: From the perspective of different stakeholders and target audiences, three to four discussants (e.g. artist, early career researcher, funder, and representative of another toolkit) will present insights on how they might use the toolkit in their work.

Guiding questions:

- What is the most useful aspect of the toolkit?
- What needs to be done so that the toolkit has an impact in the future?

Open up to plenary:

- How can we shape future capacity building and collaboration pathways?

Highlights of the discussion will be captured on a virtual flip chart.

III. Application / Reflection / Mutual learning (30 minutes)

Interactive breakout sessions: Participants are invited to apply the toolkit and lessons learned from SHAPE-ID to their work environment.

Depending on the number and composition of the participants, we can offer:

- Thematic guided tours through the toolkit
- Discussion of current challenges: one participant briefly presents his/her challenge (according to a template provided by us) and a small group searches the toolkit to find supportive resources for this challenge. If you want to present a challenge, please contact I.Fletcher@ed.ac.uk
- Small group discussions using questions from the SHAPE-ID self-reflection tools

IV. Closing (15 minutes)

The workshop closes with a short debrief in plenary. The highlights of the presentations and discussions will be shared with the participants and inform the future activities of the SHAPE-ID project.

RT-1.8: Creating 'Safe Enough Spaces' for Transformative Learning in TD: Fostering Personal and Collective Transformation

Time: Tuesday, 14/Sept/2021: 1:30pm - 3:00pm

Creating 'Safe Enough Spaces' for Transformative Learning in TD: Fostering Personal and Collective Transformation

Ruth Dorothea Förster[1,2], Petra Biberhofer[2], Saskia Eschenbacher[3], Mandy Singer-Brodowski[4]
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In this workshop we like to invite participants

- to challenge our concept 'safe enough spaces' for supporting intertwined personal and collective transformative learning processes in HESD and beyond.
- to discuss how the characteristics of 'safe enough spaces' can support transformative learning in TD-learning settings in HESD and beyond that in TD-cooperations.

Transdisciplinary (TD) education and research can be understood as part of transformative science (Schneidewind et al. 2016) where diverse actors inside and outside academia collaboratively contribute to societal transformation towards sustainability

while transforming not only science but also themselves. Therefore, prospective change agents like TD-students, as also current ones like TD-researchers, have to learn how to transform themselves and how to facilitate transformation.

Transformative learning (TL), one of the most important learning theories in regard to Higher Education for Sustainable Development (HESD), provides an adequate framework for learning in TD-processes. It is rooted in adult education and has been developed within different streams (e.g Taylor/Cranton 2012, Nicolaides et al. 2021 in press). It explains fundamental shifts in frames of reference (or so-called meaning perspectives) including values or assumptions for our feelings, thinking and acting when confronted with irritations or challenges (e.g. Mezirow 1991). These frames of reference (Mezirow, e.g. 1991) give us orientation, a sense of coherence and are often implicit. Both, dealing with irritations which may urge us to transform our frames of reference as also changing them is challenging and stressful. In TD-processes, dealing e.g. with complex real world problems, or being as TD-researcher confronted with highly diverse frames of references like e.g. those of climate change deniers can be such strong irritations.

At the center of TL is according to Mezirow (1991) the critical reflection of assumptions through rational discourse in an ideal speech situation (Habermas). The conditions of an ideal speech situation are never fully met in practice. We argue that the kind of rational discourse Mezirow suggests, a form of dialogue based on exchanging arguments, is too narrow. Therefore, we see a need to complement Mezirow's work by introducing the concept of *transformative conversations* (Eschenbacher 2020) that relies on the work of Rorty (1989) and Arcilla (1995).

At the same time, newer developments in TL-theory (Schlattner 2021 in press, Mälkki 2019) and the neurophysiological based polyvagal theory (Porges 2014) show that emotions are crucial for TL and help to better understand, which somatic-emotional reactions people experience when facing challenges and leaving their old and stable meaning perspective and entering a 'liminal space' before reaching a new one (Förster et al. 2019, Mälkki 2019, Taylor 2017).

We therefore conceptualise TL processes that are embodied and deeply related to emotional challenges as also rooted in transformative conversations. TL thereby does not only represent individual (personal) learning processes, but can be conceptualised as embedded or situated learning (Lave/ Wenger 2011), where peers are playing an important role and individual and societal learning processes are continuously entangled.

In order to cope with the multifaceted emotions and further embodied reactions during transformative conversations that are provoked within the TL processes in 'learners', but as well in educators or process facilitators, it is of utmost importance to feel 'safe enough'. This is supported by staging 'safe enough spaces' - a concept we emphasize.

In this workshop we want to propose characteristics to create 'safe enough spaces' for transformative learning based on our current work (Singer-Brodowski et al. in preparation) and discuss how they may be used to foster personal transformation in the field of TD-learning settings in HESD and beyond that in TD-cooperations.

Envisaged take-aways

- Better understanding that the staging of 'safe enough spaces' is crucial for supporting TL in TD-processes.

- First inspirations how to stage such spaces by using the proposed characteristics.

- Shift in perspective: anybody involved in transformative TD-projects/ real-world labs...may embark on a TL learning journey.

For Whom?

- Educators, curriculum designers in the field of TD for HE(SD) who want to support personal transformation (TL)

- Designers/coordinators of TD-research projects aiming to support personal transformation within TD-cooperations

- Designers involved in capacity building/ professionalization of TD-researchers

Rough structure

We will apply our characterstics to create a 'safe enough space' for profound sharing.

10' Warming up, staging a 'safe enough space'
10' Impulse: Concept and characteristics of 'safe enough spaces'
10' Q & A

45' Discussion & exploration in diverse break-out sessions ca. 3-4 in parallel

Questions:

1. How can we implement these characteristics in TD-learning settings in HESD/ in TD-cooperations?
2. Challenges and limitations?
3. Who can (co-)create these 'safe enough spaces'?

15' Harvesting & Wrapping up

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RT-2.2: Discussion on the challenges for transdisciplinary (TD) work in Latin America: five case studies from a global perspective.

Time: Tuesday, 14/Sept/2021: 3:30pm - 5:00pm

Discussion on the challenges for transdisciplinary (TD) work in Latin America: five case studies from a global perspective.

Pablo Riveros[1], Diana Soler[2], Jaqueline Meriño[1], Francisco Crespo[1], María Goñi[3], Luis Soto[4], Silvia Arguello[4], Cecilia Hidalgo[5]

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Stream: Global and virtual TD: connecting and enabling diverse communities and practices.

Question: What opportunities and challenges arise in applying TD in diverse geographical, social, political, and cultural contexts?

What is the goal of your proposed online workshop or interaction?

To understand the settings of the development of transdisciplinarity in public universities, with a public mission, in Latin America in a context of inequality. From there, find strategies to strengthen practices and knowledge networks worldwide.

What could attendees of your online workshop or interaction take away from it?

To characterize experiences in each University that can converge in strengthening networks of thought and action, regarding the development of TD in Latin America and other regions in the world.

This panel would allow us to reflect from these 5 cases, on the ways that transdisciplinarity has been institutionalized in Latin American universities. We expect to provide cues on how management practices and policies are set to its encouragement.

What communities do you want to reach?

Research groups, think tanks, academic groups, foundations, and local organizations, that identify themselves within transdisciplinary frameworks.

Description of the preliminary structure and design for your online event

The particularities of the Latin American case -in contexts of high inequality, emerging social conflicts and higher education systems hit by self-financing policies-, rather than building a homogeneous one, express a great diversity which converges in the construction of efforts, practices, and new epistemologies for inter- and transdisciplinary,

Even so, it is not just from common problems where we can build up stories that identify the contributions made from Latin America to the discussion on inter and transdisciplinary. We can also find them in the key role public Universities have played within the build-up of their nations, their relationship with the territories, and the engagement of its research and teaching for the human development.

This panel session will be composed of five presentations, each one of them representing a "case" or "context" in which ID-TD is developed in Latin America: Universidad de Chile, Universidad Nacional de Costa Rica, Universidad Externado de Colombia, Universidad de la República de Uruguay and Universidad de Buenos Aires de Argentina. bellow you will find a description for each.

1 - Universidad de la República, Uruguay

At Udelar, transdisciplinarity can be found in different practices which can be recognized through different names: outreach, comprehensive practices, engagement promotion with social actors, among others. To identify some of these characteristics, we will take as a reference the experience of the *Programa de Investigación e Innovación Orientado hacia la Inclusión Social* (Research and Innovation Program Oriented towards social inclusion). Creating new knowledge needs to involve several social actors that are linked to the problems faced. There are many challenges that are registered in these processes: defining problems collaboratively, establishing symmetrical relationships, designing methods for the integration of diverse knowledge

and experiences, among other aspects. These experiences can contribute towards the conceptual and methodological construction of studies on transdisciplinary.

2 - Universidad de Chile

The University of Chile is in a context of high marketization while, at the same time, promoting a background story associated with its public mission, and its relationship with society. Then, transdisciplinary shows up as an actor that creates linking points that form a unit of "frontier". The *Unidad de Redes Transdisciplinarias* (Transdisciplinary Networks Unit) at the University of Chile was born in 2014 as a result of the strategic will of the institution to establish a mediation unit with networks of practice related to complex problems. Nowadays, the unit struggles with the self-financing model and scarcity of public resources for research; despite this, analyzing its strategy can show the (other) challenges that bring on institutionalization processes in universities with low levels of state funding.

3 - Universidad Nacional, Costa Rica

At UNA, the interest and development for transdisciplinary is explained through compliance with the principle of the Necessary University and from the convergence of two processes: The first is based on transdisciplinary (bottom-up) work experiences from research and outreach, and the second is due to a process of institutionalization that emerged in 2015 from the Deputy Rectory (top-down) and that gave rise to the "Epistemic Communities". This case constitutes a process under construction that could contribute to problematize the forms of institutionalization of transdisciplinary from its particularities and difficulties.

4 - Universidad Externado de Colombia

Colombia is in the northern corner of South America and has a territorial configuration of environmental diversity, socioeconomic inequality, central and peripheral regions, local, regional, national, and world relations, and has advantages and geographic tensions that citizens, in general, are unaware of, which diminishes democracy. In this panorama, TD arises as a bridge between situated knowledge, dialogues of knowledge, action networks, and public knowledge, to find environmental, social, and geographical justice. Externado de Colombia University bets to contribute to this through its interdisciplinary geography program, and the transdisciplinary master's degree in sustainable living systems.

5- Universidad de Buenos Aires, Argentina

A sequence of interdisciplinary, inter-institutional and intersectoral projects oriented towards the provision of climate services in southern South America is presented. The sequence reveals a dynamic of intense collaboration, which has allowed its members to take on growing challenges. The process of expansion and consolidation of a wide TD research network is shown while dealing with the challenge of implementing a drought information system for the south of South America in the context of the creation of a regional climate center.

Participants will have a short time interval (10 minutes each) to present the context and their views around the following guiding questions:

What are the institutional settings in which TD experiences take place in each Latin American university?

What are the management elements that facilitate, or hinder research, training, and university outreach work from Transdisciplinary?

What practices and notions with different denominations, but common meanings are included in the transdisciplinary in each of the universities?

What are the interaction dynamics that occur between academic and non-academic actors in transdisciplinary experiences?

ITD 2021 appears as a scenario in which, in addition to circulating knowledge and experiences about the ways of doing transdisciplinary worldwide, it facilitates the creation of knowledge and work networks, in training, research and university outreach.

Afterwards, there will be space for conversation among the panelists and Q&A from the audience.

A discussion-type activity is proposed. The structure and schedule can be seen below:

5 minutes: reception and welcome

10 minutes: presentation Udelar

10 minutes: presentation Universidad Externado de Colombia

10 minutes: presentation Universidad de Chile

10 minutes: presentation UBA

10 minutes: presentation National University of Costa Rica

30 minutes: discussion and Q&A

5 minutes: closing remarks

RT-2.3: Institutional transformations of universities towards transdisciplinarity: tackling cultural hegemonies

Time: Tuesday, 14/Sept/2021: 3:30pm - 5:00pm

Institutional transformations of universities towards transdisciplinarity: tackling cultural hegemonies

Ulli Vilsmaier[1], Juliana Merçon[2], Basirat Oyalowo[3], Martina Schäfer[4], Dena Fam[5]
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Transforming universities towards transdisciplinarityis a complex endeavour, tackling established practices, policies, legal structures as well as personal and professional values and norms. Enabling institutions often emerge from niche initiatives,

such as courses or study programs, research projects or transfer activities, to evolve into larger realms, or may follow more pre-structured, linear top-down or bottom-up pathways. To date, universities which have undergone such transformations are still rare, but many experiences exist in niche initiatives within universities, such as in inter- and transdisciplinary research centres or study programs. Increasingly, spaces for action and reflection are forming at the margins of, and in-between established institutions as an expression of current transformations of societal orders. Static structures are being replaced by temporary, fluid spaces in which knowledge is produced, received, negotiated, and transformed in new ways and linked more closely to societal transformation. Thereby, cultural hegemonies play out in different ways: First, such transformations face long term established values and norms of disciplinarily organized academic communities that are incorporated both in everyday practices and policy making. Second, such transformations are confronted with the dominance of (occidental) academic values and norms of knowledge production and challenge the legitimacy of multiple ways of knowing and cognizing in research and education. This influences the potential of trans-sector collaboration, where different ways of knowing, acting, and being are incorporated to tackle problems through transdisciplinary research. In world regions that have been colonized, oppressed and transformed by hegemonic forms of governance multiple hegemonic dimensions overlap in transdisciplinary reserach. Therefore, transformations of universities towards transdisciplinarity cannot be disconnected from the processes of decolonization and liberation which play a significant role in forming and qualifying the next generation academics and decision makers.

The proposed panel builds on a series of conferences, workshops and research projects that will (or have) tackle(d) the question of institutional transformation towards transdisciplinarity within universities in different world regions: A transdisciplinary research workshop of a university network in Nigeria (Lagos, August 2020); a panel on institutionalizing inter- and transdisciplinarity at universities at the Third Latin American Congress of Interdisciplinary Research and Higher Education (Mexico City, May 2021);a conference on transdisciplinarity as institutional challenge for universities in German speaking countries (Berlin, June 2021); and research on transformations of universities towards dynamic and relational inter- and transdisciplinary institutions that takes into account case-studies around the world (on-going).

Core results of these activities and events will be presented and explored within an intercultural orientation, emphasizing the highly impactful, mostly invisible, and often underestimated factor of cultural hegemonies in university transformations.

The following questions will guide the panel discussion:

- How does disciplinary hegemony play out in university transformations towards transdisciplinarity? How is this dominance experienced in everyday practices and policy making, including reorganization of study programs, research, performance indicators, review systems, and funding schemes? What are the experiences of successful re-configurations of values, norms and practices in these realms?

- How does the dominance of (occidental) academic values and norms play out in trans-sector collaboration and what are impactful social and epistemic responses to create legitimacy for multiple ways of knowing and cognizing? How far can transformations towards transdisciplinarity be opportunities for decolonization and to strengthen liberating education?

The aim of this panel discussion is to share experiences from different world regions and broaden the research agenda on institutionalization of transdisciplinarity within universities by emphasizing different dimensions of hegemony and by linking these to discourses of decolonization and liberation. The target groups of the panel are representatives of university management and policy makers, researchers and teachers implementing (or aiming to implement) transdisciplinarity within their research and study programs, funding agencies and partnering organizations of universities in research and education. Participants will provide insights into pathways of university transformations towards transdisciplinarity in different world regions and provide an opportunity of intercultural learning among all involved. Further, the panel discussion will bring to light different dimensions of cultural hegemonies in university transformation along with new research horizons at the interface of transdiciplinarity, decoloniality and liberation.

Preliminary structure and design:

Introduction (10 min)

- Setting the stage – spanning the horizon and objectives of the panel: session conveners (Ulli Vilsmaier and Juliana Merçon)

Reporting on conference/workshop/research outcomes and lived experiences (20 min; 5 min each)

- Transdisciplinary research workshop, Lagos (August 2020): Dr. Basirat Oyalowo, University of Lagos Akoka, Nigeria
- Conference on transdisciplinarity as institutional challenge of universities, Berlin (June 2021): Prof. Dr. Dr. Martina Schäfer
- Panel on institutionalizing inter- and transdisciplinarity at universities, Third Latin American Congress IEI (May 2021): *tbd* during the IEI panel
- Transformation of the university towards dynamic and relational inter- and transdisciplinary institutions (on-going research with cases around the world): Ass. Prof. Dr. Dena Fam, University of Technology Sydney

Panel discussion focus 1: Tackling disciplinary hegemonies (15 min, moderated by session convener 1)

Involving comments and questions from the auditory (summary chat and 2-3 interactive questions) (10 min)

Panel discussion focus 2: Tackling (occidental) academic hegemonies, decolonization and liberation (15 min, moderated by session convener 2)

Involving comments and questions from the auditory (summary chat and 2-3 interactive questions) (10 min)

Summary and outlook: impulses for the research agenda on institutionalizing transdisciplinarity within universities (10 min, session conveners)

RT-2.4: Workshop - Methodological aspects of social power relations in Td interactions

Workshop- Methodological aspects of social power relations in Td interactions

Maria De Eguia Huerta, Esther Meyer

Lighthouse gGmbH, Germany; maria@lighthouse.global

This is an online workshop connected to a Pre-crafted contribution, a poster, also named Methodological aspects of social power relations in Td interactions.

This is a workshop contributing to knowledges about Td on-the-ground starting from a very concrete Td experience (which will be presented with a video in Spanish with English subtitles). In this workshop we will address tangible transdisciplinary practices and processes, and more concretely methodological aspects, as we develop and implement them on-the-ground at Lighthouse GgmbH in our work in Europe North and South, which address the issue of social power relations in Td interactions.

We are happy to share a great success with a very complex project, an international Antidiscrimination Lab in form of a research workcamp, in which very diverse participants had to be able to truly work and meet each other horizontally, and far away from political correctness. We highlight some of the aspects that we think contributed to this success, which, amongst others, question some of the common North European formats of transdisciplinary work.

- What is the goal of your proposed online workshop or interaction?

Our main goal with this workshop is to collectively reflect on the most complex mechanisms behind social power relations during Td interactions amongst participants who are experiencing privilege and discrimination in unequal ways. A further goal is to share some of our learned lessons in our work on-the-ground about aspects to consider when designing a social power relations conscious Td interaction.

In the academic Td circles social power relations during Td interactions have been an object of research and debate. To really decode the concrete mechanisms through which privilege and power is influencing those interactions remains a challenge. We would like to contribute with this workshop to this debate with some conclusions we have come to from our working-on-the-ground perspective. Furthermore, we would like to discuss the methodological and political transcendental questions we constantly pose to ourselves with other interested colleagues to reach a deeper level of reflection.

This workshop starts with an 8 minutes video (https://www.youtube.com/watch?v=ckpNiWl0eKo) about our project from 2019, "International Workcamp Anti-Discrimination Laboratory". This shall be a generative material for the main part of the workshop. This was an experience of collective research, reflection and transformation about antidiscrimination, its mechanisms, its origins, as well as possible strategies to reduce inequality and injustice in the everyday. A team of 16 people from 9 countries with different ages, diverse biographies and vulnerabilities was invited for a transformative research experience. It had a duration of seven days and it took place in the Pyrenees. They were asked to collectively answer urgent questions about discrimination, social justice and options for action.

Three axes were the skeleton of our methodology: the physical/corporeal axis, the analytical laboratory axis, and the creative crafting axis. These axes structured the daily routine of the work and were always connected with each other. The group worked following a spiral-based methodology that would start working on a question and going deeper and deeper into possible answers from the three diverse perspectives.

It was a risky experience, as we invited people standing on distant sides of the privilege-exclusion continuum to take part in an in-depth process of analysing discrimination. We asked white European university-students girls to collectively reflect form an intersectional perspective about privileges and exclusion with north-African black men who were not able to finish school and had no legal permission to stay in the country. Amongst others, strong issues of masculinity intertwined with Global North-Global South injustice appeared and had to find a place in very personal situations of sharing 24 hours during 7 days. And thereby research had to be done.

Despite all challenges, the aspects we consider were key to the success of this Td experience are:

a) Living together in basic conditions. The common humanity takes place and arises when participants are sharing sleeping room, washing clothes per hand outside together or sharing a kitchen work slot.

b) The surroundings, Pyrenees. For example, hiking in the mountains was intertwined with an activity of deeper reflection on violence, in which individual and group work reached high intensity because the issues that arose. This could be balanced through the parallel hiking activity.

c) A transformative, qualitative, creative, transdisciplinary research methodology constantly and consequently connecting the above mentioned three axes.

d) We asked ourselves uncomfortable questions beyond political correctness.

- What could attendees of your online workshop or interaction take away from it?

Attendees of this workshop could take some learnings in concrete aspects to consider when designing transdisciplinary interactions sensible to social power relations. They could also take some relevant questions to further think of and consider in their practitioner or academic everyday work.

- What communities do you want to reach?

We would like to reach practitioners and academics. For in our eyes both are needed to further develop Td methodologies in order to make them safer in front of discrimination mechanisms, or at least in order to enhance our consciousness so that we are able to think and act beyond political correctness and dare to confront complex inequalities during a Td interaction.

- Description of the preliminary structure and design for your online event
1. Greetings and introduction of the facilitators and Lighthouse

2. Introduction of the topic (visual support – presentation)

3. Visualisation of the generative material, our transformative research workcamp video (8 minutes)

4. Short clarifying questions about the video, methodology or results

5. Exposing our thoughts, conclusions and questions coming out of our Td practices on the ground, share our learned lessons out of successful practices, challenges and pitfalls, focusing on the video-related project (visual support – presentation)

6. Interacting with the participants (main part). Through digital participatory methodologies:

a) capturing participant reactions to the video

b) collective analysing of further aspects that may contribute to reduce inequalities during Td interactions and to enhance its transformative potential. 2 small groups. In this main part, participants will be asked to share…

b.1. their very own experiences and learnings out of their previous efforts in reducing inequalities during Td interactions (a rather narrative part)

b.2. a systematisation of mentioned factors that have appeared in the workshop so far and which are considered by the group as key-axes to take into account when planning equal Td interactions and to foster its transformative potential. This is a rather analytical part working with clusters, amongst others.

7. Plenary session to share groups work

8. Closing

This workshop is designed for a maximum of 20 participants.

RT-2.5: "Transformation & Transdisciplinarity in Africa": Grappling with political dimensions

Time: Tuesday, 14/Sept/2021: 3:30pm - 5:00pm

"Transformation & Transdisciplinarity in Africa": Grappling with political dimensions

Taryn Pereira Kaplan[1], Aisa O. Manlosa[2], Richard Meissner[3], Nelson Odume[1], Blessing Nonye Onyima[4], Rebecka Henriksson[5], Dylan McGarry[1], Norris Erhabor[6], Jessica Jane Cockburn[1]

[1]Rhodes University, South Africa; [2]Leibniz Centre for Tropical Marine Research, Germany; [3]University of South Africa (UNISA), South Africa; [4]Nnamdi Azikiwe University Awka, Nigeria; [5]University of KwaZulu-Natal, South Africa; [6]University of Benin, Benin; j.cockburn@ru.ac.za

Sub-session 2 of 3: "Transformation & Transdisciplinarity in Africa": Grappling with political dimensions

The African continent is rapidly changing, faces a range of sustainability challenges, and holds deep potential for being a leader in finding new ways forward. The notions of transformation and transdisciplinarity have found their way into research and scholarship on the continent, and are offering scholars a way to challenge existing norms and grapple with urgent questions around decolonisation, social justice and social-ecological sustainability across a wide range of sectors, fields and areas of practice. This session is part of a 3-part set of sessions where 'pracademics' (people working at the interface of academia and practice) from the African continent will gather to share, question and grapple with their work on transformation and transdisciplinarity. The three sessions are structured around the idea that transformation takes place within and across three spheres: the personal, the political and the practical (O'Brien, 2018). We see transformation as a key process taking place within and through transdisciplinary (TD) processes.

Our emphasis will be on sharing the context-specific challenges of putting the ideals of TD into practice in various case studies from Africa. We hope to prompt discussion and sharing on some of the "tough" or "messy" aspects of TD including for example power dynamics, emotional and interpersonal discomforts and difficulties, personal reflections and changes, resource constraints, practical and logistical frustrations, etc. Through these sessions, we aim to offer deeper insight into the realities of implementing TD in resource-constrained and highly heterogeneous contexts often characteristic of postcolonial and Global South contexts, as in most of Africa. We hope to cultivate an appreciation for the ways in which African pracademics are bringing TD to life despite these challenges, and to celebrate their successes. We welcome other pracademics, researchers and practitioners working in similar postcolonial and Global South contexts, and anyone with a curiosity and/or experiences of the tough and messy side of TD work.

This is sub-session 2 of the set of three sessions on Transformation & Transdisciplinarity in Africa. Here, case study presenters will grapple specifically with the 'political' aspects of transformation and transdisciplinarity that have emerged in their work. The political sphere relates to systems and structures. In TD work this relates to the following broad themes: the power relations among stakeholders in TD processes; the structural barriers to transformation and to the realisation of TD in practice; and the influence of political processes across levels of governance on transformation and change processes towards social justice and sustainability.

Format (structure/design): The session will begin with a brief introduction setting the scene for the set of three sessions, and introducing the focus on the 'political' dimensions for this sub-session. The session will focus on four African case studies. Presenters will provide short presentations (max 10 minutes each) on their work with TD, sharing specific insights on the political dimensions. These will be followed by break-out group discussions, and then a closing plenary panel discussion, drawing on cross-cutting insights and experiences offered by 2-3 panellists. Session coordinators and facilitators will use a range of online tools to facilitate an interactive discussion among participants within the different parts of the session.

Session coordinators: Taryn Pereira, Aisa Manlosa.

Case studies:

1. eThekwini's green and ecological infrastructure policy landscape: Trans- or Mono-disciplinarity? (Richard Meissner).

2. Facilitating urban river water quality governance through transdisciplinary, engaged research (Nelson Odume & Blessing Nonye Onyima).

3. Harmonising food security and biodiversity outcomes in southwest Ethiopia: reflections on challenges and opportunities of transdisciplinary research (Aisa O. Manlosa).

4. Understanding gender differences in availability, accessibility and use of climate information among smallholder farmers in Malawi (Rebecka Henriksson).

5. Reflexivity and solidarity in transdisciplinary research: questions from scholar activists working with social movements for coastal justice in South Africa (Taryn Pereira & Dylan McGarry).

Facilitators/Panellists: Norris Erhabor, Jessica Cockburn.

RT-2.6: Transdisciplinary research design - the need for reflective standards

Time: Tuesday, 14/Sept/2021: 3:30pm - 5:00pm

Transdisciplinary research design - the need for reflective standards

Barbara Regeer, Kristiaan Kok

Athena Institute, VU University, Amsterdam, the Netherlands; kristiaankok@hotmail.com

Overall goal:

In this interactive panel session we will bring together insights on sustainable transformation and societal transitions with insights on transdisciplinary processes, by exploring how to best design and evaluate processes of transdisciplinary research aimed at societal transformation. We hope that the results of this session can feed into further collaboration in the form of written contributions.

Session rationale:

Transdisciplinary approaches that integrate societal stakeholders' knowledge, perceptions and values in research and innovation are increasingly getting traction in academia and policy environments as a promising avenue in co-producing knowledge and solutions for sustainable transformation. Initiating and guiding such approaches, however, is not straightforward and comes with many challenges. A first set of challenges concerns the methodological, institutional and practical difficulties that arise in the 'fuzzy reality' of doing transdisciplinary research and innovation (Brandt et al., 2013; Lang et al., 2012). A second set of challenges is related to the emergent nature of transdisciplinary efforts in sustainability science: as such approaches aim to bridge the gap between knowledge and action, they should be designed and enacted to accommodate flexibility for, adaptation to and anticipation of emergent local needs and contextual developments (Fazey et al., 2018). And thirdly, recent work increasingly emphasizes that transdisciplinary co-production processes can best be understood as a political practice (Turnhout et al., 2020), requiring those managing and facilitating transdisciplinarity to reflexively engage with, navigate and steer the political dynamics of co-production.

In an effort to provide support to those guiding and enacting transdisciplinary in practice in navigating the above mentioned challenges, scholars have called for the development of, and proposed, (methodological) guidelines, standards or principles supporting co-production processes (Lang et al., 2012; Lux et al., 2019). Approaches like for instance Reflexive Monitoring in Action (RMA, see van Mierlo et al., 2010) are increasingly adopted in sustainability science in an effort to guide transdisciplinary processes and to facilitate learning and reflection in the context of transformation. It is argued that such guidelines or standards could not only support practitioners in 'doing transdisciplinarity', but also provide credibility and legitimacy to science-society collaboration processes (Verwoerd et al. 2020). While we see a movement towards increasingly sophisticated and detailed frameworks, it is also recognized that the transdisciplinary process is fuzzy, open-ended and emergent. The question then arises: How can such guidelines or standards be designed in a way that they do justice to open-ended nature of transdisciplinary processes, the fuzzy and political practice of doing transdisciplinarity, and provide guidance while simultaneously embracing uncertainty?

In this session we aim to synthesize insights from transdisciplinarity and studies on sustainable transformation more broadly. We also welcome insights from other epistemic communities as for instance reflexive standards have been introduced in health practices too (Zuiderent-Jerak, 2007). By doing so, we hope to advance the discussion on how reflexive designs could better guide transdisciplinary processes in offering 'just enough structure'.

Session chairs:

- Dr. Barbara Regeer (Vrije Universiteit Amsterdam, VU)
- Kristiaan Kok MSc (Vrije Universiteit Amsterdam, VU)

Panelists:

- Dr. Barbara van Mierlo (Wageningen University Research, WUR)
- Dr. Alexandra Lux (Institute for Social-Ecological Research, ISOE)
- Prof. Dr. Daniel Lang (Leuphana University Lüneburg)

Session outline:

- **0-5 min:** introduction to the session - *dr. Barbara Regeer*
- **05-20 min:** introductory pitches (3x5 minutes) to set the scene from different perspectives to design and evaluation - *panelists*
- **20-50 min**: facilitated panel discussion based on overarching questions (see below) - *session chairs + panelists*
- **50-80 min**: interactive discussion with audience, based on examples of guidelines/standards (both simple and complex) addressing the question: in what way could they help you in your transdisciplinary work? - *session chairs + panelists + audience*
- **80-90 min**: summary and looking forward: what is next? - *session chairs*

Overarching questions for the panel discussion

Transdisciplinary research design could on the one hand embrace the complex, fuzzy and responsive nature of transdisciplinary practice, but on the other hand be simplified to accommodate the uptake across process phases.

- Are there limitations to simplifying design guidelines, principles, standards? What are non-negotiable elements?
- How can we design 'designs' that accommodate flexibility as well as provide directionality?
- How to use evaluation frameworks in the design process? Or rather, what do evaluation frameworks for transdisciplinarity tell us about designing transdisciplinary processes?
- Can transdisciplinarity best be guided by handbooks, checklists, approaches, monitoring & evaluation frameworks, guiding principles, etc.? What could be the role of *reflexive standards*?
- How can we design reflexive standards that are applicable and responsive to early career researchers (for instance in the context of shorter projects, internships, PhD theses) that require some simplifications of complex processes?

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RT-2.7: Knowledge in Action: Short Film Dialogue

Time: Tuesday, 14/Sept/2021: 3:30pm - 5:00pm

Knowledge in Action: Short Film Dialogue

Loni Hensler[1,2], Juliana Merçon[1,3], Gerardo Alatorre Frenk[1,3], David Donner Castro[1,4], Ingrid Estrada Paulin[1,5]
[1]Red de Custodios de Bosques y Selvas de Xalapa, Mexico (Forest Stewards Network); [2]Universidad Nacional Autónoma de México, Mexico; [3]Universidad Veracruzana, Mexico; [4]Espora Transmedia, Mexico; [5]INANA A.C., Mexico; loni.hensler@posteo.de

The Forest Stewards Network has been working since 2015 with Participatory Action Research methodologies for a shared management and restoration of biocultural systems in the capital region of the state of Veracruz, Mexico. It is an experience of bottom-up transdisciplinary collaboration that has been experimenting different well-known and innovative methodologies for dialogue and collective action, with interesting results to share on how different actors learn in the process towards individual and social transformation. This short documentary shows how this Network builds processes of reflection and action for a more horizontal and collaborative work towards good living in the area. This process is based on the construction of knowledge, social power and transformative actions among very different people. Diverse realities and voices about the process are interconnected in the short film, thus presenting an interesting picture of transdisciplinary collaboration in the global south.

The shortfilm offers a vivid and multi-voice experience that contributes significantly to the conference title *Creating spaces and cultivating mindsets for learning and experimentation.* Learning for transformation and creativity played a key role in the depicted process. It presents an example of how transdisciplinarity can be undertaken and shares important learnings that make it tangible. The video provides inspiration to action and invites us to connect diverse communities from different cultural contexts. At the same time, it presents an example of how we can generate materials to make TD more accessible and attractive to diverse people.

In this session, the short film *Saberes en Acción* will be presented and shortly commented by special guests and participants from different socio-cultural backgrounds in the TD landscape, followed by an open dialogue on learnings and reflections on transdisciplinarity. The goal is to promote intercultural dialogue about different approaches to transdisciplarity, as well as on the learning and transformation process in this on-the-ground TD experience. We invite everyone who is interested in promoting collaborative multi-actoral processes, exploring transformative learning approaches from the global south, or discussing opportunities and challenges of transdisciplinarity in diverse cultural contexts.

The dialogue will be guided by the following questions: What aspects surprise you in the present experience? What aspects differ from you conception and practice of transdisciplinarity? Are their particular elements in the Mexican context which are different to those from your own context? To what extent can short films contribute to an exchange of experiences? What potential does this form of communication have in comparison with more conventional formats as academic papers? With participatory dynamics throughout this real time contribution, we will try to build bridges between different people, cultural

contexts and understandings of transdisciplinarity in order to explore the existent diversity of concepts and practices related to multi-actoral collaboration.

Short film: *Saberes en Acción*. Duration: 14'27. Original language Spanish with subtitles in English.

Special guests (to be confirmed):

- *Julie Thompson Klein*, Wayne State University, USA and International Research Affiliate in the Transdisciplinary Lab at ETH-Zurich, Switzerland

- *Brigitte Baptiste*, Intergovernmental Science and Policy Platform on Biodiversity and Ecosystem Services, Colombia

- *Martha Caswell*, Co-Director Agroecology and Livelihoods Collaborative, University of Vermont, USA

- *David M. J. Wood*, Institute if Aesthetic Research, Universidad Nacional Autónoma de México, Mexico

RT-2.8: Theory of Change: Application for strategic planning of transdisciplinary research for outcomes

Time: Tuesday, 14/Sept/2021: 3:30pm - 5:00pm

Theory of Change: Application for strategic planning of transdisciplinary research for outcomes

Rachel Claus[1], Rachel Davel[1], Daniela Pinto[1], Cheryl Heykoop[1], Brian Belcher[1,2]
[1]Royal Roads University, Canada; [2]Centre for International Forestry Research, Indonesia; Rachel.Claus@royalroads.ca

Rationale:

Transdisciplinary research aims to both generate knowledge and contribute to positive societal transformation. The urgency of complex social problems has led to increased social pressure for research to generate impact. In response, there has been an emergence of "meta-science" (the science behind effective science), in which scholars have developed, tested, and refined theory and methods to support effective design and implementation for research impact (Kläy, Zimmermann, & Schneider, 2015; Belcher et al., 2016; Fam, Neuhauser, & Gibbs, 2018; Belcher, Davel, & Claus, 2020).

Theory of Change (ToC) continues to gain popularity as a multi-purpose tool for the planning and evaluation of transdisciplinary research (TDR). The rise in popularity of applying ToC in TDR is demonstrated by other proposed ITD 2021 workshops (Schäfer et al.; Kny et al.; Deutsch et al.), which aim to build the base of experiences, share learning, and chart a path forward[1]. A research ToC is a set of hypotheses about the causal relationships between a research project's outputs and the resulting outcomes and impacts. It serves as a model of the change process (Belcher, Davel, & Claus, 2020). There is, however, limited documented experience of ToC application for planning and adaptive management of TDR (Armitage et al., 2019; Deutsch et al., 2021). There is a need for conceptual clarity and guidance to support the application of ToC for effective TDR planning, monitoring, and evaluation. Moreover, the climate crisis and the current COVID-19 pandemic have accelerated the trend toward the use of virtual meetings and collaboration. Even without travel and social-distancing restrictions, it can be difficult to assemble all members of a transdisciplinary team together in one physical space, so online workspaces are an ideal alternative. Yet, the online environment poses additional challenges for effective research planning and implementation. Virtual meeting fatigue has led to decreased engagement and communication within and between teams that hinder effective collaboration (Waizenegger et al., 2020). This workshop responds to both sets of needs simultaneously, offering practical tools to support effective ToC design using strategic and engaging ways to facilitate online research planning sessions for productive collaboration.

Workshop Structure and Aims:

This workshop focuses on ToC application for TDR planning and is intended for TDR researchers and program managers who seek to design effective research initiatives. The workshop will also be useful to evaluators and research funders. The workshop has four goals:

1. To provide participants with a conceptual overview of ToC
2. To demonstrate the application of the ToC tool for strategic TDR planning in real-time
3. To provide participants with an overview of how a ToC workshop (and other workshops) can be held in an online environment
4. To provide the Fishbowl participant the opportunity to think about their project within a structured ToC framework to help inform strategy development for realizing intended outcomes. The workshop facilitators have pre-selected a "fishbowl" participant in advance.

The workshop will use two online platforms: Zoom and MURAL online whiteboard. The first part of the workshop will present a conceptual overview of the components of a ToC and how those concepts apply to TDR projects from a planning perspective. The second part of the workshop will involve a facilitated Fishbowl discussion, whereby facilitators will pose questions to a respondent who has a research project in the early planning phases. The respondent will answer questions posed by facilitators. Workshop participants will listen to the dialogue and document their observations and ideas about the components of a ToC for the project directly in the MURAL whiteboard space. The third part of the workshop will consist of the facilitators synthesizing the information documented in MURAL and reporting back to the group. The final portion of the workshop provides an opportunity for participants to ask questions or raise points of discussion and will conclude by soliciting participant feedback.

By participating in the workshop, participants are expected to build literacy in ToC concepts and understand their utility and value for TDR research planning. Pairing theoretical background with practical application of ToC elements will reinforce the concepts to ensure they resonate with participants and are consistently applied. Participants may find these concepts and tools helpful for developing proposals and/or program strategies for future TDR endeavours. By observing and participating in the documentation of the ToC for an actual case in real-time, participants will gain hands-on experience with conceptualizing and documenting a TDR ToC. Furthermore, participants will be exposed to and engage in an online workspace to learn how a ToC workshop can be structured and facilitated in a virtual setting. Possible opportunities for mutually beneficial collaboration could

be surfaced through this exercise, depending on who participates and whether there is overlap between participants' and/or the Fishbowl researcher's research interests.

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[1] n.b. Two of the authors of this submission (Belcher & Claus) are also contributing authors to these submissions. If approved, these workshops should not occur at the same time.

RT-3.1: Embodied learning for a complex world: exploring creative education approaches through a transdisciplinary workshop

Time: Wednesday, 15/Sept/2021: 7:00am - 8:30am

Embodied learning for a complex world: exploring creative education approaches through a transdisciplinary workshop

Lucy Allen, Susanne Pratt, Giedre Kligyte, Barbara Doran, Bem Le Hunte, Jacqueline Melvold, Katie Ross
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Higher Education plays a crucial role in supporting young people to develop the capabilities required to act knowledgeably and ethically in a complex world. However, Higher Education is typically siloed into disciplines that constrain and fragment learning and experimentation. There is a need for new models of learning within Higher Education and beyond that build learners' capacity to approach complex contemporary challenges without separating knowing about the world from being in the world. This includes working across disciplinary compartments to enable learning for transformation and increase the potential to address complex challenges in more inclusive and equitable ways. This contribution examines how embodied, holistic and transdisciplinary learning approaches can support students to build their knowledge, skills and ways of being that enable them to act and thrive within complexity and uncertainty. Alongside, we explore the practitioner's role in reflexively developing understanding and expanding practice to support innovative modes of learning within higher education. We ask, 'what can we learn from embodied forms of collaborative learning to deepen students' capacity to engage with complex societal challenges?'.

In this interactive workshop we, 7 TD educators teaching within Transdisciplinary School (TD School) at the University of Technology Sydney (UTS), present the case study of our practice-led inquiry into transdisciplinary learning and discuss the insights and outcomes that arose. Participants are invited to experientially engage with this case study by taking part in learning activities and approaches surfaced, including but not limited to the use of tableau and gamification in enacting complexity, engaging deep listening and physical modelling to explore complex problem solving and the use of the body and senses in knowledge creation. Participants gain first-hand insight into these practices and we draw on reflexive and diffractive methodologies to contextualise this exploration within existing practice and theory, inviting participants to reflect on their own transdisciplinary learning and teaching practice. We conclude with a discussion of how we might utilise this developed understanding of embodied learning for complexity to support transdisciplinary learning across different contexts. Aligning with the stream 'TD Learning for Transformation', this contribution explores questions around what we can learn from various forms of collaborative learning in building student capacity to act within complexity. This workshop is an opportunity for educators, arts and transdisciplinary practitioners to deepen understanding, expand practice and connect with others interested in engaging embodied, holistic and transdisciplinary learning approaches in educating for a complex world.

RT-3.2: Community-based innovations of natural resource managements visualized by transdisciplinary processes

Time: Wednesday, 15/Sept/2021: 7:00am - 8:30am

Community-based innovations of natural resource managements visualized by transdisciplinary processes

Tetsu Sato[1], John Matewere[2], Brighten Ndawala[3], Hidetomo Tajima[4]
[1]Ehime University, Japan; [2]Cape Maclear Tour Guide Association, Malawi; [3]Sinthana Project, Malawi; [4]Japan Fisheries Research and Education Agency, Japan; tetsu@chikyu.ac.jp

Community-based collective actions toward sustainable futures, such as natural resource management practices driven by transdisciplinary collaborations among resource users, scientists, and other actors in local communities, are embedded in complex social-ecological systems with huge uncertainty and unpredictability. In order to produce tangible positive impacts

upon sustainability of natural resources and well-being of people in the community including resource users, co-creation and co-delivery of community-based innovations are essential, which effectively integrate diverse types of knowledge and skills emerging among resource users in the communities and scientists through transdisciplinary processes of dialogues and deliberations. This session is designed based on the processes and outcomes of two consecutive international transdisciplinary research projects (JST-RISTEX Future Earth Promotion Program "Transdisciplinary Study of Natural Resource Management under Poverty Conditions Collaborating with Vulnerable Sectors", 2017-2019, and JST-JICA SATREPS Program "Establishment of a Sustainable Community Development Model based on Integrated Natural Resource Management Systems in Lake Malawi National Park", 2020-2025). Through these research projects, we have succeeded in finding diverse spontaneous practices by local actors with significant social-ecological impacts (community-based innovations) upon natural resources and human well-being, and actors (innovators) promoting emergence of these innovations in riparian communities of Lake Malawi National Park, the World Natural Heritage site in Malawi. We have been successful in identifying innovations regarding management and enhancement of diverse natural resources including agriculture/land, fisheries, tourism, and supporting natural environments which have produced tangible impacts. We have applied a methodology of dialogue and deliberation among participants of the transdisciplinary research including community-based innovators and scientists to understand initial conditions of emergence of innovations, processes and mechanisms of their dynamic development to produce impacts, and remaining challenges opening windows for further innovations. A system analysis approach has been applied on the emergence and development processes of each innovation. Network analyses of cause-effect relationships extracted from narratives co-created in the dialogues have revealed leverage points of the system transformation, contributing to understand mechanisms to produce positive impacts upon relevant social-ecological systems. We are also moving forward to identify potentials of synergies among innovations targeting different natural resources to integrate fragmented practices in the communities, thereby co-creating integrated resource management systems to synchronically achieve sustainability of diverse resources and improvement of human well-being in the community.

Based on these transdisciplinary processes on the ground, this session is designed to promote creative dialogues and deliberations among participants including transdisciplinary scientists and students interested in sustainable development, practitioners in local communities, and community supporting organizations to achieve two goals:

1. to co-create and share perspectives on the mechanisms of emergence of community-based innovations to produce positive tangible impacts upon social-ecological systems at local spatial scales through transdisciplinary processes.

2. to find plausible way forward to integrate different resource management practices visualized in the transdisciplinary processes through identifying and strengthening potential synergies while avoiding trade-offs among innovations with different targets.

In order to achieve these goals, the session invites two community-based innovators from an enclaved village in Lake Malawi National Park to share their experiences and visions: a founding member of local tour-guide association who have promoted management activities of community landscapes and establishment of an artificial fishing ground collaborating with local fishers as the essential tourism resources, and the director of a community organization who have established a pre-school education facility combined with sustainable agriculture systems to improve nutritional conditions of children and create new supply chains of conservation agriculture products in the community. They will also share their insights on other innovators and innovations which they have been actively searching in the community.

The session will promote transdisciplinary dialogues and deliberations using boundary objects. A short video clip titled "Co-creation of knowledge and practices partnering with vulnerable people in communities under poverty conditions" will be shared with the participants of the session to stimulate creative dialogues. The video introduces transdisciplinary processes using the Dialogic Deliberation in Living Spheres (DIDLIS) method and exemplifies its effectiveness and impacts in identifying community-based innovations in diverse local communities of the developing world. The graphic representations of network analyses to visualize leverage points for the emergence of innovations and potential synergies among management practices targeting different categories of natural resources will be utilized as another boundary object to promote collective thinking.

The session is composed of three parts corresponding to the two goals described above and beyond.

Part 1: Co-creation mechanisms of community-based innovations (30 min)

The session will begin with sharing the short video clip followed by brief presentations by the two innovators and transdisciplinary dialogue inviting all participants from the floor. A few commentators from Malawi and other regions will be invited to deepen our understandings on the real-world examples of transdisciplinary processes and their impacts upon social-ecological systems.

Part 2: Integration of resource management systems with potential synergies (30 min)

The graphic representations of leverage points and synergies among community-based innovations will be shared with the floor with a brief presentation explaining analytical procedures and implications of the outcomes. It will be followed by an open dialogue regarding the visions and approaches of transdisciplinary integrations of fragmented resource management practices to produce broader impacts.

Part 3: Way forward to transformation of social-ecological systems toward sustainable futures (30 min)

Facilitated dialogue will be made using case examples presented in previous parts to co-design the processes of strengthening social-ecological impacts of localized transdisciplinary research to co-produce broader outcomes toward sustainable and equitable futures.

We hope this session will deepen our understanding on implications of creative transdisciplinary processes and contribute to elaborate research designs to co-produce social-ecological impacts by stimulating dialogue and collective thinking among participants.

RT-3.3: Knowledge brokering in transdisciplinary research to manage wicked problems

Time: Wednesday, 15/Sept/2021: 7:00am - 8:30am

Knowledge brokering in transdisciplinary research to manage wicked problems

Taryn M Kong, Jess Melbourne-Thomas, Qamar Schuyler, Rebecca Jordan, Harkness Pia
Commonwealth Scientific and Industrial Research Organisation, Australia; taryn.kong@csiro.au

Managing complex social-ecological problems requires a systems perspective. This approach allows multiple knowledge systems and stakeholders with different worldviews, values and objectives to be included in building a collective understanding of problems and adaptation pathways. Participatory transdisciplinary research naturally supports such systems-based processes and practices because these areas of research engage with multiple knowledge-systems and -holders. Knowledge brokers play a key role in transdisciplinary research, bridging boundary spaces, particularly between scientists and other stakeholders. Knowledge brokers translate, communicate and share sciences with users, clarify users' information needs and objectives with scientists, and facilitate knowledge co-production. Research on the practices of knowledge brokering is emerging, albeit sparsely, because these practices are often seen as tacit knowledge. We argue that there is a need for a greater understanding of the processes and practices of knowledge brokering in transdisciplinary research to accelerate its contribution to managing complex problems and adapting under uncertainty.

We propose an interactive session consisting of a series of talks followed by panel discussion that explores knowledge brokering in the context of transdisciplinary research. The session will open with an introduction including emerging definitions and frameworks to knowledge brokering, providing a broader context for the diversity of experiences shared in this session. Five to six short presentations will then showcase knowledge brokering practices from developed and developing countries in the Southern Hemisphere, before a final discussion to identify potential themes for a special journal issue on knowledge brokering. This session aims to be inclusive and informative for all experience levels, reaching current knowledge brokering practitioners and researchers, as well as those new to knowledge brokering. For attendees with little prior knowledge about this topic, we aim to raise awareness of the role and importance of knowledge brokering and stimulate their interest to consider this in their future work. Drawing on a breadth of expertise and experiences, we also look to learn from attendees who are current knowledge brokers and aim to facilitate innovative connections and discussions between attendees. Finally, we want to identify a community of knowledge brokers from this conference who could collaborate with us on a special issue highlighting the importance of knowledge brokering in transdisciplinary research. We listed some potential presentations and presenters below, but we will have additional two to three presentations in this stream.

Taryn M Kong, Research Scientist, CSIRO (Commonwealth Scientific and Industrial Research Organisation) Land & Water

Topic: *Knowledge brokering for climate change science and information: Building typologies from practices in South Africa*

Qamar Schuyler, Research Scientist, CSIRO Oceans & Atmosphere

Topic: *Navigating the waters of project co-design and creation across industry, manufacture, and research*

Jess Melbourne-Thomas, Senior Research Scientist, CSIRO Oceans & Atmosphere

Topic: *Stakeholder engagement and knowledge brokering for Antarctic marine ecosystem management*

RT-4.1: The Apple-Model of Real-world Lab Research: Conceptual Considerations and Analytical Potential

Time: Wednesday, 15/Sept/2021: 11:00am - 12:30pm

The Apple-Model of Real-world Lab Research: Conceptual Considerations and Analytical Potential

Richard Georg Beecroft[1], Sarah Meyer-Soylu[1], Oliver Parodi[1], Julianna Gwiszcz[2]
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Real-world labs are a relatively new form of transdisciplinary research. They combine transdisciplinary methodology with more intervention-oriented approaches by offering a *transdisciplinary infrastructure* for transformative experimentation. Real-world labs open up spaces for learning and experimentation, and they support iterations and cross-sector links between otherwise disconnected learning cycles, facilitating learning between experiments and between actor groups.

To describe this function of RwLs, the *Apple-Model of Realworld-lab research (AMoRe)* was developed in a combination of conceptual work on learning in real-world labs and a reflection of experiences from several projects and interventions in the Real-world Lab "District Future – Urban Lab" in Karlsruhe. AMoRe will be used both as the key boundary object and as a canvas for the digital facilitation of the workshop.

Workshop goal:

The *goal* of this workshop is to introduce AMoRe, and explore its potential for reflexive monitoring and design of real-world lab research (and similar approaches).

Intended take away for participants

Participants should gain inspiration from a conceptual framework that puts learning processes at the core of transdisciplinarity, both in terms of methodology and intended results:

- Participants working in real-world labs or similar settings should learn how to reflect on their practice in terms of interlinked learning processes.
- Participants working in real-world experiments or similar project formats should learn how to consider the supportive structures they are working in, and consider its strengths and weaknesses with respect to learning processes.
- Participants planning labs or experiments should gain ideas about how to facilitate and interlink learning cycles.
- Participants new to experimental transdisciplinary modes of work should gain an insight into this methodological field to decide whether they should get involved.

Addressed communities

The workshop is primarily designed for participants with own experience in experimental forms of transdisciplinary research, especially in real-world labs and similar formats, such as transition labs, urban living labs, change labs, or stand-alone experimental formats such as real-world experiments. But as not everyone has experience in this methodology (or is interested in discussing it in this workshop format), the workshop is designed for one third of the participants sharing their experience or planes for new projects.

The workshop is designed to engage all participants in an active role for a large part of the time, but with different roles to allow for varying interests and experiences. The workshop is not ideal for participants with neither experience nor basic conceptual knowledge on experimental transdisciplinary strategies.

Workshop design and preliminary structure

The workshop will be centred around the application of AMoRe in two fields: reflexive monitoring and design thinking.

In a first phase, participants will get an introduction to the workshop design and the tool miroboard. They will introduce themselves briefly, already using miroboard as a tool to gather notes and gain an overview. After a brief view on core learning concepts in our field such as transformative learning, capacity building, organisational learning, social learning (J. Gwiszcz), the Apple Model of Real-world Lab research will be presented (R. Beecroft), first as a concept, then in its application in two ways: as a reflexive tool to analyse past learning processes and their interaction with the lab, and as a design tool to plan learning processes and structures to support them. In an application example, we will present both reflections from a climate action project with multipliers in our real-world lab, and our design considerations based on the model for a follow-up project (Sarah Meyer-Soylu).

In a second phase, the group will split into teams for an adapted form of Socratic dialogues with three roles: one person presenting his/her case, one supporting the thinking process with guiding questions (supported by the workshop team), and one taking notes on a prepared canvas on miroboard. The group canvasses are based on the visual form of AMoRe, adapted to collect comparable case descriptions. There will be two types of groups: Reflexive monitoring groups, analysing a case from a participant, and design thinking groups, to support one person in the development of an experimental idea along the lines of the model. At the end of this phase, each group will also take some notes on the feasibility of the model for the respective type of use.

In a third and final phase, we will get a brief overview on the application of the model for mutual learning, and collect experiences on its feasibility for design thinking and reflexive monitoring. As a final step, all participants will be invited to a follow-up process, e.g. to work on a comparative paper based on the model.

30' Phase I

5' Welcome, Workshop-concept, Introduction Miroboard (O. Parodi)

5' Notions of learning in transdisciplinarity (J. Gwiszcz)

10' The Apple Model of Real-world Lab Research - AMoRe (R. Beecroft)

10' Application examples: Mapping participatory journeys for "climate coaches": project reflection and design of follow-up options (S. Meyer-Soylu)

35' Phase II

5' Forming groups (3 participants each)

30' Canvas-supported Socratic dialogues

- focus 1: design thinking
- focus 2: reflexive monitoring

25' Phase III

15' Discussion of experiences (O. Parodi) – guiding questions:

- feasibility of reflexive monitoring with the model
- feasibility of design thinking with the model
- key learnings
- key limitations

10' Summing up and interest in further activities (comparative publication, workshop). (R. Beecroft)

We plan to facilitate the workshop with a Videoconference-Tool with break-out sessions (zoom or other) and a visual collaboration tool (Miroboard or other), eventually also a survey tool.

Literature

Beecroft, R. 2020: Das Reallabor als transdisziplinärer Rahmen zur Unterstützung und Vernetzung von Lernzyklen. Rahmentext zur kumulativen Dissertation, Leuphana Universität Lüneburg. https://pub-data.leuphana.de/frontdoor/index/index/docId/1031

Vizualisation AMoRe: https://bwsyncandshare.kit.edu/s/eZMjgiPY3zbCbz6

RT-4.2: Evaluation of what? And for whom? Tensions in Transdisciplinary Evaluation

Time: Wednesday, 15/Sept/2021: 11:00am - 12:30pm

Evaluation of what? And for whom? Tensions in Transdisciplinary Evaluation

Stephen Gary Williams[1], Dagmar Simon[1], John Holmberg[2], Kimberly Slater[3]

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Evaluation is fundamentally a process to facilitate learning. It involves collecting and analyzing information about an intervention's activities, characteristics, and outcomes, but can also glean impact (i.e. contribution to sustainability transition). In so doing, evaluation offers a powerful learning experience that generates ongoing lessons for the leaders and other participants of interventions, as well as funders, which in turn can lead to better decision-making, program and funding improvements, as well as stronger relationships. This type of evaluation *should* support the conference theme of "Creating spaces and cultivating mindsets for learning and experimentation."

However, organizations often evaluate their activities solely because they are required to do so by funders, largely as proof of accountability for the use of their grant maker's funds. Prioritizing the evaluation needs of the funder over those of the funded, however, means evaluation doesn't necessarily help researchers and stakeholders achieve their activities' desired aims. This applies for research projects in general, and for TD research in particular, as different actors and their perceptions - also on evaluation - are brought together. There is a tension between the need for evaluation that generates learning for those designing and managing (transdisciplinary) research projects and accountability for 'results' driven by funders and governments. This tension between 'evaluation for learning' vs. 'evaluation for accountability' is the focus of our workshop.

Workshop goals

The goal of the workshop is to give an overview of the spectrum of evaluation practice, present examples of learning through TD evaluation, and surface different approaches, values, and uses of evaluation in TD from workshop attendees. The workshop explicitly brings together questions from different themes of the conference including questions about funding schemes, learning, evaluation, methods, and integrating expertise from different fields.

Attendee takeways

A better understanding of multiple values of TD evaluation, methods and approaches to evaluation, learning from different actors (science and civil society), geographical/science system contexts, and co-learning from participants. Through the interactive design, the workshop provides a reflective space for mutual learning through experience of evaluation in different geographies, contexts, purposes, and science systems.

Communities

Any TD scholar or practitioner who is wrestling with questions of evaluation and impact will benefit from our workshop.

Preliminary structure and design

The session will be highly interactive with a combination of context setting panel presentations, small breakout group discussions, and a closing plenary dialogue.

Moderator: Steve Williams, IASS - Presenting an overall approach to evaluating TD processes based on Williams & Robinson, 2020

Panelists:

- Dagmar Simon, IASS - Discussing the experience of IASS' recent evaluation process for the Germany Science Council

- Kimberley Slater, University of Toronto - Discussing a grassroots co-produced evaluation framework with The Atmospheric Fund and 12 local NGOs in Toronto, Canada

- John Holmberg, Chalmers University of Technology - Discussing the role of evaluation in fostering learning at multiple scales through the North-Mid Sweden Challenge Lab project

Workshop outline

1. Introduction to workshop and context setting (10 minutes)

2. Panel presentations on three or four different experiences in the spectrum of evaluation for learning vs. evaluation for accountability (20 minutes)

3. Small-group discussions. Participants break into small groups to share their own experiences with TD evaluation and find common themes/challenges. Participants asked to place their experience along the spectrum (30 minutes)

4. Plenary discussion. Groups share results of their discussion. Facilitated group discussion between participants and reactions from panelists (20 minutes)

5. Closing and next steps. Invitation to participants for collaboration in ongoing work on evaluation and sharing of workshop results (10 minutes)

References

Williams, S. and Robinson, J. (2020). Measuring sustainability: An evaluation framework for sustainability transition experiments. Environmental Science and Policy. Volume 103, January 2020, pp. 58-66.

RT-4.3: "Transformation & Transdisciplinarity in Africa": Grappling with personal dimensions

Time: Wednesday, 15/Sept/2021: 11:00am - 12:30pm

"Transformation & Transdisciplinarity in Africa": Grappling with personal dimensions

Matthew Weaver[1], Alice McClure[2], Nosiseko Mtati[1], Tasneem Jhetam[3], Ivan Pauw[3], Amy Bosworth[3], Tally Palmer[1], Ancois De Villiers[3], Gardiana Bandeira-Melo[4], Jessica Jane Cockburn[1]
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Sub-session 1 of 3: "Transformation & Transdisciplinarity in Africa": Grappling with personal dimensions

The African continent is rapidly changing, faces a range of sustainability challenges, and holds deep potential for being a leader in finding new ways forward. The notions of transformation and transdisciplinarity have found their way into research and scholarship on the continent, and are offering scholars a way to challenge existing norms and grapple with urgent questions around decolonisation, social justice and social-ecological sustainability across a wide range of sectors, fields and areas of practice. This session is part of a 3-part set of sessions where 'pracademics' (people working at the interface of academia and practice) from the African continent will gather to share, question and grapple with their work on transformation and transdisciplinarity. The three sessions are structured around the idea that transformation takes place within and across three spheres: the personal, the political and the practical (O'Brien, 2018). We see transformation as a key process taking place within and through transdisciplinary (TD) processes.

Our emphasis will be on sharing the context-specific challenges of putting the ideals of TD into practice in various case studies from Africa. We hope to prompt discussion and sharing on some of the "tough" or "messy" aspects of TD including for example power dynamics, emotional and inter-personal discomforts and difficulties, personal reflections and changes, resource constraints, practical and logistical frustrations, etc. Through these sessions, we aim to offer deeper insight into the realities of implementing TD in resource-constrained and highly heterogeneous contexts often characteristic of postcolonial and Global South contexts, as in most of Africa. We hope to cultivate an appreciation for the ways in which African pracademics are bringing TD to life despite these challenges, and to celebrate their successes. We welcome other pracademics, researchers and practitioners working in similar postcolonial and Global South contexts, and anyone with a curiosity and/or experiences of the tough, messy side of TD work.

This is sub-session 1 of the set of three sessions on Transformation & Transdisciplinarity in Africa. Here, case study presenters will grapple specifically with the 'personal' aspects of transformation and transdisciplinarity that have emerged in their work. The personal sphere relates to individually held beliefs, values, worldviews and paradigms. In TD work this relates to the following broad themes: the personal identity, role and experience of TD researchers; the role of individual-level agency and change processes within TD cases; and the influence of affective and emotional dimensions within TD processes.

Format (structure/design): The session will begin with a brief introduction setting the scene for the set of three sessions, and introducing the focus on the 'personal' dimensions for this sub-session. The session will focus on four African case studies. Presenters will provide short presentations (max 10 minutes each) on their work with TD, sharing specific insights on the personal dimensions. These will be followed by break-out group discussions, and then a closing plenary panel discussion, drawing on cross-cutting insights and experiences offered by 2-3 panellists. Session coordinators and facilitators will use a range of online tools to facilitate an interactive discussion among participants within the different parts of the session.

Session coordinators: Matthew Weaver, Alice McClure.

Case studies:

1. Transformative change for sustainable and just landscape management in rural South Africa: Exploring personal vignettes through a cross-scale analysis in the Tsitsa Project (Matthew Weaver, Tally Palmer, Nosiseko Mtati, Jessica Cockburn).

2. Power, positionality and the role of early career researchers in a Transdisciplinary project: exploring the case study of Impilo Yabantu Healthy Food Market in Khayelitsha, South Africa (Tasneem Jhetam, Ivan Pauw, Amy Bosworth).

3. Coherency and creative tensions: grappling with the messiness of transdisciplinarity as a way of being and doing through reframing thinking, values, worldviews and skills as a TD PhD candidate in the South African context (Ancois De Villiers).

4. Walking The road less travelled: experiencing "earth and people" transformation through transdisciplinary research (Tally Palmer).

Facilitators/Panellists: Ancois De Villiers, Gardiana Bandeira-Melo.

RT-4.4: Transdisciplinary principles for climate resilience learning: insights from FRACTAL

Time: Wednesday, 15/Sept/2021: 11:00am - 12:30pm

Transdisciplinary principles for climate resilience learning: insights from FRACTAL

Alice McClure[1], Mzime Murisa[2], Rebecca Cullis[1], Mary Thompson-Hall[2], Chris Jack[1], Clay Oboth[2]
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Future Resilience of African CiTies and Lands (FRACTAL) is a transdisciplinary community of practice from around the world that aims to support climate-resilient decision making and planning in southern African cities (www.fractal.org.za). Reflecting on the noteworthy impacts from FRACTAL since its inception (2015), the team has recently been unpacking some of the FRACTAL "black box magic". A set of 12 principles that supported impactful transdisciplinary climate resilience learning processes in southern African cities during FRACTAL has been collaboratively and iteratively co-produced by the team. Examples of the principles include *inter alia*: i) genuine representation of relevant stakeholders, an appreciation of all input (voice equity) and co-production of solutions; ii) striving for humility, sensitivity and respect towards and between all partners and participant; and iii) a well-designed programme with objectives and boundaries and a carefully managed process to support cohesion, coordination and effectiveness. These principles have been used as a framework to analyse the evidence from the first phase of FRACTAL to better understand how these principles were engendered to support impactful transdisciplinary climate resilience learning in southern African cities. Through this study, the principles have been honed and successes and failures from transdisciplinarity in this context have been interrogated.

As a 'living legacy' of FRACTAL work, the FRACTAL community expects these principles to evolve so that they remain relevant to the dynamic and emergent climate-related problems faced by humanity, as well as the collaborative responses to these. For example, these principles have most recently been reformatted to develop a (non-legally binding) FRACTAL declaration for

decision-makers, practitioners and researchers that aims to support inclusive, contextual and proactive responses to climate challenges faced in southern African cities and beyond.

The proposed session at the ITD will provide a space in which these principles will be shared with and interrogated by the broader transdisciplinary community (i.e. outside of FRACTAL). This session will also help to integrate diverse perspectives relevant to transdisciplinary design and practice into the evolution of these principles. The session has two main goals: i) to share and interrogate the FRACTAL principles for transdisciplinary climate resilience learning, which have been co-produced during the project, with the broader transdisciplinary community; and ii) to showcase the second season of the STARTcast (podcast), which is being collaboratively produced by FRACTAL team members and START (https://start.org). The second season of the STARTcast focuses on transdisciplinary approaches, drawing on lessons learned from the FRACTAL project.

The FRACTAL principles have implications for transdisciplinary practice. Engagement with these principles during the session, as well as reflection on a broader set of experiences, will provide a space in which workshop participants can consider how to better design, implement and sustain transdisciplinarity. The workshop is relevant to all participants practising transdisciplinarity.

RT-4.5: Transdisciplinary learning spaces in a university context

Time: Wednesday, 15/Sept/2021: 11:00am - 12:30pm

Transdisciplinary learning spaces in a university context

Kerstin Krellenberg, Nele Kress, Malena Haas
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Transdisciplinary research is key to develop viable solutions to complex urban sustainability problems. Only through co-creation, co-production, and co-evaluation with non-academic urban actors can real-world societal challenges be sufficiently addressed, integrative knowledges produced, and transformative change towards sustainability triggered.

This implies that transdisciplinary research designs, methodologies and methods also need a prominent place in university teaching to train future generations of all kinds of urban actors in different types of knowledge production, transboundary and systemic thinking and to foster student's strategic, interpersonal, and normative competencies.

This session builds on our own experience in teaching transdisciplinary methods in urban research in a one-semester master's course, in which students designed, planned, and executed their own real-world urban laboratories as a role play in a fully digital format due to the COVID-19 pandemic. The students developed their labs along a transdisciplinary and transformative real-world laboratory process after Wanner *et al.* (2020) and Rose *et al.* (2018) by co-designing research gaps, problems and questions about complex real-world urban issues and co-producing viable ideas and solutions to them. By immersing themselves in real-world urban settings and stakeholder roles and implementing various methods via online tools, they facilitated peer learning environments. This experience sparked the following questions that we will address jointly in this session:

- What kind of learning spaces (both online and in-person) help students develop their ability to work collaboratively on societal urban issues in the spirit of transdisciplinarity?
- What capacities (skills, tools, etc.) do both, teachers and students, need for this?
- How can we enhance the connection of university learning environments with practitioners to stimulate mutual learning between academia and practice on societal urban issues?

Organised as a real-time contribution, the session aims to pool experiences from teachers and students who have been involved in university courses on transdisciplinary methods and non-academic urban actors who have participated in or are interested in transdisciplinary projects (e.g. real-world laboratories) to foster mutual exchange.

After a short welcome and introductory speech, we, as university teachers and students from the aforementioned master's course, will provide brief input statements on aspects that we found particularly challenging, but also particularly beneficial, when working in (immersive and online) transdisciplinary environments, with a focus on the methods used. This will be followed by a round of introduction with all participants, focussing on an open exchange of experiences with transdisciplinary learning environments for approx. 20 minutes. We will then break into mixed groups of academics and (invited) practitioners for approx. 30 minutes to develop a discussion around the following guiding questions:

- What challenges and promotes collaborative work on cross-cutting issues between academia and urban practitioners?
- What capacities, skills, and tools are needed to work on real-world societal challenges in urban settings?

Each group discussion will be recorded using a pre-structured, shared online whiteboard (e.g. mural workspace) to summarize the lessons learned from the perspectives of university teachers, students, and urban practitioners. The results will be shared with all participants after the workshop.

The remaining 20 minutes will be used to discuss ways to connect urban research, teaching and practice in order to further develop transdisciplinary teaching and learning spaces at universities and to make transdisciplinary urban research more tangible for everyone. Although the focus of this session is on the specifics of transdisciplinarity in urban settings, we strongly encourage participants from all thematic backgrounds interested in transdisciplinary learning spaces to attend.

RT-4.6: Inverting the Transdisciplinary Research Process for Creating Generative Space and Avoiding Closed Mind-Sets: a Workshop on Reverse Project Initiation

Time: Wednesday, 15/Sept/2021: 11:00am - 12:30pm

Inverting the Transdisciplinary Research Process for Creating Generative Space and Avoiding Closed Mind-Sets: a Workshop on Reverse Project Initiation

Machiel Keestra[1], Hans Dieleman[2], Andrea Frank[3], Paul Hirsch[4], Mercedes Zandwijken[5]

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Transdisciplinary teams are usually configured and structured as a function of the problem or problems to be investigated and solved. With the problem definition being prioritized, a second step usually consists in selecting academic input towards problem-solving, typically determined in terms of academic disciplines. In addition, extra-academic input is sought from those deemed to have relevant interests, experiential knowledge of or expertise in the problem.

Working in this way is rather self-evident for many involved and presented as standard in education and textbooks. However, this workshop raises the question whether it is really so self-evident? Indeed, could it be that applying this sequence of steps is sub-optimal with regard to cultivating a mind-set for learning and experimentation. For defining a problem is itself already a process that is not just content-driven nor expertise-dependent as it builds upon intra- and interpersonal interactions, processes, hierarchies and so on. On the contrary, a team's determining the space of options that characterize a problem and its potential solutions is a process rich in affective, motivational and embodied states and interactions, complementing and influencing the contents that we associate with academic contributions. Obviously, those dimensions are equally important to the process of determining which participants are assumed to have a stake in the problem or bring relevant expertise. Initiating a project in terms of its problem definition and team composition while relegating these rich process dimensions to a later stage - considered to merely play a supporting role - implies that the project's initiation risks suffering from constraints that will continue to hinder subsequent project phases. This analysis has elsewhere led to proposals of decolonizing the research process, which is in some sense implied in this workshop's proposal.

If, in contrast, we do acknowledge these typically neglected dimensions of the project initiation and build upon these, inverting the transdisciplinary process as this workshop proposes implies that its outcomes are also likely to be qualitatively very different from typical TD outcomes. By postponing to a later phase the input of formal academic, extra-academic or professional knowledge and expertise and foregrounding and attending to these dimensions, we can focus upon building interpersonal trust and confidence, allowing for an emerging team dynamics that fundamentally affects the project initiation. Indeed, inverting the process also emphasized the iterative or recursive nature of it, as the first process step does not yet allow the constraints on problem contents or team composition that are typically present.

This workshop consists of a 90 minute online experiment with the audience, in which we participate together in an inverted transdisciplinary process, experiencing its consequences and reflecting upon its implications for normal transdisciplinary research processes. More specifically, the reversed - and iterative - process we propose for this occasion consists of:

1. Starting the process, creating an open space ready for diversity, experimentation and imagination by focusing on the configuration of a team beyond a mere group of experts. Shedding off (academically) socialized features, we start working with embodied, affective dynamics. In doing so, the team emphasizes trust building and richer ways of interaction while allowing its configuration to emerge and recognizing the plurality of options it has.

2. Proceeding the process, going from the embodied to motivational dimensions. Here the focus is on metacognizing and articulating the motivations, alliances, life experiences, and personalities that each team member brings in their interactions with others. The team will recognize how a problem space and the space of possible solutions is shaped by these neglected dimensions, even before it starts determining the problem.

3. After trust building and attending to motivational dimensions, the team is only entering the phase of articulating and assigning formal, academic and extra-academic expertise and knowledge. This project initiation step also involves the team composition, requiring potentially its expansion and reconfiguration.

The workshop/experiment will start and end with asking the participants the question "What are in your opinion both the biggest promise of TD research and the critical challenge(s) potentially undermining TD projects?" Further questions we aim to address and explore with the participants are a.o.:

- Does a reversed TD process, more than its typical version, create space for a more inclusive problem definition, shared by most people involved in the process irrespective of their status and discipline?

- Does a reversed TD process scaffold a space to foster the creativity present in all the team members, creativity that otherwise might be hindered by neglected dimensions?

- Does the TD space that is created in a reversed TD process results in an outcome that reflects better the collective expertise, motivations and normative positions of the team members?

- Does a reversed TD process prepare mind-sets in the team members such that it encourages their individual and joint imagination, relevant to all research process phases?

- Does a reversed TD process, more than its usual course, ensure that the outcomes created by the team will reflect their collective engagement and care, enhancing the probability that these will be actionable and eventually implemented?

RT-4.7: Methods of knowledge integration in inter- and transdisciplinary research – what about epistemology and rigour?

Time: Wednesday, 15/Sept/2021: 11:00am - 12:30pm

Methods of knowledge integration in inter- and transdisciplinary research – what about epistemology and rigour?

Antonietta Di Giulio[1], Bianca Vienni Baptista[2], Sibylle Studer[3], Stefan Böschen[4]

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Goal of your proposed online workshop or interaction?

The goal of this workshop is to advance the debate about inter- and transdisciplinary methodology by discussing questions of method choices, epistemology and rigour.

In the last few years, the discussion on methods of knowledge integration has gained relevance in different scientific communities. New toolkits are available now and creative methods are elaborated in different contexts and for different purposes. For inter- and transdisciplinary research this movement carries the potential of advancing the field and addressing urgent questions on what influences and how to improve collaborative research processes. In 2020, an international working group affiliated to the ITD Alliance, has launched discussions related to toolkits for inter- and transdisciplinary research and discussions about the choice and assessment of methods. The outcomes of the workshop will be fed into this ongoing work and contribute to advancing the methodological debate.

One key challenge with regard to the epistemological basis of inter- and transdisciplinary research methodology is the quest for scientific credibility of the integrated knowledge that is (co-)produced in such research. This kind of knowledge is still not fully acknowledged and handed down in academia. Against the background that scientific knowledge typically gets its scientific credibility by the standards of knowledge production in differentiated scientific communities, we argue that standards for *methods of integration* have to be developed and methods have to be epistemologically justified. The concept of rigour itself needs to be adequately addressed in inter- and transdisciplinary research settings as well, as contested disciplinary definitions can lead to differing criteria about how to achieve and assess rigour.

The basic questions that will inform our discussions and for which we want to raise awareness for are:

- How does the choice of methods shape the problems (and problem spaces) that are investigated in inter- and transdisciplinary research?
- What criteria are considered in justifying the choice of methods for knowledge integration? How are differences in cultural, political and social aspects dealt when deciding to apply certain methods?
- How to ensure the scientific rigour of methods for knowledge integration? How to characterize such rigour and how to report on it (e.g., in presenting results)?

This workshop aims at opening a space for discussion. In the session, there will be no presentations of methods as in a traditional in-person conference. Rather, participants are invited – prior to the session – to watch a set of pre-crafted contributions submitted by participants who will present tried and tested methods. In the session, we will focus on joint reflection and discussion, and on comparing experiences, concerns, and best practices.

What could attendees of your online workshop or interaction take away from it?

For participants, the session will yield the benefit of having jointly debated methodological and epistemological issues that are not only crucial for choosing methods, but also for an inter-methods reflection for how to deal with and combine different knowledges in inter- and transdisciplinary research. The convenors will document the discussion. Documentation may cover different perspectives on the term 'rigour', concerns and approaches related to the justification and reporting of methods, emerging suggestions for standards for methods of integration, and topics that need to be further elaborated. The discussions might also lead to further joint activities, e.g. in the context of the ITD-Alliance Working Group.

What communities do you want to reach?

The workshop targets primarily those that are actually in charge of designing inter- and transdisciplinary processes and do actually apply methods of knowledge integration. Furthermore, it targets people that are dealing with assessing the rigour of methods in inter- and transdisciplinary research. Participants can be researchers, funders, practitioners or students.

The four convenors will give an introduction and facilitate the workshop. The discussion will be informed by the participants' contributions. We distinguish two types of participants:

1. Participants that have presented tried and tested methods in pre-crafted contributions.
2. Participants that have experiences in applying methods in their own work but have not provided a pre-crafted contribution in which they present a method.

There are two ways how pre-crafted contributions will be linked to the workshop:

(1) Some presenters have linked their pre-crafted contribution to the workshop by including a remark in their abstract.

(2) The convenors will invite participants that have submitted pertinent pre-crafted contributions. This will be done by reading the abstracts of accepted pre-crafted contributions and reaching out to the authors of these contributions.

Authors of a pre-crafted contribution that is linked to the workshop consent to their method being referred to in the discussion.

The number of participants will be limited to 30. All participants of the workshop are expected to watch the pre-crafted contributions that are linked to the workshop prior to the workshop (all of them or, if there are too many of them, a selection for which the convenors will provide guidance). In addition, all participants are expected to prepare for the session with the help of a set of questions that will be communicated to them after registration. This set of questions will relate to the three basic questions informing the workshop.

Description of the preliminary structure and design for your online event

Participants will be, in advance, provided with a set of questions to prepare for the discussion. The idea is to learn about the participants' experiences related to the basic questions that are informing the workshop prior to the workshop and to also gain first answers to these questions by the participants. The answers by the participants will be analysed by the convenors, and this 'participants' input' will be used to launch the discussion. This way we want to ascertain that the methodological as well as epistemological core aspects will be the center of the conversation.

The workshop (90') will be structured as follows:

- Brief introduction to the problem and to the basic questions by the convenors (10').
- Discussion of the basic questions by participants (4 break out rooms, facilitated by the convenors, 40').

- Sharing insights (plenary, 30').
- Wrap-up by convenors (10').

Based on the list of participants, we will make sure that break out groups are not biased, e.g., with regard to research fields. The discussion will be organized in a format that is inspired by the format of a World Cafe. The discussion in the World Cafe will be initiated by the convenors presenting the 'participants' input'.

The results of the discussions in the break-out rooms will be recorded in written form (using Mural or Flinga or another tool) and shared after the session.

PC-3.1: Pre-crafted contributions - session 3.1

Time: Wednesday, 15/Sept/2021: 1:30pm - 2:15pm

Methodological insights for Strong transdisciplinarity

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The ability of transdisciplinarity to generate radical transformative impacts for sustainability, beyond mere stakeholders' participation, is crucial. In an influential paper, fifteen years ago, Manfred Max-Neef (2005) was distinguishing a weak transdisciplinarity, essentially practical, and a more ambitious strong transdisciplinarity, introducing "a kind of quantum logic". In line with previous theoretical work of Nicolescu, three pillars were identified: 1) Levels of reality; 2) Logic of the included middle; 3) Complexity. In his conclusion, Max-Neef (2005) was questioning "the applicability of strong transdisciplinarity as a methodology", particularly "with respect to levels of reality in the social world". In the last fifteen years, much progress has been achieved in transdisciplinarity sciences. However, it is still unclear how strong transdisciplinarity can be realized in practice to foster needed sustainability transformations. In this communication, I suggest that two recent methodological breakthroughs have significantly clarified the applicability of strong transdisciplinarity. First, the recent elaboration of practical tools to operationalize the concept of *worldview* is particularly helpful to characterize different levels of reality in the social world. Second, the application of quantum concepts at socioecosystem scale makes the introduction of a "kind of quantum logic" more robust and easily applicable, to better handle contradictions between worldviews and their transformative potentialities. On this basis, the debate can be moved toward renewed methodological and theoretical investigations.

Transdisciplinary research in natural resources management: towards an integrative and transformative use of co-concepts

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Transdisciplinary research often utilizes collaborative ways of knowledge production to enable intended transformations towards sustainability. Multiple collaborative concepts with varying definitions are applied leading to confusion in the aims and uses of these concepts. In our recent study, we reviewed five concepts relevant to the current debate on the new collaborative ways of knowledge production in transdisciplinary research. We focused on the concepts of co-creation, co-production, co-design, co-learning, and adaptive co-management. While not aiming to be exhaustive, the selected co-concepts have become particularly relevant in the context of the current challenge of co-creating a sustainable future for the Earth's system which science needs to meet. We elaborated our analysis in the context of natural resources management (NRM) literature where these "co-concepts" have gained importance as a way to contribute to environmentally sound and legitimate decision-making. NRM is also a context in which transformations towards sustainability are crucial. In this setting, TD is used as a research mode to link society, sciences and practitioners and as a pathway to address complex social-ecological issues.

Our study coupled a literature review and a conceptual analysis and aimed to clarify definitions, use, and interlinkages of these concepts and shed light on their intertwined nature. The first analysis phase consisted of the authors developing a synthetic overview of the literature for every five concepts. After reviewing the concepts individually, we conducted coding of 40 articles on Atlas.ti focusing on co-production, co-creation, and co-design to explore and understand the interlinkages between the concepts presented in previous literature. The three concepts were chosen because they are often used interchangeably and therefore coding served as a way to systematically gain an in-depth understanding of their interlinkages.

Our review revealed the variety of meanings and practices related to the co-concepts in NRM, and also highlighted the inadequacy and plurality of perspectives to their transformative aims. Basing on the results, we propose an integrative understanding of these concepts to navigate between collaborative modes and to facilitate the transformative aims of research processes. We share our results in the form of an infographic. In the infographic we combine both temporal (i.e. timing), epistemic and conceptual (i.e. how the concepts are understood and used individually and in relation to each other) relationships, which we found to vary depending on the conceptual perspective they were looked at from. This stresses the multiple possibilities the concepts provide for TD research. No research before has assessed and clarified the conceptual plurality in collaborative modes, which a researcher faces when practicing engagement in TD projects. The infographic we have created can be used by researchers, practitioners, and experts, and helps to navigate engagement in TD projects through grounding the research in those relevant points that align different perspectives. The infographics also facilitates anchoring the transformative aims of the project by focusing simultaneously on process orientation, power issues, and reflexivity.

We argue that an integrated understanding of the five co-concepts — in addition to understanding the concepts individually — may help to overcome some of the typical methodological and epistemological tensions occurring while practicing transdisciplinarity. The epistemological and related conceptual pluralism has practical influence on choices on how to carry out research. We underline that collaborative research projects may benefit from considering the epistemic nuances, manifesting in different disciplinary backgrounds, of each co-concept and acknowledging their integrated nature to counteract these effects. This consciousness operates in the sphere between theory and practical considerations, which may help to build a stronger methodology for TD research.

mQoL: Methodology for Assessing and Modeling Human Aspects in Interactive, Mobile, Wearable and Ubiquitous Computing in Situ

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Interactive, mobile, wearable and ubiquitous computing applications and services assist us on a growing scale in our daily life situations, fulfilling our needs for leisure, entertainment, communication, or information and influencing our life quality in the long term. On the one hand, user acceptance of an existing application depends on the variety of human aspects influencing the application perception. These human aspects may be diverse such as, for example, preferred interaction style (e.g., kinaesthetic, visual), mobile service experience level (e.g., poor due to service unresponsiveness), user's specific health and care needs (e.g., dizziness, hand tremors, low radiation), or user-specific aspects like cognitive load, physical flexibility, momentary perception of safety, intimacy or love in a given context. On the other hand, there are many human aspects and needs, which could be supported by interactive, mobile, wearable, and ubiquitous computing and are unknown to date. In both cases, these human aspects shall be assessed 'in the wild,' also denoted as in situ - situated in naturalistic settings, non-controlled, daily life user environments, and different contexts, in ecologically valid, longitudinal study designs.

The challenge is that there are no rigorous and robust scientific methods and tools to understand and accurately model human aspects and implicit needs in the user's natural daily environments, which not only impair the acceptability of the existing mobile services but, what is more important, it impairs potential for replicability of the studies in mobile interaction domain.

Towards this end, we propose a replicable mixed-methods research methodology denoted as *mQoL*. The mQoL unifies several quantitative and qualitative human attitude and behaviour assessment and analysis methods. The mQoL consists of different methods that triangulate the data collected concerning the human aspects of mobile interaction; it bridges disparate fields of knowledge within computer science regarding the value of different types of data. Therefore, it implies the use of methods that are qualitative (entry/exit and occasional surveys/interviews, a weekly Day Reconstruction Method (DRM), daily Experience Sampling Method (ESM)/Ecological Momentary Assessment (EMA)) and quantitative (a minute-based, unobtrusive for participant phone, wearable and computer activity loggers). mQoL applies in experiments aiming to explore and quantify human aspects in interactive, mobile, wearable, and ubiquitous computing in situ. We have evaluated the applicability of this methodology in user-based research to study different phenomena and for a set of different research questions spanning from assessment of physical activity via stress, sleep, public transportation usage to the individual's intimacy perception. With these studies, we reflect upon and provide guidance to researchers upon the replicability of the mQoL.

Terminology of collaboration

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For enhancing concepts and methods, we must be clear about what we are doing and work with consistent definitions of the form of our cooperation. Each form of cooperation has its own designation - or several. With the further development of various forms of inter- and transdisciplinary cooperation, the corresponding terminology has also evolved. An initial search revealed 27 different terms, the meaning of which is often unclear, as are their semantic relationships to each other. For example, what is meant by hyperdisciplinary, supradisciplinary or x-disciplinary collaboration and to what extent are there semantic relations to (the various definitions of) transdisciplinary collaboration? There are almost as many different terms to describe these settings as there are team compositions. Some of these terms were used consciously and only after several years of development; other terms arose spontaneously and without prior research. This resulted in a seemingly arbitrary set of terms with different definitions and sometimes ambiguous usage. In addition to terms with the lexeme disciplinary, other terms have been developed for different forms of disciplinarity: For example, team science - followed by science of team science (Stokols et al. 2008) and and integration and implementation sciences (Bammer 2018).

Focusing on terms with the lexeme disciplinary, this contribution would like to present a selection of these terms and show their relations to each other in order to contribute a little to the systematics of discipline-theoretical terminology.

This contribution ventures an overview of the existing terminology before analysing individual terms linguistically. These selected terms come from different discourses and some of them are certainly discourse-specific. As already documented by Balsiger (2005) there are already various lists of definitions of forms of collaboration, but these lists are not exhaustive and the linguistic analysis is missing. There is an initial analysis from linguistics (Pelikan/Roelcke 2020), but it is based only on a small terminological field, without a direct focus on the semantic relations to transdisciplinarity and without connection do the direct application. In the meantime, this study has been expanded so that a broader data basis including references to concrete practical examples can be assumed.

This complex terminology will be shown and analysed with the help of our own graphics, which will be explained in a video. Furthermore, different types of definitions are presented using concrete examples, which culminate in an attempt to define transdisciplinarity.

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Mapping the discourse around transformative and transdisciplinary science for young scholars: sketching a participatory undertaking

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Transdisciplinary (Td) and transformative science are relatively new approaches, compared to prevailing modes of doing science. Whether or not they succeed in gaining ground in academia beyond the niches in which they are currently operating depends crucially on a mindshift among scientists. They are the ones who define and reproduce what it means to do science, and therefore they are the ones who will ultimately have to acknowledge and accept Td and transformative science as valid and beneficial. This mindshift is the less likely to occur, the longer a scientist has been operating within the prevailing system, due to socialization and incentivization effects. Students and early-career researchers (ECRs), therefore, are more likely to be open to change and adopt new mindsets since they have not yet been operating in the "old" paradigms as long (even though we should not forget that they often face the pressure of "publish or perish" to advance their careers which might be hard to align with working in a Td/transformative mindset).

We have found that there is a lack of easily accessible and understandable literature introducing students and ECRs into the most important concepts around Td and transformative science. Therefore, we – ECRs ourselves – have set off to write such an introduction ourselves. From the beginning, we framed this process as a learning journey, starting off with various questions that we had ourselves. Subsequently, we accessed various sources of information to approach answers to these questions. These information sources ranged from a classical literature review over more than 30 semi-structured interviews with experts from the field to a multi-stage peer review of our text drafts, involving students and young scholars from our peer group as well as senior experts. As a result, we published a book compiling the outcomes of our own learning and development processes in a concise, understandable, and conciously designed format: »Draußen ist es anders. Auf neuen Wegen zu einer Wissenschaft für den Wandel«.

Given the wide range of perspectives that are incorporated in this book, it can be seen as a mapping of the current status of the discourse around Td and transformative science, albeit limited to the German-speaking countries. As a next step, we would like to take the book as a starting point to create spaces for exchange and reflection for interested students and scientists (in the form of workshops or other formats). As such, the book can serve as a boundary object for scientists from various backgrounds and at various stages of their professional development.

In our contribution to the conference, we would like to present the process outlined above, our central learnings and experiences, and the main results and outcomes. To do so, we intend to produce a sketchnote/graphical summary that outlines the main stages of our learning journey.

PC-3.2: Pre-crafted contributions - session 3.2

Time: Wednesday, 15/Sept/2021: 1:30pm - 2:15pm

Community resilience as a guiding mechanism for the execution of an intercultural transdisciplinary project in Guatemala

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We understand the TD research process as an attempt to link two processes of knowledge production: 1. a societal process, in which actors try to understand and tackle a particular societal issue, 2. a scientific process, in which scientists design and conduct research on the societal issue (Bergmann et al. 2005, Jahn et al. 2012). The challenge is to provide links between "science" and "practice". This is necessary because researchers and practitioners typically perceive and handle sustainability issues by different rationalities – in the words of Ludwik Fleck (1979), by different "thought styles", with additional layers of emic and etic interpretations to the same issue. The Green Health project is executed in collaboration with the Unit of Medical Anthropology of Universidad del Valle de Guatemala (UVG), the ACGERS Council of Elders at Poptún, Petén, and UCL's School of Pharmacy at London. Since 2019, it has been conducting a transdisciplinary (TD) research project with predesigned methodologies in the north-east region of Guatemala to document plant species relevant in ethnomedical practices.

However, on March 2020, due to the COVID-19 pandemic restrictions and two tropical storms (ETA & IOTA), the food and nutritional security of the Q´eqchi´ families was threatened, along with the research mechanisms outlined from the beginning of the project. This presented an opportunity to create synergies between urgent income generation (covering a year's supply of food staples for local partners) and the adaptation of the pre-established research methodology by empowering local leaders to supervise and systematize data collection about biodiversity, food insecurity strategies and the use of forest, instead of academic partners. This TD orientation during the emergency response installed capacity among Q´eqchi´men and women to conduct complex and systematic research by fostering community resilience and flexibility, which would not have been possible without a trust relationship between stakeholders that allowed addressing all interests, while accounting for complexity. The project directly benefited 80-90 families participating in the conservation and research activities of the Green Health project, encompassing a total of about 990 people, since each family has 10-11 members on average (Zinsstag et al, 2018). Gender equity has been monitored from the start, understanding the local needs of women and creating more spaces where they could

collaborate. At least 15% of these families are single-parent households led by women, which means that more female household heads were benefited through this project.

In this presentation, through a collection of photos, we will demonstrate how we reshape the original TD methodology to empower Q´eqchi´ participants in order to achieve the research goals by training them for data collection, set rules for equal participation and decision-making processes, and promote culturally appropriate activities for men and women.

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Opportunities and challenges for inter- and transdisciplinary collaboration in an international research project - The case of the German-Ghanaian project EnerSHelF (Energy-Self-Sufficiency for Health Facilities in Ghana)

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Reliable supply of electricity for West-African countries is a pressing issue, especially when it comes to health services and e.g. the uninterrupted cooling of vaccines. Renewable energy offers a clean option to address these issues and offers opportunities to satisfy the United Nations Sustainable Development Goals (SDGs) 3 (health) and 7 (energy).

Fostering the distribution of renewable energies, in this case Photovoltaic (PV), requires a technological shift towards more appropriate PV systems as well as an institutional shift to lower distribution barriers. Both can only be achieved with the collaboration of academic researchers and practitioners, thus, transdisciplinary.

This paper examines inter- and transdisciplinary collaboration in terms of synergies between different disciplines and branches within the international research project EnerSHelF (Energy-Self-Sufficiency for Health Facilities in Ghana). Furthermore, an analysis of the opportunities and challenges that such collaboration present is done and the role of the virtual work environment is pointed out.

The goal of EnerSHelF is to improve and disseminate marketable PV based energy solutions for health facilities in Ghana. For this purpose, natural and social scientists from Ghana and Germany work together with technicians, who develop off-grid systems. Technical development involves engineers and climate-scientists from academia and business to collaborate directly to find the best PV-System solution for the Ghanaian health context. The socio-economic part of the project aims to find reasons that hinder or foster the distribution of PV in Ghana, and therefore needs a close collaboration between the Ghanaian and German researchers.
The project has had to adapt to the pandemic situation and collaboration mostly takes place virtually. The (virtual) interaction of researchers and practitioners from different fields within the EnerSHelF project offers an opportunity to investigate some general aspects of inter- and transdisciplinary collaboration.

To systematically evaluate inter- and transdisciplinary collaboration within the EnerSHelF team, work-meetings have been observed and specific transdisciplinary meetings have been set up to foster interaction across the team. Additionally, semi-annual interviews have been conducted with team members to obtain their assessments of the topic and to observe the dynamics of interaction over time.

First results show, that collaboration across scientific disciplines and branches are more feasible if they are thematically close to one another or if there is one common problem that needs to be solved. If the disciplines or branches are further apart e.g., economists and engineers, collaboration sometimes needs an external impulse. Results also show, that virtual environments are perceived as a great opportunity for transdisciplinary collaborations, especially if the team is geographically scattered. However, when it comes to challenges, whether related to work- or e.g. cultural differences, the virtual environment hardly replaces face-to-face meetings. Since it is harder to grasp in a virtual environment, if one's counterpart understands or agrees with a method, or e.g., the set-up of a measurement device if he comes from another branch or discipline, the combination of transdisciplinary and virtual collaboration could be more prone to mistakes. Another finding is, that transdisciplinary collaborations work better in a virtual environment, if the partners already know each other in person, so that a certain level of trust is built up beforehand.

The art graphic will show the methodological approach to inter- and transdisciplinary collaboration within EnerSHelF described above, as well as the detailed results and initial lessons learned.

Maps, Narratives and Data: addressing climate change developing boundary objects in one community located in Mediterranean semi-arid ecosystem of Chile

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The Mediterranean semi-arid ecosystem located at the central part of Chile it is historically exposed to many threats as a consequences of land use and land cover change, reducing its biodiversity and limiting its ecosystem services(Hernández et al., 2015). This tendency has been increased due to the rise in frequency of extreme weather events, highly associated with climate change (Miranda et al., 2017). Beside its contribution to the world biodiversity -being one of the biodiversity hotspots-, this ecosystem is especially important since more than the 60% of the Chilean population lives there, which means that

addressing the effects of climate change it is strategic for the Chilean Sustainable Development. As the last report from the UN Climate Change stated, a combination between policy measures and community actions are necessary to address climate change (Whitesell & Whitesell, 2011). While Chile has set climate change policies since 1998 and singed all the international agreements including Paris; and it is located in the 9th position of the Climate Change performance index 2021 (Burck et al., 2020), right now community and climate change policy it is specially interest because the country is currently debating its new constitution and it is also in the second position within the worst GINI index (OCDE, 2021).

With the aim of co-creating solutions that helps to address climate change effects and cope with the collapse the Mediterranean semi-arid ecosystem in central Chile, we worked with a small community (about 100 inhabitants) located in the coastal zone of Chile (Tunquen, Valparaiso Region, Chile) and with a group of researchers to identify which were the problems to address and what the solutions that better fits the community. We did it by applying a transdisciplinary approach to develop boundary objects -*Metalogue*- (Urquiza et al., 2018) through a series of online workshops where we gather both the community and the researchers' impressions, both verbal and spatial. The outcomes of this process were two boundary objects: a map and a document with the identified problematics and solutions.

The transdisciplinary dialogue was promoted by the application of the metalogue approach, which is inspired by the notion of metalogue originally introduced by Gregory Bateson. The approach elaborates a systemic-constructivist proposal of observation and contextual intervention, aimed at fostering reflexivity within dialogical-participatory instances by inducing their participants to perform a second-order observation of the distinctions mobilized within the interaction. Building upon this reflexivity, the metalogue pursues the co-construction of documents able to coordinate the perspectives of the participants and the expectations of the structural and organizational arrangements in which they operate.

The aim of our presentation will be sharing the lessons from budling boundary objects, as part of a transdisciplinary process within the context of a declining ecosystem. Comparing from what was founded in literature about this topic, we found new solutions which emerge from this collaborative process. Also, we found a tendency within the researcher group for proposing solutions that considering larger scales than the community.

We believe that our contribution will shade light on using online resources for transdisciplinary proposes; a reflection about the role of transdisciplinary within the context of declining ecosystem and coping; and the use of *metalogue* as a framework to build maps and solutions based on a boundary object approaches.

We want to reach a big range of communities of practices, action researchers and researchers involved in management of Mediterranean ecosystem; researchers involved in design of transdisciplinary tools and methodologies. Also, we are very interested in reaching communities dedicated to deal with coping and climate change adaptation techniques.

Co-production of Knowledge and Sustainability Transformations: A Strategic Compass for Global Research Networks

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An increasing number of voices highlight the need for science to engage in the transdisciplinary co-production of knowledge and action, in order to enable the fundamental transformations needed to advance towards sustainable futures. But how can global sustainability-oriented research networks engage in transdisciplinary co-production of knowledge and action? We developed a heuristic tool called the "network compass", which highlights four generic, interrelated fields of action through which networks can strive to foster transdisciplinary co-production:

1. Connecting actors and scales to enable co-production
2. Supporting the network community in co-production
3. Fostering co-production to leverage the network community's transformative power
4. Innovating the network to strengthen co-production

The network compass is based on the networks' particular functionalities and how these can be engaged for co-production processes. This tool aims to foster self-reflection and learning within and between networks in the process of (re)developing strategies and activity plans and effectively contributing to sustainability transformations.

Short intro: https://youtu.be/eaW3B29AXlQ

Further contributors: Carolina Adler, Oonsie Biggs, Ariane de Bremond, Tobias Buser, Cornelia Krug, Marie-France Loutre, Sarah Moore, Albert Norström, Katsia Paulavets, Davnah Payne, Eva Spehn, Gabriela Wülser, Ruben Zondervan

Research Atlas: a digital tool to reline discussions between different players

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Ideally, a transdisciplinary research process would include all different players from the very beginning – scientists as well as stakeholders (non-certified experts). Naturally, this kind of participation is not always given, as is the case with the first research line of the so-called "Grand Challenges" of the excellence network Berlin University Alliance (BUA). Therefore, we aimed for a way to include knowledge from different stakeholders and support td-research later on in the process. To do so, we developed a tool which would allow us to start the discussion about a rather complex topic such as "Social Cohesion" with non-academic stakeholders and without having events in presence – briefly: a new digital tool for knowledge exchange.

We came up with a complex but appealing visualization, we named "Research Atlas" based on the idea of connecting information items through a root-like branch system. This visualization allows us to show the complexity of a research topic (in our case "Social Cohesion") while demonstrating the breadth of subtopics which are being processed in Berlin – the local research landscape of this field. We combined topics and research projects with questions and themes raised by stakeholders of different societal groups.

Research projects as well as research-questions communicated by (a) the society and (b) the scientific community itself are located at one main topic branch and linked to multiple other topics as well. To all topics, subtopics, research-questions from society and research projects a side bar provides further information. The topic branches are not aiming to be exhaustive, but a convergence towards these topics, which are playing an important role in the local Berlin research community.

Furthermore, we want the Atlas to be a "living document", where later additions are possible. Intended use cases of the Atlas are laying in various aspects of knowledge exchange, e.g. getting inspiration, exploring new connections and contexts, highlighting boundaries and communicating to a broad public.

The data basis for the Atlas lies in the given topics of the short (Pre-Call) and long (Main-Call) exploration projects of BUA's first "Grand Challenge Social Cohesion". Findings from qualitative interviews with scientists and individuals from organised civil society, politics, administration and business are included in the visualization. The concept and visualization of the Atlas were developed by the Humboldt-Viadrina Governance Platform (HVGP).

The Atlas will be published during summer 2021. The first feedback we got from the scientific community (especially the Principle Investigators of the BUA-Exploration Projects of Social Cohesion) was overall very positive. We also used the Atlas to get in contact with and have a basis to enter into debate with societal stakeholders, which has worked well. We will test the Atlas in a wider context with an event (so called "Trialog") in autumn 2021, where different players from scientific and non-scientific communities will discuss a subtopic of Social Cohesion in a deliberative manner.

Besides presenting the Atlas, we are looking forward to getting feedback and critical questions by other TDR-experts as well as discussing the potential for further development of this digital tool.

PC-3.3: Pre-crafted contributions - session 3.3

Time: Wednesday, 15/Sept/2021: 1:30pm - 2:15pm

Formative evaluation of transdisciplinary innovation processes. Opportunities and challenges of impact-oriented adjustment of regional innovation management

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The consortium WIR *region4.0* brings together various actors from science, business, politics and society to initiate technical and social innovations in a rural structurally weak region. The overall activities of the consortium are guided by a regional innovation strategy, coordinated by an innovation management and supported by an advisory board. Transdisciplinary processes are taking place in projects in two strategic thematic fields of infrastructure and public services, as well as of agriculture and regional food. For example, one project deals with the improvement of transport and mobility in rural areas and another with value chains for regionally produced food. In both projects, groups of actors that do not otherwise work together have been linked: A municipal public transport company has been cooperating with local enterprises for the delivery of regional goods and local farmers, meat processors and canteens have established a prototype for a new value chain, which strengthens regional sustainable beef production.

The consortium's impact-oriented evaluation concept is based on theoretical approaches of regional development and literature on effects of transdisciplinary research. The set of *process* and *impact* criteria was developed in a participatory manner involving regional actors as well as external experts of regional development processes in other regions. The process criteria relate transdisciplinary quality criteria to the overarching goals and intended effects of the innovation strategy. The indicators for the projects were identified by applying the theory-of-change-approach, exploring the projects' particular contribution to regional change processes in the context of the innovation strategy.

Formative evaluation has been engaged with providing feedback to the innovation management and the projects on the basis of continuous data collection and monitoring. So far, the empirical findings have shown that the consortium operates in a field of tension between implementation-oriented processes in focused thematic areas (projects) and the initiation of far-reaching regional innovation processes with comprehensive claims. Close transdisciplinary exchange and producing knowledge for action is only possible within projects, which involve a certain (small) number of actors and relate to a particular problem. As long as these projects do not have concrete results, their potential for regional innovation cannot fully unfold. The envisioned overall picture of the innovation strategy has not yet been apparent for those regional actors that are not part of the projects. However, those actors are relevant for the continuation of the regional strategy in the long term. For this reason, the formative evaluation recommended better communication of the consortium's goals and scope for action as well as involvement of key stakeholders in strategic decisions of the consortium.

At this point of time, we can summarize that a project-internal formative evaluation has been able to support the projects' impact orientation and to carry out a bridging function between them and the overall innovation strategy. However, the prevailing challenge remains to enable regional actors to locate themselves in the ongoing comprehensive regional innovation process. The formative evaluation therefore recommended an adjustment of the structure of the steering group of the consortium and a narrower thematic and spatial focus of the innovation strategy, corresponding to ongoing and future project objectives. In the video, we reflect on the challenges of assessing the success of context-specific projects and of developing the innovation strategy further on the basis of context-specific data, using the example of one of the projects.

Improving the effectiveness of transdisciplinary research through co-produced and ongoing meta-research evaluation.

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Research collaborations generate many challenges, such as overcoming disciplinary silos and integrating assumptions, ideas and knowledge. The UKPRP funded 'Tackling the Root causes Upstream of Unhealthy Urban Development' (TRUUD)

consortium aims to prioritise health in urban decision-making processes in the UK. The project spans five university cities and multiple disciplines, sectors and publics. To maximise the efficiency of inter/trans-disciplinary working, a parallel, and complementary, work stream of meta-research evaluation is ongoing, which aligns with TRUUD's main phases of work. This research-on-research combines online interviews and workshops with situational and network analysis, and a critical systems approach, studying the research activities in relation to healthy systems criteria. The approach relies upon co-producing analysis and results in collaboration with the research team and aims to determine any course corrections that may be needed to keep TRUUD on track. We are approaching the end of the first phase of research and would like to share our initial insights and challenges in a short film comprising mappings and diagrams, with an accompanying 'live' online whiteboard (Miro) for encouraging refection and feedback from other delegates.

Scientific Room-Cleaning or The Practice of Research Management in Inter- and Transdisciplinarity

Sabine Toussaint

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From the point of view of a management office for inter- and transdisciplinary research associations, with a pre-crafted short video presentation we intend to foster the know-how-exchange on id/td-research management. The aim is to contribute to professionalizing it, to provide best practice examples of tangible id and td research structures and processes and to receive advice from science on id/td research management.

The management offices, located at Munich University and Augsburg University, gained expertise by providing the coordination for the Bavarian Research Associations ForChange (2013-2017), ForDemocracy (2018-2022) and ForDigitHealth (2019-2023). Funded by the Bavarian State Ministry of Science and Arts, this funding line requires an external coordination office, which is not involved in the research process as such, but plan and organize the internal communication- and working-process, the external communication (science communication) and the controlling of the budget. Out of these nine years of working and learning, we want to contribute to the joint learning process at the ITD.

In three steps, we will discuss:

1. General information about the funding line of the Bavarian Research Association (targets, proposal, funding, working structure and process) and the specifics of the role of the management office

2. Best practice examples out of the communication and working processes

a. Involvement of partners from practice: "Practice-Conference" (targets, settings, impressions)

b. Different methods and products of the interdisciplinary process:

- the responsibility of PhD students for cross section research subjects and their outputs;
- circulating methods – the example of measuring stress hormones and its impact on the association

3. Science communication

- Scientific blogging, Twitter & Co.: Requirements to establish constant content and interesting formats: process, working structure, competences, budget
- Examples of innovative formats

Resuming, we offer some general statement on research management for further discussion: Research management requires competences in communication and process management, which are fundamentally needed for good id/td-research. Research management and the research on the scientific topic have to take place in separated fields of responsibility and budget. At the same time, it is important to involve researchers in the management decisions at all stages of the process and of all statuses of scientists involved.

Research modes and their societal and academic impacts - Demarcating transdisciplinary research in sustainability science within 59 on-the-ground research projects

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The discourse revolving around "new modes of knowledge production" – particularly in sustainability-oriented research – seems to imply a duality of transdisciplinary versus non-transdisciplinary research. Yet, we assume that actual research practices will vary in their expression of transdisciplinarity, due to different research questions, funding structures, or stakeholder fields. Hence, in reality, a spectrum of more or less transdisciplinary research modes may be expected due to design decisions to navigate sustainability research within the boundaries of societal and scientific requests.

In this video, we present an empirically grounded distinction of five research modes, based on a cluster analysis of 59 completed sustainability-oriented research projects. Projects in one cluster approximate a transdisciplinary ideal type, while another cluster combines almost purely practice-oriented projects. Among the three remaining clusters with varying degrees of practitioner interaction, one cluster assembles projects with strictly academic research, while realizing substantial societal impact. Furthermore, our analyses indicate that the choice of research mode strongly depends on the funding context, with mission-oriented funding en-couraging more collaborative modes. Overall, clusters with more practitioner interaction dis-play stronger societal outputs and impacts at the cost of academic outputs and impacts. Our work may be seen as adding important nuances to existing theoretical conceptualizations and empirical studies that mostly focus on ideal types and best practices in transdisciplinary research. As a practical contribution to research planning and management, our typology and the relationship between research modes and their impacts could help setting the priorities along the trajectories of the societal and scholarly aims of future research. Moreover, our find-ings may support funding agencies in setting up effective research programs, combining dif-ferent modes of research to reach multi-dimensional impacts in society and academia to push sustainable development.

Starting from the ITD online conference 2021, we would like to initiate a virtual discussion about how to navigate transdisciplinary sustainability research in this tension between societal and scientific demands – especially since the discourse to date has focused almost exclusively on societal impacts of transdisciplinary research, neglecting the academic contributions of TDR to some extent.

Transdisciplinary Resilience Assessment: Lessons from the Development and Application of the I-RES Methodology in Diverse US Communities

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With disruptions of all kinds increasing the need for innovative action to strengthen community resilience, new opportunities are emerging for universities to engage in assessing community resilience. Given the complexity and multi-sector dimensions of community resilience, universities have potential to serve as anchor institutions to convene and support a collaborative approach among public and private sector institutions to produce actionable recommendations related to interdependent infrastructure systems, ecological systems, and social systems. University-based teams may also have unique capacity to center social justice, economic justice and racial justice into their assessments and recommendations to advance equity, sustainability and resilience at the community scale. Despite growing calls for university researchers to engage directly with the policy process to identify and implement policies informed by science, specific mechanisms to do this in the context of complex interdependent systems are emerging but are not yet well defined. Globally, the COVID public health crisis and associated economic and social disruptions have highlighted interdependencies and cascading failures. Coordinated approaches to manage interconnected crises are essential to prevent increased economic and social vulnerability within communities during times of disruption. Building upon decades of community resilience research led by Oak Ridge National Lab, researchers at Northeastern University's Global Resilience Institute have piloted a transdisciplinary resilience assessment methodology, Integrated Resilience Enhancement Solutions (I-RES). This new assessment framework integrates multi-sector resilience metrics and engages public and private sector stakeholders in collaborative identification of resilience challenges and priorities for recovery from disruption and resilient development. We critically review applications of the I-RES approach in communities in Northeastern and southern Gulf Coast states and find that that systemic partnerships among government institutions, multinational enterprises, and local civil society organizations facilitate adaptive governance solutions. We identify strengths and limitations of the I-RES resilience assessment methodology and define research questions to guide the future development of effective university-community partnerships to develop systems and strategies capable of managing through disruptions and transforming to thrive in a changing world.

Transdisciplinary Processes in Climate Services. Quality Criteria and Formative Evaluation

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Climate change and its socio-ecological impacts represent a complex real-world-problem that affects all sectors of society. Hence, the cooperation between civil society and political, economic and scientific actors is a key element for the development of adaptation measures. Participatory and interactive modes of scientific knowledge production have become promising concepts to tackle the multiple risks of a changing climate. In particular, in the field of climate services, transdisciplinary approaches are increasingly applied. Climate services relate to "[…] the transformation of climate-related data — together with other relevant information — into customised products such as projections, forecasts, information, trends, economic analysis, assessments (including technology assessment), counselling on best practices, development and evaluation of solutions and any other service in relation to climate that may be of use for the society at large." (European Commission 2015, p. 10). In order to enhance the adaptive capacity of society, the development of climate services requires continuous interactions between science and society. Transdisciplinary processes are therefore important to advance knowledge integration between providers and users of climate services.

However, climate providers often do not reflect on transdisciplinary processes and evaluate to a sufficient extent. Usually, output and outcome assessments are conducted that include indicators like the usability and application of the service, behavioural change of users, or the socioeconomic value of products. What is more, current evaluation approaches most often apply ex-post assessments and hence are not suitable for the adjustment and improvement of transdisciplinary processes over the course of ongoing projects. In this contribution, we identify main characteristics for the sound development of climate service products and related quality criteria. The alignment of the needs, preferences and expectations of practice partners with scientific feasibility is for example a particularly important step at the beginning of a project. Subsequently, the development of a climate service entails several steps of situated testing within the contexts of application, e.g. in relation to the selection of climate indices, time frames, methods, or the design of the service product. The finalization of a climate service product opens up another phase, including operational guidelines for implementation and strategies for upscaling. Associated with interaction steps of the development of climate service products are quality criteria, which provide the basis for evaluating the transdisciplinary process over a project's lifetime. These evaluation criteria and related indicators origin from a literature review, were discussed and validated with participants of transdisciplinarity and systematized in an evaluation scheme.

We will show how this process-oriented, formative evaluation scheme can help scientists and their partners to increase the usability of climate service products by continuous reflections on science-practice engagements in different phases of climate service projects. A careful documentation of transdisciplinary processes in all phases of co-creation ensures transparency for all the involved actors and, what is more, that can also be utilized for adjustments of science-practice engagement methods. Besides, good documentation material is key for any sort of evaluation. The proposed scheme will be able to be transferred – at least in parts – to other transdisciplinary research fields.

Literatur

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PC-3.4: Pre-crafted contributions - session 3.4

Time: Wednesday, 15/Sept/2021: 1:30pm - 2:15pm

Taking sustainability seriously: an empirically grounded typology of sustainability-oriented labs

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Sustainability carries aspirations to guide major societal change processes in the coming decades. In transitions and transformations research, sustainability gained traction as a normative construct providing purpose and direction to systemic change processes. A growing set of approaches, including various labs in real-world contexts, are providing dedicated spaces and processes for joint learning and experimentation to contribute to sustainability transformation. While lab approaches are increasingly studied, little work has been done connecting empirical experiences from various disciplines and discourses. Practical similarities and differences remain under-explored, particularly in relation to how labs engage with sustainability as a normative aim and procedural quality. This hampers learning from various approaches and slows down the development of more effective and efficient lab designs and practices for transformation.

Therefore, we aim to describe and classify the diversity of how sustainability-oriented labs approach sustainability. Method-wise, we adopt a qualitative case-based approach to categorize labs according to their properties. The central data source is derived from a recent systematic review of sustainability-oriented labs, resulting in a collection of 53 labs (McCrory et al. 2020). This includes sustainability-oriented labs from 7 different research communities, conceptualized as Living, Urban Living, Real-world, Evolutionary Learning, Urban Transition, Change, and Transformation labs. This sample includes a demarcated group of labs with visible orientations towards sustainability and (in most cases) a transdisciplinary character. However, the underlying study lacks a deeper comparative orientation. Here, we aim to compare and distinguish lab cases based on their qualities and characteristics in practice. Thereby, we develop a case-based, empirically grounded typology as a core result. We employ a 4-step typology process, including the development of dimensions, grouping of cases, analysis of empirical regularities, and subsequent construction of types and typology.

The typology includes six different *lab types*, with each type having a characteristic orientation towards sustainability: 1) *Fix and control labs*, framing sustainability as a matter of technology and increased efficiency; 2) *(Re-), design and optimize labs*, engaging with sustainability consumption, lifestyles, and behavior; 3) *Make and relate labs*, centering on participation, local practices, and relations; 4) *Engage and educate labs*, focusing education and university-society relations; 5) *Empower and govern labs*, focusing urban regeneration and governance; and 6) *Explore and shape labs*, focusing complex challenges in context. Types are grouped and differ according to properties, namely: their construction in time and space, formulated ambitions, foregrounded enablers of transformation, the framing of innovation, key collaborating actors, and the nature of the process in labs.

The typology functions as a heuristic for situating and comparing labs as a rich set of transformative, co-creative initiatives. It enables for similarities and differences of sustainability-oriented labs to be surfaced within each type of related labs (internal homogeneity) and across different types (external heterogeneity). Additionally, this typology provides a frame for reflexive lab design and praxis. It provides a frame that can allow stakeholders involved in future lab design, orchestration, or participation to reflexively explore, adjust, or challenge the direction of change implied in the properties of labs.

Experimental Strategies for Real-world Labs – Towards a Topology of Epistemic Practices Beyond a Natural Sciences Paradigm

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"That's not an experiment!" Many of us working in transdisciplinary settings such as Real-world Labs (RwLs) have heard this criticism at some point, or have thought it ourselves. What are we doing in our research, far beyond an epistemic regime of controlled conditions, reproducibility, control groups and distinctions of subject and object? These are so fundamental to experiments in natural sciences, at least in their reconstruction! But a critical analysis of the practical realities of experimental strategies in science and technology will take us only so far, helping us feel better while still *"muddeling through"* (Lindblom), but not inspired for our work.

In this video-presentation – framed rather as a science-slam stage-act than a traditional presentation – I will suggest an approach of collecting epistemic practices beyond the natural sciences paradigm.

Starting with well-established practices like field experiments (where conditions are neither fully controlled nor reproducible) and prototyping in engineering (where the result is far from open), I will take a tour through experimental strategies where subject and object overlap (*self-experiments*), where thought experiments are only accompanied by material ones (*futures design*) where experience is the basis of knowledge production (*experimental archeology*), or where traditional scientific distinctions do not really fit at all (*teaching ethical reasoning to AI*).

All these practices combine experience, action, analysis, planning, comparison, and reflection into different learning cycles. To create a topology for such a diverse field of epistemic practices which might be adaptable to transdisciplinarity, I suggest to focus on three aspects: their potential for knowledge production, for (social) learning, and for practical transformation. This way, practices from beyond science can be included into the topology of experimental practices as well (such as *empowerment-oriented events*, *concrete utopias*, and *narratives of change*).

Community of Practice and Reflexive Governance in Transdisciplinary Research on Crop Diversity Management

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Community of practices (CoP) is seen as powerful governance mechanisms to address complex problems by fostering transdisciplinary collaboration between spaces and opportunities across wide areas of expertise, geographies and actors. CoP has become an "umbrella" term since its inception by Lave and Wenger. This notion has been initially coined to reflect on the collective and socially situated dimension of learning by opposition to the dominant cognitive and individual approach of learning. It has been taken up by the management literature and the focus shifted rapidly form CoP as a terrain of social learning to an organizational tool to more effectively manage knowledge teams. By contrast to this managerial approach and building on the experience of a global transdisciplinary project (CoEx) on the diversity of crop diversity management systems in West Africa, we assess the benefit of coming back to the original meaning of CoP to address transdisciplinary challenges.CoEx gathered researchers from various disciplines as well as farmers' organizations and NGO in France, Canada, Senegal, Mali, Niger and Burkina Faso with the overall objective to provide a more accurate picture of actual practices surrounding seed acquisition, uses and exchange, beyond the usual "formal" and "informal" binary division that still predominates international and national legal and policy frameworks. Based on our field experience, we first examine to what extent recognizing collective and situated character of learning has consequences on the way objects are described. More specifically, we paid attention to the diversity of practices producing knowledge about seeds and investigated to what extent existing categories and descriptors were able to accurately reflect existing seed practices. In parallel, a relational approach was also been explored by some CoEx members in order to circumvent the difficulty to produce data without referring to pre-existing categories and better reflecting those experienced by the different actors involved. This relational approach brought on board both the emotional and moral dimensions of seeds, two dimensions seldom explored despite their critical importance to the perception of fairness and equity in the management of crop diversity. In total, the notion of CoP helps addressing the socio-cognitive challenge of producing data on objects/dimensions very often left out in existing knowledge systems and database about seed and seed systems and that better reflect the diversity of actual practices in the field.

However, the focus on practices offered by this conception of CoP is not limited to the epistemic dimension of building new and collective meanings about objects. It also applies to the collaborative practices themselves and allows going beyond the harmonious bias that characterizes the managerial conception of CoP. The highly politically charged environment surrounding plant science and breeding forces to double up on precautions about meaning production and power differentials among actors. Recognizing that knowledge actors rarely share complementary or compatible motivations and objectives in transdisciplinary context, the CoEx's CoP focused reflexively on previous collaborative transdisciplinary practices to develop a critical stance towards the values and assumptions of the various members of the community as well as towards the institutional and power structures that shape current organization of research and, more specifically research project governance. CoEx has been conceived as a collective experiment that takes up the question of the conditions of its own collaboration and defines its own rules and modus operandi regarding the specific collective action problems that arise in the course of the project. We ultimately argue that paying attention to the way CoP acts on itself to manage its own collective organization and decision-making is critical to manage as best as possible the differences in power between groups, inherent to these processes of collective construction of meaning.

Energy infrastructure, landscapes and sound

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Following a classical disciplinary PhD in Energy Economics, I decided to search for other means than scientific empirical research to encounter some of the todays complex problems such as the energy transition. In order to explore this, I pursued a Master degree in Transdisciplinary Studies in and with the Arts (at the Zurich University of the Arts), where I was able to explore aesthetic empirical research – in the sense of *aisthēsis* (study of sensory and embodied perception) – as a tool to investigate energy infrastructure while employing the Arts as disciplines that deal with this concept on a daily basis. Hence, my understanding of the term «transdisciplinary» — among other features — lies in the productive intermingling of scientific and artistic research. Such a view on transdisciplinarity that includes artistic research is valuable in order to advance transdisciplinary concepts and methodologies. Artistic approaches can bring in novel perspectives, contribute to new narratives and allow to make subjectivities negotiable, which then can be reflected. Moreover, a further characteristic of transdisciplinarity is the integration of different forms of knowledges, that should also include the epistemologies of artistic research and practices.

In the audio piece for the ITD conference I will use my master thesis as an example to show how the intermingling of social science research and an aesthetic approach can be used to co-produce alternative energy futures in alpine spaces. In the project, I used field work visits of hydro dams in the Swiss alps to collect aesthetic material in an experimental setting. Energy infrastructure – such as a hydro dam – changes, influences and recreates alpine landscapes. Research on landscape changes generally use standardised preference surveys to study the perception of these changes. While standardised preference surveys provide valuable information, the detection of sensory and bodily perceptions by means of closed questions is limited, as only pre-formulated information can be gathered. One key aspect in this work is that the discourse around landscapes are dominated by the visual aesthetics, however we engage with the world not only with our eyes but also with our ears. Thus, I complemented the material collection process with a listening and recording approach. Using this method, one is able to investigate the affective and aesthetic qualities that the encounter with sound, landscape and hydro dams produce.

While the technical solutions for the energy transition from engineers are mostly ready, there is a societal dimension — that plays a critical role for the political transition to come. However, for investigating this social dimension and its issues not only scientific empirical research is necessary, but also aesthetic empirical research and practices. Stepping outside for a moment, generating new narratives connected to affective factors in how we respond to the world, are tools that potentially should be integrated to TD research. Future research could thus test whether such an approach might be useful to be integrated to a participatory energy planning process for the energy transition.

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Audiovisual power for SDG16+: Reflecting on processes, roles and transformations beyond professional repertoires

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This contribution reflects on the power of filmmaking to build bridges across disciplines, geographies, science, policy and practice. Within a research synthesis process, the Swiss Programme for Research on Global Issues for Development (r4d programme) worked with three social conflict research teams to create a full-length research documentary. The documentary was conceived as a boundary object connecting different research disciplines, countries and social groups, from the most vulnerable local populations to international policy makers.

The application of audiovisual media in a scientific context constitutes a boundary crossing by and of itself, as the well-established rules of disciplinary writing need to be translated into audiovisual language.

Our contribution to the ITD2021 focuses on the ´making of´ process of the documentary as a transdisciplinary practice between scientists, filmmakers and development practitioners and ex-post reflections on the process.

A package of products
"Inequality and Conflict - Beyond us and them" (trailer here) was premiered in Geneva in November 2019. It portrays activists, local leaders, researchers and policy-makers in five countries on four continents marked by diverse experiences with inequality and structural violence. One year after the premiere, we collected testimonies - with both the target audiences and within the participating researchers and protagonists. "Inequality and Conflict – Beyond us and them" has transformed us beyond our expectations.

As pre-crafted contributions, we offer 1) The full-length film, 2) Selected short key video sequences for discussions, 3) and a new short investigative audiovisual reflection video with testimonies about the co-creation process.

During our session, our new short video (see product 3) will be accessible via a frame.io link. On this platform, participants can engage in a "social video dialogue" with comments, questions and discussions. This session enables reflection about expectations and outcomes as well as conditions for transformation.

Our products offer a package for learning, reflection and dialogue about transdisciplinary practice applied in an audiovisual scientific synthesis process. We emphasize the high degree of open and adaptive management that is necessary when working under conditions of high uncertainty, the instrumental role of enablers in fragmented knowledge systems and structures.

We invite for debate and share ideas on how researchers, filmmakers, policy makers and activists across the globe can collaborate more creatively and effectively towards peace, equality and justice in a turbulent world.

Addressing the themes and questions of ITD2021
Our pre-crafted contributions speak to several questions of the ITD201 conference, especially "how can we use and build on knowledge integration to contribute to envisioning and co-producing alternative futures".

Our reflections about the audiovisual power for SDG16+ beyond professional repertoires build on key elements from the co-design filmmaking process:

- Workshop to co-create narrative and to translate key concepts and global issues into potential visuals;
- Co-creation in the field: Film production team with international and local researchers;
- Daily reflections within production team; ad-hoc adaptations of creative ideas into film;
- Co-production of a rough cut; feedback rounds in collaborative online video editing software;
- Rough cut screenings and feedback events in Switzerland and Indonesia with policy audiences informing final cut;
- Launch of documentary;
- Outreach process, e.g. sticky dialogue events, exposure in unconventional settings (ongoing).

Knowledge management practice to foster knowledge sharing in socio-environmental project

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Knowledge management (KM) is a systematic approach that allows organizations to deliver value from their knowledge assets. For this purpose, organizations can use KM practices, which refer to conscious and intentional managerial activities to support the KM and its processes (e. g., knowledge sharing). Those practices can support the interaction within the team and the work in collaboration, which permits to delivery of results based on a transdisciplinary approach. The purpose of this abstract to present evidence regarding a KM practice to foster knowledge sharing in a Brazilian socio-environmental project. The project was part of the Federal University of Santa Catarina, and it aimed to conduct a socio-environmental diagnosis to create a protected area. The team was composed of 47 people, including professors, students, and consultants of several fields, such as fauna, geography, anthropology, and environmental education. A qualitative research approach was adopted using Action Research as the strategy of investigation. The data collection was based on observations and semi-structured interviews, which took place between September 2019 and July 2020, and the thematic analysis method for data analysis. To participate in the KM practice, the team used a WhatsApp Group to send videos, audios, or texts with the main results obtained by their investigations according to an established schedule between March and July 2020. For example, the first week was scheduled for the environmental education team, the second week for the anthropology team, and thus all the teams could participate. The KM practice permitted the teams to share their results, which could be fruitful for several research fields. For instance, the

results from the geology team helped the analysis of the Hydrology team. Also, it allowed a collective discussion regarding what one of the teams have shared on the WhatsApp group. Therefore, it has contributed to the achievement of tasks and the increment of interaction between the teams. Furthermore, through the KM practice, the teams shared information, doubts, and opinions from the community where the project was carried out to be discussed collectively with everybody. Doing that helped the Environmental Education team to clarify doubts regarding the project to the local community. In addition, it contributed to the project team understand concerns and expectations from the community regarding a protected area creation and how was the occupation process of that territory. The KM practice supported the knowledge creation based on the interdisciplinary vision, which contributed to delivering robust and interconnected results concerning the environmental, cultural, and social aspects. Consequently, the final report, which presented the final results and indicated a protected area type and its limits, was written integrating the knowledge from the different research fields and the opinions and demands from the local community. To conclude, the KM practice fostered knowledge sharing, promoted collaborative work, and provided a robust study to create a protected area.

PC-3.5: Pre-crafted contributions - session 3.5

Time: Wednesday, 15/Sept/2021: 1:30pm - 2:15pm

Art, Politics, and Sustainability: A live techno performance

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For my contribution, I propose a live (recorded video) analog and digital hardware performance as 'drusnoise'.The performance will consist of a mix of planned and improvised techno with a combination of analog modular synthesizers, digital samples and drum machines, all performed without a computer. The mix of analog and digital represents the challenges of reimagining a relationship to 'analog' nature in the midst of a 'digital' culture. My performance illustrates that sometimes tension can be productive. That tension need not always be resolved but can itself be a source of creativity, exploration, and inspiration.

The performance will be built around a lecture by **Prof. Bruno Latour** (Sciences Po, France) on the relationship between art, politics, and sustainability. Prof. Latour discusses the role of artists in creating politics, in the sense of articulating societal concerns, and the challenges of playing that role in a rapidly changing world and climate.

The musical performance embeds each of these ideas in a techno track. Samples, synthesizers, percussion, melodies, and rhythms are carefully chosen to support, challenge, and enhance the ideas presented. At the same time, the pieces are performed in a manner that can be interpreted in different ways. The audience may focus on the words and ideas, or solely on the music, or on the integration of both. This fluidity in interpretation is a key element of the performance. This fluidity is directly connected to the questions of integrating different forms of expertise and how they are valued.

By presenting these ideas in a musical performance, I embody the challenges of TD itself - how to integrate different modes of thinking, forms of knowledge, and perspectives on sustainabilty in a way that is engaging and stimulates societal transformation. I hope that this piece will spark reflection on these topics. And provide a much needed musical and dance respite in the midst of academic paper presentations!

My drusnoise artist persona integrates two key areas of my background. As a sustainability scholar, I lead a research group at the Institute for Advanced Sustainability Studies in Potsdam and am part of a research team at Chalmers University of Technology in Gothenburg, Sweden. My research focuses on the social, political, and cultural dimensions of transformation towards a more sustainable society. Research projects include my doctoral dissertation on the Energy Futures Lab in Alberta, Canada and currently the Challenge Lab in North Mid Sweden. In my work, I am particularly concerned with the role of citizens and decision making, justice in transitions, engagement with Indigenous peoples, and the arts and sustainability. My research background has a direct connection to my musical interests. When I was completing my PhD in Canada, my niece and nephew started calling me 'Dr. Uncle Steve' which led to 'dr.us' and then to 'drusnoise'

As a preview of the performance, you can view a live performance of 'Democracy' featuring Dr. Patrizia Nanz here https://youtu.be/V2Vy6CR-1Yw?t=1183. This performance was part of the Virtual Berghain 48-hour live stream the weekend of 20-21.03.21

Art and Design Pedagogical Practice as a site for Phenomenological and Theoretical Transdisciplinarity - A Post-Qualitative Project

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Art and Design pedagogical practice at tertiary level is a site of potential for phenomenological AND theoretical transdisciplinarity. This presentation explores art and design practices (micro TD), art and design teaching practices (meso TD) and art and design international practices (macro TD) and situates them as transdisciplinary exemplars. Meso TD and macro TD are explored using a qualitative approach, exploring transdsciplinary art and design pedagogical approaches such a The Wind Tunnel by Florian Dumbois and -Da programme at FEFU, with the third, micro TD or individual perspective using a post-qualitative conceptual approach, positioning such as disciplinary 'borderwork'. By using a visually creative multi -methodological approach I suggest the opening of constrictions within institutions to accommodate transdisciplinary potentials and integration across the disciplinary landscape of third level (Institute of Technology/Technological University) in Ireland.

Teaching practices within art and design at tertiary level have both phenomenological (Zurich) and theoretical (Nicolescuian) transdisciplinary attributes. By outlining these attributes the 'potential' of transdisciplinarity can be understood on a personal level (student/teacher/practicing artist attributes), on an institutional level (institutional openings and closures to integration) and on an international level (pedagogical practices which are transdisciplinary in other institutions). By locating both theoretical and phenomenological transdisciplinary possibilities already within art and design third level educational practice, frameworks can

be explicated and made visible across institutional boundaries. By adopting a post-qualitative paradigm in my work I enact transdisciplinarity and challenge normative Arts/Humanities/Social Sciences (AHSS) research conventions.

This visual presentation will include audio, visual and textual/spoken excerpts from my current doctoral research outcomes, combined to produce a post qualitative concept led creative output.

How to span boundaries? Methodological reflections on transdisciplinary cooperation involving artistic and social research

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The question of knowledge integration has already been widely discussed in the discourse on transdisciplinary methodology. The underlying premise is to gain the best from combining different perspectives. Instead of multidisciplinarity in the sense of solely arranging disciplinary perspectives side-by-side, transdisciplinarity intends to bridge differences, focusing on integrative results. The reflection of this premise at the background of the arts- and social science based research in "Mapping the Unseen" explores the collaboration with a view on zones of blurring as well as on contours, and raises the question of consequences for the conceptualization of integration.

The video presentation focuses on how knowledge integration in transdisciplinary research can be (re-)conceptualized in the face of less familiar cooperation between research approaches, namely between artistic and social research. The background of experience is the transdisciplinary artistic research project "Mapping the Unseen". It explores unseen, undiscussed topics, which are absent from public discourse because of their implicit social taboo potential. Enabling a visualisation of the respective topics and generating dialogue through participatory processes between researchers, artists, and the public is at the core of the activity. The project involves local artists in Croatia, Bangladesh, and Iran, where art laboratories are created in local public space to deal with marginalised topics. In a second step, the partner's artistic work is shown in Austria. With the purpose to enable an intercultural dialogue, it is embedded in interventions in the public sphere. A reflective process accompanies the whole project, including artistic- and social research methods (auto-ethnography, qualitative interviews, focus groups, participative observation). In a third step, a virtual mapping of all the research content is created. This archive can be explored interactively and follows the idea of an unfinished participatory dialogue.

The presentation gives insight into a dialogue on aspects that appear as relevant in a project constellation including artistic research, which does not happen so often in transdisciplinary projects. The focus lies on the aims of research, the attitude towards normativity, epistemological premises regarding the knowledge generation processes, and objectives and forms of representation. The analysis leads to the question of how we can handle the differences in research and how we can make them fruitful for the involved stakeholders and the topic under discussion. A slightly nuanced conceptualization of integration arises that touches two levels: the explicit, with an exchange of perspectives and processes of negotiation, and the implicit, where unfamiliar stimuli and not seldom irritating impulses foster creativity and new insights more on an unconscious level. Integration then appears not so much as a methodical step but as a methodological premise realised throughout the project in dialectical processes, partly with a strong focus on differences and less on integrative aspects. In line with that: It might be not so much about spanning boundaries but simply about transgressing them.

www.mappingtheunseen.com

Advancing and contextualising arts-based participatory research methods to co-produce transdisciplinary knowledge for sustainable ocean governance

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This paper outlines the exercise of mapping an arts-based participatory research methodology within a transdisciplinary research team to co-produce knowledge for integrated ocean governance in Algoa Bay, South Africa. Exploring the challenges and opportunities of engaging different epistemologies and ontologies in transdisciplinary research teams, where indigenous and local knowledge holders are engaged co-researchers, this project investigates how contextualised conceptualisations of photovoice and digital storytelling can create pathways to co-create alternative and equitable futures. Arts-based research approaches, by offering the opportunity to represent, convey and open up the conversation for different ways of knowing, can promote social justice issues and challenge the inherent coloniality of research methodologies with (as opposed to on) marginalised communities. By activating the imagination and encouraging empathy, arts-based methodologies have been found to be helpful in exploring alternative futures necessary to respond to complex social-ecological systems challenges such as climate change. However, the privilege of certain epistemologies and deconstructing or overcoming these during knowledge production processes proves more challenging than expected. For example, ILKS might prove incompatible with current ABOM strategies such as spatial mapping. Highlighting the importance of social learning and reflexivity throughout the research mapping process, this paper provides a simple heuristic for iterative transdisciplinary arts-based participatory research. This can be summarised as i) defining the project objectives, ii) deciding on the specific ABPR approaches, iii) contextualising the methods through engagements and redefining the objectives, iv) planning the practicalities, v) in situ ABPR training workshops, field visits and storytelling, and vi) collaborative analysis workshops review of further work. Simultaneously, the paper argues that the research process needs to be redefined and reconceptualised together with the co-researchers throughout the lifetime of the project to move from knowledge integration to knowledge co-production. Arts-based participatory research methods, when employed in a contextualised transdisciplinary and collaborative setting, have the opportunity to bring together different ways of knowing and encourage creative thinking, which are both necessary to produce creative solutions for a better future.

Suratómica: a collaborative global network of artists and scientists for new knowledge-creation.

Natalia Rivera, Daniela Brill Estrada, Ulrike Kuchner

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The union of art and science is currently one of the bases for the creation of new knowledge related to alternative, more open and more equitable social structures. However, successfully connecting artists and scientists presents a significant challenge since these disciplines rarely share common methodologies or ways of communication, or so it seems. An added complication is the perceived difference between the Global South and Global North, related to the idea of a unidirectional source of knowledge. Often participants of projects that are "branded" art-science are left feeling dissatisfied, stemming from an imbalance of expectations and a misunderstanding of the other discipline's practices. Through new structures of transdisciplinary collaborations, we aim to encourage reflections on science, society and alternative forms of organization that lead to meaning-making and (knowledge-) creation.

In this contribution, we will describe our experience of successfully creating and participating in Suratómica (loosely translated as "atomic South"), a global network of organizations, groups and individuals that, through collaboration and openness of knowledge, propagates scientific and artistic thought. During Suratómica's first cycle, called "A Cerca Del Origen" (Near the Origin), a group of 8 Latin American artists traveled to CERN, the European Organization for Nuclear Research in Geneva. Initially the idea was to promote a two way conversation between creative ideas of Colombian artists and the knowledge produced at CERN, however we were astonished to experience that this journey broke the apparent dichotomies of the global North and South, artists and scientists. The diversity of the individual entities that formed into a wide-spanning network, each with their own intentions and unique histories, blurred the apparent divisions. During the past 2 years we have found that this success was fundamentally linked to the way Suratómica structures itself: a non-hierarchical, horizontal, and wide network of individuals/communities whose involvement is based on their ideas and interests rather than on their status within the art world or scientific constitution, seniority or origin of understanding. We saw that transdisciplinary diversity can erase socio-political borders when it is based on non institutional social relationships; importantly while acknowledging the dramatic impact political and social injustice can have on individuals.

Collaborations are made of relationships. Successful collaboration relies on personal communication and the willingness to learn from and engage with other participants. The Suratómica network demonstrates that many challenges that art - science collaborations face can be overcome by providing adequate time and a curated space for interventions and exploration, and by generating open-goal spaces for possibilities to emerge. Nevertheless, some challenges persist: those are challenges linked to language, time and funding.

We will discuss the impacts and effects Suratómica has on the participating artists and on scientists. The conclusion of this cycle was a successful bilingual online-festival, which was both closure and continuation, offering workshops and learning spaces, as well as a book publication in progress. The virtual environment allows the continuation of collaboration, and has made a unique learning practice possible: Suratómica is now regularly facilitating global online Creation Groups that are initiated and developed by members of the network. Suratomica's current cycle focuses on Bioart and nature, again connecting artists and scientists globally and virtually.

PC-4.1: Pre-crafted contributions - session 4.1

Time: Wednesday, 15/Sept/2021: 2:15pm - 3:00pm

Reclaiming research – dismanteling disciplines

Marco Kellhammer[1,2], Jan Freihardt[1,3]

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How might research contribute to gaining knowledge about societal impact mechanisms rather than claiming to know the future based on one-dimensional data?

Quantitative research tends to ask people about their preferences and behavior while they are sitting in front of their desks. Researchers might then be tempted to infer the respondents' way of making decisions from whether they chose option ‚a' or ‚b'. But do the respondents know explicitly why they behave the way they do? Do we spend enough effort and time on understanding how the way we do research influences scientific outcomes? Algorithms and simulations are often based on assumptions gained through quantitative research. Researchers try to transfer decision mechanisms from clinical research settings to real life. The current state of our planet and the lack of social innovations might make us curious to rethink research practices.

We need to negotiate alternative ways of breaking down grand social and ecological challenges into smaller questions of „How might we…?", trying to link these challenges to the everyday life of humans. We would like to record a discursive talk revolving around the question in how far we can trust companies and scientists who pretend to have the answer to big questions and to provide a bouquet of solutions. How might we foster a critical mindset and posture that claims for a "permanent beta" rather than making certain design tools broadly available or shouting out technological fixes? Wherein lies the potential of bringing design doing and transdisciplinarity together? Further, we will reflect on our experiences of trying to apply transdisciplinary concepts in our research, and on our struggles to do so in environments outside "the bubble" where both the awareness and the willingness to change existing research practices are low.

In his book „Draußen ist es anders", Jan Freihardt uncovers path dependencies inherent in our research system through surveys, interviews and a peer-review text writing process with researchers and students from German speaking countries. Marco Kellhammer is a design researcher at TU Munich and enthusiastic about transition design (Irwin 2015) and 4th order design (Buchanan 2001). The two of us met during a (presumably) transdisciplinary summer school in Singapore and were amused how a large part of the discussions during the school dealt with techno-fix solutions to tackle climate change, without even considering to integrate relevant stakeholders. Questioning everything that tries to predict the future with a good sense of humor is our motivation and shapes our critical attitude. In our contribution, we would like to discuss two perspectives on research practices and education from the fields of design and political science – in the spirit of design theorist Horst Rittel who stated in the 1970s: „Understanding what the problem is, is the problem".

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Methodological sensitivities for non-indigenous researchers adopting indigenous research methods for online data collection

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Indigenous land management has been marginalised by colonisation, dispossession of lands, and underinvestment and denigration of indigenous knowledge systems. In an attempt to redress these injustices, non-indigenous researchers have begun partnering with indigenous communities to co-produce knowledge which enables indigenous landowners to adopt more sustainable land use practices. However, co-producing knowledge is challenging for both indigenous landowners and non-indigenous researchers and presents many risks to both.

In this presentation, we will discuss a project on sustainable land management in Aotearoa New Zealand that used similar approaches to qualitative data collection which were developed in different knowledge systems. One approach was hosting online hui (meeting) informed by Māori tikanga (protocols). The other approach was hosting online focus groups which were guided by Forrestal et al.'s (2015) best practice guidelines. The presentation details how non-indigenous researchers engaged with the knowledge and practices of hui and the risks and benefits for Māori communities in participating in this research. We use the conceptual framework of He Waka Taurua, which was developed to enable integration of indigenous Māori and New Zealand societal values into marine co-management decision making, to explore how these data collection methods can act as points of connection across different knowledge systems, enabling co-production (Maxwell et al. 2020).

Our results highlight how indigenous participants found the use of karakia (ritual chant) to open and close the hui, as well as the introduction of non-indigenous researchers through mihi (acknowledgments), genuine and respectful. The success of these experiments highlight how future co-production of knowledge might occur in Aotearoa New Zealand, however to ensure this partnership does not erode, continued commitment needs to be made to partner with Māori in the design and implementation of land use policies informed by this research. We also explore the potential future use of He Waka Taurua, a metaphor used in marine co-management, to help co-design initiatives to improve sustainable land management. Our presentation concludes with some general lessons derived from the project for global researchers attempting to co-produce knowledge with indigenous communities.

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What counts for transferability of knowledge across cases in transdisciplinary research?

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In transdisciplinary research, researchers work with actors from civil society, the public, and the private sectors. Together they investigate a socially relevant problem in a concrete case. On the one hand, it is important to learn from each of these cases in their unique context. On the other hand, however, it is unclear under what conditions the knowledge gained from a specific case on a given problem can be transferred to another case. In this study, we investigate how researchers and stakeholders think about this transferability of knowledge.

First, we asked if considerations for knowledge transfer are present, and if so, which specific findings or research outcomes are considered transferable by researchers and stakeholders involved in the project. To empirically examine what knowledge is considered transferrable to other cases, 30 respondents from academia and practice in 12 Swiss-based transdisciplinary research (TDR) projects were interviewed. the transferable knowledge we found can be classified into seven classes: 1) transdisciplinary principles, 2) transdisciplinary approaches, 3) systematic procedures, 4) product formats, 5) experiential know-how, 6) framings, and 7) insights, data and information. Second, the same respondents were asked to reflect on key considerations for why, or on which basis, would certain knowledge be deemed transferable. Responses generally clustered around three key categories: 1) Pre-conditions: reflecting on expected outcomes and outputs, a certain set of conditions need to be met to justify a potential for transferability; 2) Arguments by analogy: to what extent are cases comparable on similar or relevant aspects, with sufficient similarities to justify a hypothesis that it *could work* in the new context; and 3) Procedural aspects: whereby a process for application accounts for the necessary conditions that need to be met at the target case for an application to bring the expected results or outcomes to fruition. In this last category, a key question to reflect upon is how to lead and organise a meaningful process for transfer as an outcome of co-production.

Overall, we find that deliberations on TDR have predominantly focused on transdisciplinary principles and approaches. However, for knowledge co-production in TDR beyond an unmanageable field of case studies, more efforts in developing and critically discussing transferable knowledge of the other classes are needed, foremost systematic procedures, product formats, and framings. This is not only an imperative to supporting the value and quality of TDR in and of itself but also to help structure and enhance the scaling potential of solutions that necessarily seek to address problems of societal relevance in context.

Toolkitting on the Intersection of Creative Humanities and Scholarship of Interdisciplinary Teaching and Learning

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Toolkitting is popular and particularly so in relation to the 21st century skills of creative thinking and collaboration. Academics use toolkits in order to structure and enhance multi- and interdisciplinary research collaboration either amongst academics or between academics, professional experts, and the wider public. Such collaboration often has the goal of finding unconventional solutions to complex ongoing problems, a goal that only comes within reach when there is common ground amongst the participants. This contribution discusses two projects that build toolkits for exploratory and integrative group work: Creative Urban Methods (CRUM), a project of a group of scholars from the Humanities, Anthropology, and Social Geography at Utrecht University; and the Glossary Project, set up by Creative Humanities Academy (CHA) of the same university. The two projects are unique in that they are situated on the intersection of "Creative Humanities" and the Scholarship of Interdisciplinary Teaching and Learning (SoITL). Creative Humanities is an approach that sees Humanities thinking as a form of making (so it does not just research artists' making). SoITL, focused as it is on thinking and doing, provides situated and hands-on research methods, as well as pedagogies and didactics for "common grounding." In this contribution, toolkits will be discussed that have been tested on the intersection between academia and the field of arts and culture. Toolkits have the capacity of both fostering creativity and attracting creative minds. How do Humanities scholars and Arts and Culture professionals feed into, and feed, this process? What is specific about integrating the arts as both a practice and a field for reflection in the context of existing toolkits? Today, Arts and Culture professionals, as well as citizens in general deal with an abundance of unstructured or even contradictory knowledge, information, and exchange in our "algorithmic condition" (Colman et al. 2018). The toolkits of CRUM and CHA are helpful in that they pre-determine ways of working through the sheer abundance of concepts, neologisms, and data. Ultimately, they lead users to making an informed selection of relevant theoretical, textual, and/or visual material for a particular context or project. Concrete examples are, first, the "Concept Randomizer" of CHA that helps participants work with a random selection of concepts from *Critical Concepts for the Creative Humanities* (Van der Tuin and Verhoeff Forthcoming/2021) for which a common ground as well as a demonstration of use (a "mobilization", as we call it) must be developed. Second, examples are a set of workshops connected to several types of creative methods (performative methods, mapping methods, and making methods) that share a perspective toward spatiotemporal and relational structures of urban environments, dynamics of change, and forms of mobility, and have a phenomenological emphasis on embodied experiences of the (academic/expert/citizen) researcher or participant. These workshops pertain to walking-thinking workshops and neighborhood explorations of, for instance, data infrastructures. The contribution will focus on toolkitting per se as a form of procedural thinking, making, and doing; on the necessity to be specific about the role of the Humanities in the burgeoning toolkitting landscape (think of TD-net's and ShapeID's meta-toolkits); and on the toolkits that both CRUM and CHA have experimented with and with what results.

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Towards an inter and transdisciplinary agenda to study sustainable territorial transitions

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The study of transitions is inherently interdisciplinary. Moreover, there is a need to advance towards a more integrated framework to portray how multiple co-occurring changes may interact, superimpose or influence one another, and how these changes manifest in different environmental and societal contexts, affecting societal actors differently.

To answer this challenge, this contribution aims to set the conceptual basis for an integrated, inter- and transdisciplinary analytical framework to investigate sustainable territorial transition processes.

In particular, it will discuss:

a) the potential for the concept of sustainable territorial transitions to foster a fruitful collaboration among several disciplinary and analytical approaches, including those related to resilience, polycentric governance, territorial metabolism, nature-based solutions, socio-technical transition management, among others

b) possible strategies to build socially robust, collectively validated, and transferrable research on sustainable territorial transitions, particularly stressing the opportunities and challenges associated to the participatory modelling and projection of territorial transitions

c) a preliminary design for an inter and transdisciplinary research initiative in Chile to exemplify these reflections. Chile is a natural laboratory for the study of sustainable territorial transitions, considering its high territorial heterogeneity, the accelerated changes it has been enduring in the last decades, the unique transformative scenario brought forward by the current constitutional process.

Context compass – a navigation tool for reflecting on context factors and their influence on TD processes

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Motivation and purpose

Transdisciplinary research is characterized by iterative processes and the aim of knowledge integration. Which and how knowledge is integrated is highly context-dependent, and requires researchers and practitioners to go beyond the horizon of

their own knowledge. On such a journey, researchers often have to navigate "unknown waters" and need to adapt to changing circumstances. This requires a broad understanding of the environment in which such a journey takes place.

Especially when navigating "unknown waters", tools can help guide us, like a compass. Our contribution consists of developing a navigation tool that can be used to reflect on and gain perspective and awareness of different context factors and how they shape our research. This knowledge helps us to identify risks and actively seize opportunities, as well as establish an open culture of failure.

Conceptual approach & methods used

The tool translates the heuristic concept of *Hotspots of transdisciplinary cooperation*, outlined by Defila et al (Defila et al. 2016). Hotspots are "(…) constellations, they designate different possible (parts of) initial situations of projects. They therefore do not designate that something is good or bad (...). Rather, they designate things that have the status of facts (…)" (Defila et al. 2016, 74)

The constellation(s) or the context of a TD process, similar to weather conditions and currents, are not necessarily good or bad and cannot be directly or easily influenced by the researchers. However, being aware of them enables researchers to identify how they may influence their research process and the integration of knowledge. The tool helps researchers create this awareness by inviting them to self-reflect on the constellation(s) of their TD process through a set of guided questions. It can also help create mutual understanding and avoid potential pitfalls in the transdisciplinary collaboration.

Results and Conclusions

We tested the method as a tool for researchers to reflect on the challenges of their own project, as well as a tool for a comparison across cases, working through defining questions for each of the 8 hotspots. It has proven to be a support for researchers with little experience in inter- and transdisciplinary research, looking for an orientation and finding their role in this thrilling field of research, which can be overwhelmingly broad and complex.

The tool successfully enabled us to better understand the context in which we were operating as transdisciplinary researchers. We created a deeper understanding of the system of different actors, which helped us to navigate through the TD process (e.g. workshop design/participants, integration of new actors, etc.).

We could imagine developing the tool even further and explore possibilities to use it in a participatory manner, where practitioners and researchers reflect jointly on their initial situation at the beginning of a TD process.

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PC-4.2: Pre-crafted contributions - session 4.2

Time: Wednesday, 15/Sept/2021: 2:15pm - 3:00pm

Where science meets the user. Living lab method to support the co-development of the new urban climate model PALM-4U.

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Cities and urban areas are sensitive to climate change and its effects, such as heat waves, droughts, heavy rainfall or air pollution. Due to high population density and concentration of other resources combined with modified atmospheric processes, cities in particular must be adapted to the consequences of global climate change. High-performance urban climate models with various applications can form the basis for prospective planning decisions, however, as of today no such model exists that can be easily applied by non-experts outside of the scientific community.

In the second phase of the research program "Urban Climate Under Change" [UC]², funded by the German Federal Ministry of Education and Research, the new urban climate model PALM-4U (Parallelized Large-Eddy Simulation Model for Urban Applications) is being further developed into a practice-oriented and user-friendly product that meets the needs of municipalities and other practice users. The project ProPolis, one of the three joint research modules in [UC]², aims at the operationalization of PALM-4U in planning practice.

Our contribution focuses on the ProPolis central targets: the development of a continuation strategy, ensuring the practicability of PALM-4U and capacity building. With the development of an easy-to-use and intuitive graphical user interface (GUI), comprehensive manuals, support services and trainings we aim to enable practitioners to apply the model independently for their real-case planning measures. In order to fulfill these targets, we follow the principles of a living lab approach to implement an intensive transdisciplinary collaboration with our practice partners from German municipalities and private business. Such distinctive feature of living labs as systemic involvement of users in all development phases within a realistic application setting has proved to be effective in digital innovation.

Correspondingly, our work is conceived as an iterative process divided into exploration, experimentation and evaluation phase. Practice partners play a key role in each step, from the definition of PALM-4U application fields and test cases (exploration) to the testing (experimentation) and assessment of the model practicability (evaluation) together with the respective capacity building services. For this purpose, we provide moderated "Experimentation Rooms" (called Ex-Labs in the project) in form of both centralized and individual workshops. The Ex-Labs offer a central place to present the concepts, gather requirements, discuss the results and facilitate the mutual learning among practice partners and GUI developers. Additionally, we established a Community of Practice forum as a transdisciplinary place for user advice and exchange of experience. It can be considered as a complementary activity to the Ex-Labs and other support services for PALM-4U users.

This poster contribution illustrates the interim conclusions of the exploration phase including the impact of transdisciplinary processes on both the model and GUI co-development. We reveal the essential success factors for the effective service co-development in real usage situations, for example clear agreements and communication on the model development process along with foreseen application benefits in various application settings. Furthermore, financial and organizational continuity of the developed services after the end of the project are among the focal points for the permanent operationalization of PALM-4U.

The ENSO Paradigm: The need for an adaptive, climate-centered policy planning framework

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The Philippines remains one of the most at-risk nations in the world from worsening climatic factors. In particular, the El Niño–Southern Oscillation (ENSO) cycle has far-reaching implications across several sectors and ecosystems that are increasing in severity due to climate change, necessitating a paradigm shift across all aspects of governance. Despite this, temporally, policy planning has remained unchanged, utilizing arbitrary time periods. An examination of previous policies reveals an emphasis on target- and time-based outputs, and a general lack of adaptive approaches necessary towards program sustainability. Acknowledging the cross-sectoral impacts of climate change and the ENSO cycle in particular, we argue for the need for a co-production among different sectors and disciplines of a policy planning framework. Our framework takes from the initial structure of Laverick & Labonte (2000), integrating the temporal aspect of ENSO to inform the planning process through socio-ecological indicators. The framework is structured to foster an iterative and integrative approach characteristic of adaptive management. Consequently, it would take into account climatic cycles which affect typical calendrical weather patterns as a sustainable and adaptive approach towards achieving climate resilience. Such a planning framework would benefit from an ontological cross-pollination from different disciplines such as the agricultural, social science, and public health sectors, as well as local native communities who are traditional knowledge and culture bearers of a given geographical area. It favors adaptive management in place of monolithic planning and management regimes by taking ecological considerations and transdisciplinary perspectives into account. This would benefit policy-makers and their stakeholders by efficiently utilizing limited time and resources while enriching opportunities for linkages across fields and communities. From a practical perspective, application of the framework does not necessitate a significant ontological leap. Rather, our framework is designed to be easily applied to existing and prospective public policy.

Non-certified experts or Jane and Joe Public: Stakeholders within a thematically open transdisciplinary research approach

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In *Transdisciplinary Research* (TDR) processes, stakeholders who are involved in addition to scientists are understood as non-certified experts. The decisive criterion is their practical and local expertise, which complements the scientific expertise and aims to enhance the cooperative production of applicable new knowledge and knowledge exchange. Up to now, criteria such as the social role or decision making of stakeholders are not much relevant within TDR (Defilia and Di Giulio 2018). In addition to the TDR approach, *Citizen Science* (CS) follows an "opportunity-based approach" which allows all citizens, also called laypersons or volunteers, to contribute to the research in a requested way (Pettibone et al. 2018). Within TDR and CS approaches, research topics and questions, are normally set by scientists before stakeholders are additionally involved.

But which criteria are relevant for the (pre-)selection of stakeholders, if a TDR process starts before the main research topic is set and no specific practice expertise of stakeholders can yet be identified? Within the Berlin University Alliance (BUA), an excellence association of the four biggest research institutions in Berlin - the Technische Universität, the Freie Universität, the Humboldt-Universität and the Charité Universitätsmedizin - we are currently developing a new format called *Berlin Citizen Forums* (BCF) to foster knowledge exchange between stakeholders and research institutions.

Within this format, we start with the involvement of stakeholders before the research topic and question are set. The aim is therefore not only to develop practice-relevant research questions for the future. Rather, the BCF are about to identify new research topics through an open and cooperative process using a transdisciplinary research mode. Thus, the main challenge for the BCF regarding the stakeholder involvement, is to remain thematically open at the beginning of the process, and to generate a practicable approach with group sizes and purposeful discussions for all participants to reach an effective outcome.

Learning from both, TDR and CS, we would like to discuss questions of (pre-) selection, motivations of possible stakeholders, and criteria for stakeholder involvement, e. g. diversity in expertise and types of knowledge, interests, accessibility and capability. In the discussion, we also want to reflect other influencing factors, such as requirements of scientific processes, pre-definitions of planned formats and practices, the culture of research institutions and our role as managers, mediators, organisers and scientists within the process. With the BCF-approach, we want to expand the transdisciplinary research mode by considering not only not-certified experts, but also Jane and Joe Public with their specific questions, expertise and interests, as important stakeholders for participation within TDR projects and processes.

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Transdisciplinary Boundary Smashing

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Transdisciplinary research (TDR) presents opportunity to address society's wicked problems. Theoretically, transdisciplinarity assumes we can discover connections and new knowledge by transcending disciplinary boundaries. However, differences between stakeholder's identities and institutional logics, among others, have proven to be a significant barrier to TDR. Achieving a state of transdisciplinarity is not guaranteed and getting stuck is common, often resulting in mediocre inter-disciplinary agreement.

Using a research case study focused on transferring tactile sensation via the web between humans and machines, the authors offer a new framework for boundary smashing as an approach for unsticking TDR. This framework attempts to bridge two transdisciplinary schools of thought: Basarab Nicolescu's deep theoretical approach based in hermeneutics and drawing from concepts in theoretical physics with the Zurich Conference's applied approach that strives for robust knowledge and innovative TDR processes. By linking theory to practice, the proposed framework provides an educational and reflective tool that can help TDR teams understand together *why* they might be stuck while providing concepts for *how* they might get un-stuck. The framework was developed as the result of observations and experiences with the Human Fusions Initiative, a collaboration of multiple universities and across various disciplines to develop neuro-reality. It connects metaphors, language, sensemaking, anticipatory learning, liminality, and transdisciplinarity and it depicts an iterative, dynamic process of discovering, valuing, and transcending disciplinary boundaries to create new knowledge.

We argue from the perspective that boundary spanning is an action which implies that boundaries are maintained, whereas boundary smashing invites teams to exist temporarily in a liminal state without traditional structures. It shifts focus from the individual boundary spanner to the process of collaborative action based upon emergent, shared language and anticipatory images. From researchers' original boundary-preserving, disciplinary states, this boundary smashing calls the group to simultaneously move from retrospective to anticipatory learning, from monologues and dialectic discourse to analogic dialogues, from re-arranging the known to exploration of the unknown, from proving to inquiring, and from less to more sensemaking through the use of models (e.g., mathematical models) and metaphors as boundary objects for representing new relationships between concepts across disciplines.

Several threads in the framework help define and differentiate how teams engage in boundary preserving, boundary sharing, boundary spanning, and boundary smashing, which are situated in separate quadrants along axes of retrospective to anticipatory learning and less sensemaking to more sensemaking. These threads are metaphors themselves, helping us "see as" and understand how we can accomplish boundary smashing in familiar ways. Included in these threads are elements related to transdisciplinarity, Hannah Arendt's "going visiting," Ludwig Wittgenstein's private language and language game, and Donald Schön's generative metaphor.

With this framework, we argue that generative metaphors are useful in boundary smashing and knowledge integration by helping diverse transdisciplinary groups access temporary states of liminality, a concept like Basarab Nicolescu's Hidden Third. Generative metaphors foster new perceptions and facilitate frame restructuring and in doing so, allow groups to create their own social realities. When groups encounter a generative metaphor, they understand that within the conflict and context, there is a productive way they can transcend the paradigms which are limiting breakthrough innovations. As a result, groups can move from boundary preserving to boundary smashing; this ascent is one from a state of competition to communitas, an egalitarian state in which human relatedness is stripped of its typical inequalities and hegemonies.

Are inter- and transdisciplinary research projects self-transformative devices? Values of Nature and Nature's Contributions to People in ValPar.CH

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The operationalization of inter-/transdisciplinarity (Id-Td) and its capacity to generate transformative change have been suggested to require a self-transformation of researchers and stakeholders (Otero et al., 2020). Self-transformation refers to the acquisition of embodied knowledge, aptitudes and values in collective processes that address the underlying drivers of unsustainability. In Id-Td research on Nature and Nature's Contributions to People (NCP), the question of values (instrumental, intrinsic and relational, Arias-Arevalo et al. 2017) is especially relevant. The need for scientists to become more reflexive about their values and normative positions has been recently highlighted in a call for pluralistic perspectives on nature (Pascual et al., 2021). In theory, Id-Td research projects on NCP could be the framework within which researchers and stakeholders transform themselves by questioning their own mindsets while learning from colleagues. However, we lack evidence on whether and how self-transformation processes can occur in concrete projects, as well as how to trigger them through project management.

We address this gap by investigating the project "Values of the ecological infrastructure in Swiss parks (ValPar.CH)". ValPar.CH is commissioned by the Swiss Federal Office for the Environment to an interdisciplinary research partnership composed of several Swiss universities, and belongs to the Action Plan of the Swiss Biodiversity Strategy. The project examines the benefits and added values of the Ecological Infrastructure (EI) in parks of national importance until 2024. The EI is considered the basis to ensure NCP. By means of semi-structured interviews, surveys and participant observation, we explore the experience of ValPar.CH researchers and stakeholders in terms of Id-Td interactions and their values and perceptions on nature, NCP and EI. We use a model of Id-Td that focuses on the dynamic interactions between the 6 basic components: research object, research subject, institutional context, methodology, paradigm, and serendipity (Otero et al., 2020). Transformation processes are studied under the lens of the three spheres of transformation, i.e. personal, political, and practical, focusing on the personal one, which relates to beliefs, values and worldviews (O'Brien and Sygna, 2013).

The poster will present the main aspects of this research and some preliminary results. In so doing it will address one of the central themes of the conference, namely how can we increase the integrative potential of Id-Td while keeping the necessary pluralism and contributing to an alternative future.

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PC-4.3: Pre-crafted contributions - session 4.3

Time: Wednesday, 15/Sept/2021: 2:15pm - 3:00pm

Knowledge Exchange between Quadruple Helix Stakeholders on Sustainability: How Can Transdisciplinary Knowledge Networks Facilitate Sustainable Knowledge Exchange and Contribute to Complex Societal Issues?

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Today's complex urban and societal challenges require more diverse types of knowledge and actors to be addressed since they are set within complex interactions and a constantly changing environment. They require knowledge produced in the context of application, by communication, and negotiation between heterogeneous stakeholders in a transdisciplinary (TD) setting. HEI's are increasingly seen as a pivotal partner in addressing complex societal challenges and are driven to alight from their ivory towers and collaborate across sectors, between disciplines and - most of all - with societal partners. Likewise, students need to be prepared for their professional life with 21st century competencies to be able to tackle today's challenges.

One of multiple ways to put this into action is bridging the gap between both theory and practice and on-campus and off-campus learning. In this article we present a case study of a knowledge network where approximately thirty diverse quadruple helix stakeholders in a specific local geographical area are interacting to exchange knowledge, learn from each other and address their challenges in the local sustainability transition. The network consists of citizen groups, associations, NGOs, welfare organizations, social entrepreneurs, municipality officials, academics, and students. The purpose of this case study is both to operationalize a local knowledge infrastructure to foster urban sustainable development and to provide the city as a learning environment for students by providing questions for coursework for interdisciplinary student teams from local HEIs, referred to as Community Service Learning activities.

Through a participatory action approach, also 'reflexive monitoring in action' (RMA) is employed to evaluate the effects of the TD process and practice for all stakeholders. Effects may manifest themselves in various values, respectively the content value, affective value, strategic value, network value, and instrumental value (the translation from content value to concrete actions). Within four iterative phases: planning, action, observation (analysis) and reflection (evaluation, revisiting), mutual learning is stimulated and reflexivity is enhanced through monitoring of and reflection on the TD process, goals, strategies, actions and contexts.

Data is gathered through field notes, semi-structured interviews, and focus groups. Network activities are iteratively steered and adjusted based on the emerging content during interactions and reflections on the process.

Interim results show both added value of the operationalization of the network as challenges in its development and anchoring. The process thus far shows content, network, and affective value. The network activities contribute to increased knowledge on dealing with challenges. Additionally, the activities have network value for those involved by getting to know other relevant actors and making relevant links for collaboration to increase impact. Also, making these links and learning from each other's practice generates a sense of cohesion. However much potential for instrumental and strategic value is experienced as underexploited, which gives rise to questions of governance and ownership, aim of the network, balancing power balances between the various societal stakeholders, students, and researchers, the value of knowledge developed, and its dissemination and impact.

By concretizing a knowledge infrastructure in co-creation with all partners, mapping needs, evaluating the process, and identifying enabling and constraining factors, we aim to contribute to understanding and improving the impact and working mechanisms of a TD process. Additionally we aim to advance integration of the variety of stakeholder roles, expertise and values.

A transdisciplinary arena in policy design – from on-the-ground practice to a Covid-19 induce pause

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Transidisciplinary (TD) tool boxes can improve dialogue between participants. Yet, to the best of our knowledge, very little is discuss regarding the time needed to create common grounds, understanding and a TD mindsets. We are very concern with this and are testing an approach that implies frequent and long term dialogue between TD participants. During four years we facilitated a dialogue platform between academic and non-academics regarding the sustainability a high nature value farmland culturally rooted in the Alentejo region in Portugal (the Montado). A total of 22 face-to-face meetings involving 153 different actors were developed. Each section was design considering guiding questions, small group discussions, plenary discussions and a few other techniques that improve mutual understanding (e.g. conceptual modelling, visioning).

This dialogue platform designated Tertúlias do Montado still exists; however from this platform we have created a smaller one titled as: TD arena for the design of future policy interventions for the Montado. This TD arena started in 2018 and includes around 20 participants: researchers from several disciplines, land managers, land owners and public administration. The start of this TD arena was smooth because of the capital created during Tertúlias do Montado. Hence, all participants knew how we needed to work in order to "get the job done".

The aim of the present work is to:

- provide an overview of how the TD arena functions;

- present the lessons learned from this TD arena while face to face activities were possible (before Covid-19) and during the several lockdowns (after Covid-19).

Until the start of the pandemic situation, the group would meet regularly. Each meeting was facilitated by a skilled facilitators. The roles of each participant were well defined and smaller working groups created to arrive at specific objectives. A key moment for the group was a 3-day trip to Ireland to discuss the transferability of the Burren Program to the Montado case. A total of 23 meetings and 18 field work visits occurred so far.

During the pandemic situation, the TD arena continued to work by one to one meetings, virtual gatherings, and field work. The lack of collective meetings meant more time to think and question each other. Of course that questioning is part of the everyday activity of researchers; yet, during 2020 instead of trying to find a way to maintain the interaction between all members of the TD arena we allocated time to "sit back", describe and discuss the results achieved so far.

Questioning can be considered one of the building blocks of all the work developed, trust and leadership were also key in moving forward while facilitation skills contributed to unblock obstacles and arrive at a clear pathway towards progression.

In the current pandemic context, we strength the understanding between researchers of different disciplinary backgrounds as we had more time to focus on our collaborative work. A major drawback was the weakening of the working relationships with non-academics, established before the first lockdown in Portugal. As all of us are still adapting to this new way of living where uncertainty is certain and plans change at a fast rate: how this will impact the sustainability of the Montado is still an unanswered question.

"Sometimes we see water that is green or yellow and we find the fish dead": The potential and limits of community monitoring to drive social accountability for mining-related water pollution in Zimbabwe

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Despite its economic relevance for many developing countries, the mineral sector is associated with environmental externalities and negative implications on human and ecosystem health. Regulators often struggle to enforce environmental standards due to financial, technical or personal capacity constraints or political capture. To compensate for the shortcomings of formal accountability mechanisms, civil society organizations and development agencies have promoted the concept of social accountability (SAcc). In SAcc initiatives, citizens directly hold duty bearers to account for their performance. We test a citizen-science approach to strengthen the evidence base in SAcc for contested environmental incidences and analyze the case of water pollution in Hwange, a coal mining area in Zimbabwe. Here, mining and combustion of coal are negatively impacting the water quality of the local Deka River that experiences several fish kills per year. Since the river is a life vein to the rural communities in this arid climate, community members and local NGOs had initiated a mediation process with government and the mining industry to address pollution issues and get safe access to drinking water. In 2018, this mediation process came to an impasse because no industrial stakeholder would take responsibility for the river pollution. In this context we initiated a citizen science project to identify sources and the extent of the pollution. Over 1,5 years, a dozen community members measured pH in-situ, noted down field observations and took hundreds of water samples that were subsequently analyzed in Switzerland. During that period, scientists and community monitors met on numerous occasions and talked about sampling experiences, challenges and project expectations, co-decided on when and where to sample, and discussed the results of the chemical analyses. This tight feedback loop allowed to improve the data quality, keep the motivation high and deepen the trust relationship.

Community monitors and scientists jointly presented the monitoring results in the multi-stakeholder forum and pointed out the contribution of each industrial stakeholder to the river pollution. In semi-structured and conversational interviews with close to 60 stakeholders from local to national level, we have traced the pathway of the newly generated scientific evidence through formal and informal "chains of information". Using political ecology theory, we analyzed the impact of the citizen science project on the ongoing social accountability process. We found that the community monitoring was very effective in empowering the community members towards local powerholders and allowed them to underpin their grievances with scientific knowledge. A direct outcome was the partial addressing of the most pressing requests such as the drilling of some drinking water wells. However, these limited improvements only resulted from local arrangements. In Zimbabwe, the politico-military elite and a patronage network control natural resource extraction from the capital. In such a context, local bottom-up initiatives need strong allies to apply pressure from above to be fully effective. Our interviews revealed that the Hwange coal miners had multinational enterprises (MNEs) as clients and that they perceived those MNEs as benchmarking authorities for environmental standards. Thus, MNEs could become powerful allies to support local citizen science interventions and achieve goals of social accountability if they would fully implement their own supply chain due diligence guidelines.

Striving for efficiency

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Striving for efficiency

Personal development in project communication

We all want to communicate efficiently and achieve maximum impact with our transdisciplinary projects.Unfortunately, we rarely define what exactly is meant by "efficiency" and often focus on communicating the results of the project. However, the elementary part of communication takes place from the first day of the project - internally. This contribution aims to show how strategic internal communication can contribute to the personal development of project members as essential part of efficiency in communication.

Long before project results can be communicated, projects require a concept of strategically planned project communication - where internal communication is the basis for successful dissemination. In the context of internal communication, the various project members take on important communicative tasks of which they are often not aware at the beginning. For example, they use different languages without being aware of the ethical consequences (Pelikan et al. 2020). Project members must learn to communicate as transdisciplinarians (Guimaràes et al. 2019) and to reflect on this. If internal project communication is successful - and in our contribution we only describe this as efficient if it is also fair and ethically correct - then external communication (including dissemination) can be developed from this. Up to the dissemination stage, all project members take on important communicative tasks into which they must grow. Within a communication concept, we will present 5 levels of external communication in transdisciplinary projects - at each level the project members are asked to communicate and develop themselves further.

Transdisciplinary collaboration influences participants' ways of thinking (Tobias et al. 2019) - this must be reflected in project communication. The difficulty here is to transfer this change in thinking to communication, to plan it strategically and to implement it. Here we would like to present concrete proposals and discuss how to implement them in practice. Our contribution in form of a video benefits from linguistic research, which ultimately also leads to different models for defining efficiency and discuss how to implement them in practice.

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Transdisciplinary design of water management concepts in the Andean highlands, Peru

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Accessing safe drinking water and sanitation is still a challenge in many regions. The approaches to reach SDG 6 "Clean water and sanitation for all" need to go beyond technical solutions and must unite different disciplines, perspectives and forms of knowledge. We would like to provide an example of designing drinking water supply and waste water management concepts that are adapted to local contexts and requirements of rural Andean communities, in the Lurín river catchment in the region of Lima, Peru (www.trust-grow.de). Not only experts' scientific knowledge played an important role in designing socio-technical concepts but also the experiences, empirical knowledge and priorities of local actors, particularly communal organizations and local government. Therefore, actively involving local stakeholders throughout the entire process was vital.

During the course of the project, several participatory formats were applied to integrate the local perspectives of Peruvian stakeholders in designing socio-technical concepts. Various methods (e.g., interviews, transect walk, actor mapping, focus groups) were used to gain a comprehensive picture of the local water sector and generate a common understanding of the situation and its problems. The hydrological, technical, social and economic backgrounds were key for designing the concepts and the socio-technical solutions were tailored to them.

Among the activities to include the multiple local perspectives were participatory assessment workshops with Peruvian experts and future users to discuss and evaluate the concepts. Here, evaluation criteria were developed jointly, providing further insight into local priorities and needs. Results and feedback from the workshops were incorporated in the subsequent design of the socio-technical concepts and their technical measures. Finally, the concepts were implemented to serve as a pilot and training plant jointly with the support of Peruvian NGOs. Local actors were actively involved in choosing the site, in the construction process and the operation of the pilot plant. This way, future users were able to familiarize themselves with the functioning of the plant already during construction. Equally important however, the experiences, obstacles and problems encountered during the installation and use of the plant provided valuable insights and feedback regarding the concept design and its practicability. The pilot plant also allows learning processes to prepare for managing and planning plants at larger scales. Additional NGO-led activities to support communal water providers and raise awareness for the importance of water proved very helpful.

Our experiences illustrate that it is important to adapt approaches and technologies to local social and cultural structures. Pursuing transdisciplinary approaches in the development of new water management concepts and involving various experts and stakeholders during the different phases of concept design and implementation is not only necessary but also beneficial. Access to knowledge is particularly important and valuable in sectors with weak or fragmented governance, frequent staff turnover, or little formal documentation. Frequent and continuous participation in developing water management concepts ensures that not only the technical requirements are met but that the social and cultural realities within which the concepts are embedded are properly taken into account.

Trans-disciplinarity and on-the-ground translation: co-creation with communities in Brazil and Colombia

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Based on the experience of an ongoing project which seeks to expand the understanding of risks, vulnerabilities and potentialities associated with hazards in Latin America, this pre-crafted contribution explores the critical factors for success as

well as the challenges to equitable trans-disciplinarity. Co-creation and dialogical engagement among the multi-disciplinary research team from the UK, Brazil and Colombia, the marginalised communities living in self-constructed neighbourhoods and the governmental agencies has already led to initial methodological and procedural reflections. With the project explicitly focusing on equity, various procedural questions were and continue to be addressed, and the pandemic presented both challenges and opportunities for equity and on-the-ground impact. Work with two marginalised communities enables a comparative approach and allows us to present preliminary insights for transdisciplinarity for discussion. The core theme of the project which appears to emerge is "translation". In our pre-recorded presentation which includes two short video clips produced by the community-embedded researchers we will illustrate the different types of translation and local interpretations, the emerging dialogues as well as dissonances which reflect the linguistic, socio-spatial, and disciplinary plurality. Conceptually, the project has adopted a dialogical approach inspired by Paulo Freire's critical pedagogy (1970) to allow for experimentation and for the communities to take ownership of the co-creative research process. This dialogical approach and the decentralisation of project management to the local co-investigators has allowed the project to adapt to the community challenges and make visible their interpretations of concepts such as "resilience", "risk" and "vulnerability". These are brought into dialogue with the existing definitions and mediated through tools for engagement and co-creation such as participatory online mapping. An immediate result are community-driven processes of risk reduction related to the social needs due to the pandemic – particularly in Rio de Janeiro, and to a recent landslide in Medellín, bringing the different interpretations to light. Challenges, however, continue to exist. In the context of the pandemic and the inability to hold on-site workshops, these primarily relate to the digital divide, with the most vulnerable often not being able to participate, and project monitoring and impact evaluation, the latter of which in turn requires further work to develop a shared conceptual language for measurement. We conclude with thoughts for further discussion during the conference and invite comments based on similar experiences.

Increasing the relevance of science for practice and practice for science: Quantitative empirical insights

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We present results of a survey conducted with researchers and practitioners involved in a Swiss National Research Programme on steering energy consumption. We analyse what motivates practitioners and researchers to engage in a collaborative research project, their perception of the collaboration intensity (here defined as the frequency of contact) in different project phases, and the extent to which the research project provided useful results for practitioners. Our analyses demonstrate that the intensity of collaboration is a key driver of successful collaboration as it fosters trust between researchers and practitioners. Thereby, it increases the usefulness of the research project for practitioners and their perceived contribution to the success of the research project. Research programmes should thus (1) foster trust through incentivising collaboration between research and practice; (2) facilitate the development of a shared understanding of researchers' and practitioners' respective roles; and (3) support the inclusion of practitioners in the project development phase through financial support during the proposal-writing phase.

PC-4.4: Pre-crafted contributions - session 4.4

Time: Wednesday, 15/Sept/2021: 2:15pm - 3:00pm

Fostering Knowledge Integration through Individual Competencies

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One central goal of inter- and transdisciplinary (ITD) research is the education of Inter- and Transdisciplinarians. In our recent study, we focused on a central challenge of ITD processes and raised the question: Which individual competencies facilitate the process of Knowledge Integration and therefore contribute to successful ITD work?

Knowledge integration is the process of combining knowledge from different scientific disciplines as well as real-world expertise in order to extend knowledge about an existing problem or to generate new knowledge.

Previous work address the question of the individual characteristics of ITD experts. Guimarães and colleagues (2019) present a review of motivation, attitudes, and competencies of ITD researchers and were able to confirm many of the postulated characteristics based on empirical results. Furthermore Brandstädter and colleagues (2018) found that interdisciplinary competencies are positively related to individual experience in interdisciplinary collaboration as well as the perceived interdisciplinarity of one' s own projects. Claus and Wiese (2019) additionally showed a positive relationship between interdisciplinary competencies and interest in interdisciplinary work.

Based on these results, our goal was to expand the existing body of knowledge on competence research in the ITD context. In particular, we focused on the question which competencies have a positive impact on knowledge integration.

Perspective Taking, Reflexivity, Analogical Reasoning and Tolerance of Ambiguity and Uncertainty, were investigated as core competencies to foster Knowledge Integration.

Furthermore, we investigated the postulated relationships in the scientific as well as in the economic context and assumed that individual competencies predict Knowledge Integration in different levels of expertise.

To test our hypotheses, 421 participants from the working contexts of science (N = 152) and economy (N = 104) as well as students (N = 165) answered questionnaires on Knowledge Integration and competencies of Knowledge Integration in an online survey. Further questions were related to demographic data, as well as experience and expertise in ITD work.

The main result showed that all postulated competencies were positively related to Knowledge Integration.

Moreover, Perspective Taking showed the strongest effect on Knowledge Integration and mediated the relationships between the other competencies and Knowledge Integration.

Further results revealed that students as well as experts benefit from the education of individual competencies in ITD work and that the postulated competencies predict higher levels of knowledge integration in both economic and scientific contexts.

One way of applying the results in practice is to incorporate the competencies Perspective Taking, Reflexivity, Analogical Reasoning and Tolerance of Ambiguity and Uncertainty into educational units, trainings or coaching sessions of ITD education.

However, further studies using different methodologies are needed to investigate the interactions of the postulated competencies with knowledge integration. Our study involved a quantitative survey. Experimental studies are planned in the future to investigate the causal effect of competencies on knowledge integration. Yet qualitative methods should also be employed to understand how and which facets of competencies are socialized in different work contexts.

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Towards a caring transdisciplinary research practice: Navigating Science, Society and Self

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Transdisciplinary research that bridges science and society is needed to address the complex social-ecological sustainability challenges we are facing. However, many transdisciplinary researchers grapple with balancing the competing demands of scientific rigour and excellence, societal impact and engagement, and self-care. This is especially evident in the growing literature by early-career researchers describing the challenges of pursuing a transdisciplinary research career in social-ecological sustainability research. It also coincides with increasing mental health issues in the academic community at large, particularly among early-career researchers, and scholars calling for an ethics of care in academia. To guide discussion and reflection towards a flourishing transdisciplinary research practice, we synthesized our own and other researchers' experiences of using a transdisciplinary approach and formulated the heuristic of the 'Triple-S': caring for Science, Society and Self. This heuristic adds the frequently overlooked personal aspects of transdisciplinary research. Current dominant academic structures, cultures and metrics of success are not supporting a balanced and flourishing transdisciplinary research practice, but rather creating and exacerbating the trade-offs between these three aspects. As an example of a solutions-oriented approach, we developed a theory of change to address the changes we see are necessary to enable a transdisciplinary research practice in line with the Triple-S. We hope that this will foster academic environments where transdisciplinary research practice can flourish and the next generation of researchers are not burnt-out, but empowered.

Inselkita Spiekeroog - Energy efficient design of an environmental kindergarden for early childhood education on the island Spiekeroog – a collaborative- transdisciplinary higher education teaching project

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This paper describes a collaborative- transdisciplinary higher education teaching project organised by Jade University of Applied Sciences and University of Applied Sciences Emden/ Leer in Lower Saxony, Germany interconnecting bachelor and master students of the following fields: a) early childhood pedagogy, b) geoinformation science, c) architecture and d) civil engineering. The cross-disciplinary task of a kindergarden design proposal offers a comprehensive and practical example for all four participating professional disciplines addressing practise-based learning. The task requires professional knowledge input and a specific role of each individual discipline: Students of early childhood pedagogy provide the pedagogical concept by taking the role of a client. Geoinformation science students provide geodata on ecology, demography, soil and climate which are taken into account by architectural students to translate the requirements into a design proposal. The civil engineers act as consultants on climate-sensitive construction and construction site logistics regarding the specific environment of an island. The project enables students to experience working in a transdisciplinary environment. Of particular interest are the challenges of integrating multiple perspectives based on expert knowledge in a design process task of a learning environment focussing on resource-efficient and climate-sensitive criteria. The project focusses on the following competences and learning outcomes: communication, cooperation and coordination, development of a scientifically reflecting habitus, flexibility and openness to unknown and foreign methodologies. Furthermore, learning in a protected and closed academic environment by realistic case challenges is a process that allows students to foster creative exploration, realistic simulations and feasible experiments. Due to the corona pandemic the module was conducted completely online, which surprisingly enhanced the cross-disciplinary group work. Evolving from content-based teaching to learning by knowledge consolidation and further development of individual skills enabled the lecturers to emphasize on independent, creative and responsible teaching to provoke intrinsic motivation and positive learning outcomes. This teaching module was conducted for the first time during the summer semester 2020 and will be offered frequently.

An urban transformation ecosystem laboratory building on the NEWROPE network with hybrid open public structures, innovation brokers, and distributed organizations

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The Chair of architecture and urban transformation of the ETH Zurich is a distributed transdisciplinary academic organization, under construction, under the name NEWROPE, https://newrope.world. What is special about NEWROPE is that many of its members are based outside Zurich, in different European cities (Brussels, Antwerp, Amsterdam, Paris, Sofia), and most are active under different roles in their local environments (founder of a big architecture office, politician, facilitator, consultant, anthropologist, digital activist), and engaged in different sites of transformation, urban planning projects, cultural centers, informal learning processes. But the same people are members of the same University chair where they co-develop a progressive curriculum on training architects to become drivers of urban transformation, coming from different academic backgrounds: architecture, sociology, anthropology, computer science, philosophy. These key actors of the knowledge exchange network formed across Europe, which we call innovation brokers, are both separated and united, both independent from and dependent on each other, active in different case studies and in the same one.

This contribution visualizes the evolution and key design characteristics of the NEWROPE ecosystem in the context of its "open public structures" programme, which aims to create public spaces in existing infrastructures of academic institutions, museums, churches, but also in abandoned spaces in transport nodes or residential areas, and more. Opening up such spaces and inviting the general public and especially often excluded communities, either in the form of extending their traditional audience or creating neutral in-between spaces, offers new opportunities for engagement, inclusion, and conviviality in complementary ways to traditional public and community spaces.

Ongoing projects which will provide the basis for the proposition developed include the opening up of ONA, the groundfloor studio of the ETH building where NEWROPE is based, the ETH innovedum project "Informal Learning as a design practice: creating safe space to engage with real-world problems", the transformation of train station spaces in Sofia and Brussels to open public structures, and more.

The accompanying paper will lay out a methodology for innovating in three important ecosystem creation and capacity building processes in this context: 1) The creation of direct links between old and new open public structures, through the use of digital tools and appropriate facilitation methodologies, by democratizing knowledge exchange and reducing the need for traveling. 2) The formation of a European Community of Practice of highly skilled urban transformation facilitators, innovation brokers, who encompass different roles, different backgrounds, and different contexts through their own personal movement through disciplines, institutions, local contexts, and case studies; these qualities allow them to become ideal translators, mentors, supporters, inspirators. This community of practice will form a peer learning environment for such actors to dissect the challenges that they face and to secure the key resources they need to mobilize. 3) The establishment of a wider ecosystem of knowledge exchange and solidarity in the form of a distributed multi-actor organization, which forms an international transdisciplinary framework of co-creation of open public structures that is organic and itself replicable as a prototype.

RT-5.1: The role and shape of innovative formats in different transformative research settings

Time: Thursday, 16/Sept/2021: 11:00am - 12:30pm

The role and shape of innovative formats in different transformative research settings

Bettina Brohmann[1], Melanie Mbah[1], Silke Kleihauer[2], Regina Rhodius[3], Daniel Hoernemann[4]
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Particulary during the last decade, transdisciplinary (td) research has developed as a research practice which aims to address complex real-world problems. In this context td research takes up transformative challenges and seeks at contributing to solutions for these problems by intervening in or supporting processes of new social practices at different scales (Lang et al. 2012, Pereira et al. 2020).

Td research involves societal aims and viewpoints, inter alia by inviting practicioners and scientific actors from different disciplines to co-produce action-oriented knowledge that potentially leads to transformative change (Caniglia et al. 2021). A wide range of different disciplines, such as sustainability science, technology studies, or social sciences have contributed to a sophisticated understanding of the theory and practice of td research. At present, in td research various methods and formats exist (e.g. Defila und Di Giulio 2019). To choose the right format is highly significant for a common vision (the identification of a boundary object and a common research question), cooperative research activities and the governance of successful processes. Numerous "new" formats have been developed and put into practice – like real-world labs (Rhodius et al. 2021) or innovation groups. Grunwald et al. (2020) analysed four of them to assess their relevance for and impact to td research.

We argue for a broader view on innovative formats – like *arts based research* (Leavy 2020); *AExpertirience* (Heinrichs und Walbrodt 2021); *Transmente* (Kleihauer and Führ 2019); or *Theory of Change* (Deutsch et al. 2021). Therefore, further systematization of methods and formats is needed to enhance the accuracy of fit and improve the effectiveness of methods and formats according to specific contexts and purposes. Some of the innovative methods and formats cannot be classified so easily as either method or format, yet, because of their newness in td research or various usage as either one single method or for structuration of the whole td process. For this reason, we propose a working definition of *innovative formats*[1] which we want to present as a starting point for discussion with scientific experts and practitioners, invited from different research contexts.

Goals of the workshop

Innovative formats have increasingly been applied during the last years in td contexts. In the light of this diversity, the workshop aims at exchanging on the experiences made in selected contexts and the specific needs for innovative formats. The guiding

questions for the workshop are: What are the reasons for innovation of formats and what are specific challenges in the utilization?

Intended target audiences and expected inputs

We invite interested scholars and practitioners with different thematic and (cross-)cultural background to contribute with their experiences in applying an innovative format and enroll different adequate methods. To discuss on a common ground of understanding, we want to ask the invited participants for inputs on:

What was your approach to find an adequate format? On the basis of which criteria and objectives was the format - and methods - chosen? What influence did goal orientation, problem impulse and actor constellation have on the choice of format or format development? Have you combined different methods (for what reasons, at what stage of the research process)?

Planned workshop structure

The workshop will be structured into the following 4 steps:

- Input by the key authors to introduce the session, main goals and a proposal for definition (10 minutes)
- Presentation of a minimum of 3 different formats and experiences in practice (3x10 minutes)
- 3 + x Break-out groups addressing different topics oriented at the practical experiences of different formats (30 minutes)
- Discussion in the whole group bringing together the insights from all experiences (reasons and challenges in various contexts) (20 minutes)

Literature

Caniglia, Guido; Luederitz, C.; Wirth, T. von; Fazey, I.; Martín-López, B.; Hondrila, K. et al. (2021): A pluralistic and integrated approach to action-oriented knowledge for sustainability. In: Nat Sustain 4 (2), S. 93–100.

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[1] Innovative formats in the td context offer a "framework" to jointly develop solutions for a transformation process with reference to a specific issue. An innovative format consists of defined minimum standards such as a joint boundary object, a collaboration between practitioners and researchers right from the start of the idea or application of a project and structure the whole td process or at least two phases of such. Formats include several methods in each phase of the td process. These methods can be combined differently and can be adapted from various disciplines. The combination of methods might lead into an innovative format for a specific context.

RT-5.2: Sustainability without Exclusion: Inequalities in mobility transitions

Time: Thursday, 16/Sept/2021: 11:00am - 12:30pm

Sustainability without Exclusion: Inequalities in mobility transitions

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We propose an online workshop with the participants of the ITd Conference 2021, as part of the projects 'Social2Mobility' and 'Sustainability without Exclusion'.

The workshop 'Sustainability without Exclusion: Inequalities in mobility transitions' is based on the two projects 'Social2Mobility' (www.social2mobility.de) and 'Sustainability without Exclusion' (https://lighthouse.global/de/projekte/nachhaltigkeit-ohne-ausschluss/) and lasts 90 minutes.

The focus of the workshop are social dimensions of sustainability. As the 17 Sustainability Development Goals (SDGs) show, sustainability becomes more prevalent as a highly multi-dimensional and interrelated endeavour. However, in contrast to ecological and economical dimensions, social aspects are marginalized in many political and scientific discourses on sustainability. According to SDG 10, a transformation process towards sustainability requires a reduction of inequalities - both between and within nation states.

Transdisciplinary sustainability research (TDSR) is advancing as a form of research to organize collective research processes with participants from fields such as academia, civil society, economy, public administration and arts. From our research experiences, however, discourses on TDSR are limited with regard to methodological assumptions, methods and dominating groups of actors. Thus, the design of TDSR projects inherently gives preference to specific groups of actors or perspectives while neglecting others. Furthermore, these process designs are referring to abilities, attitudes, or capacities of actors that become a prerequisite for an involvement in the process. There are several groups that are commonly left out regarding transformative endeavours towards sustainability. A consequence is that people are excluded from participatory and transformative processes. Furthermore, their perspectives, knowledge, and experiences that are valuable and important for a transformation towards sustainability are not heard. Therefore, to achieve the goal of social sustainability, also processes and procedures that are socially sustainable are required.

The goal of the workshop is, to discuss the issue of exclusion with regard to sustainability and to create a virtual narrative space for sustainability without exclusion in order to allow the participants to relate to the topic with their own experiences, expertise and life-worlds. The workshop builds on publications on marginalisation in political participation as well as on the collective experiences of the workshop participants. We will generate results on which groups and perspectives are marginalised to achieve sustainable solutions and for what reasons, as a basis to be able to develop recommendations for action in research and transformation processes. Experiences from the project 'Social2Mobility' in the field of transportation and mobility are serving as an example in the workshop. The project 'Social2Mobility' focuses on the relation between poverty, mobility and societal participation. A real-world lab is established in a municipality in the Hannover Region (Germany), which addresses the link between mobility and social exclusion of low-income households with kids. An issue that becomes even more pressing under Covid-19 conditions. Mobility has a high potential of reducing CO_2 emissions, followed by calls for a transition towards climate-friendly, or even climate-neutral, and sustainable transportation and mobility. Furthermore, mobility is a highly interdisciplinary field that is interconnected with health, education, economy, climate change, regional and city development or social planning. However, everyday practices, political participation and institutional arrangements and negative effects of transportation are unevenly distributed in society. Therefore, institutional learning, the cooperation of a broad spectrum of actors and socially inclusive forms of co-creation are required for a mobility transition.

"What could attendees of your online workshop or interaction take away from it?"

- Discuss the social dimension of sustainability transformations and the role of exclusion on different levels (political, methodological, social, institutional)
- Recognise asymmetric and politicising tendencies within transformation processes and transdisciplinary approaches
- Highlighting the need for reducing social exclusion in local and regional sustainability policies
- Reflect on own positioning, responsibility, possibilities for action and being affected in local sustainability transformations
- Make connections between structurally similar projects
- Understanding the relation between sustainability, mobility and poverty based on an example

On request, the participants will receive summarised and visually processed interim results of the workshop. As we work as an NGO on the topic of 'Sustainability without Exclusion', we also enable you to collaborate on your own ideas, videos, publications, etc. beyond the workshop.

"What communities do you want to reach?"

- Participants working in the field of sustainability, participation and collaborative methodologies, who want to reflect their practices with regard to social exclusion
- People who are working in the field of mobility or traffic planning (e.g. public administration, research, NGOs)

"Description of the preliminary structure and design for your online event"

1. Greeting and methodological introduction into the workshop
2. Impulses on social exclusion in the field of sustainable mobility transitions
3. Interactive group work with narrative approaches
4. Round up and final discussion

During the workshop, there will first be a short introduction and various impulses on the topic, followed by interactively guided small group work in which we work with narrative methods, and a final discussion and reflection in the plenary. Our transformative methodological approach is transdisciplinary, participatory, intercultural, encouraging and question-based. It aims to enable listening to all voices of the participants in order to integrate different experiences and knowledge while being sensitive towards heterogeneity and differences. The topic of mobility will serve as an entry point, however, the discussion will be open for the topics of the participants.

The workshop is organized around the following guiding questions:

- **Who** is **in which ways** and **why** (not) being part of (local) sustainability activities?
- Which social questions are most urgent and which questions are neglected in the political strive towards sustainability?
- **Who** feels/is responsible for political activities for sustainability in fields such as mobility? Who is passive/active? Why? In how far is this compatible with democratic decision-making?
- **With whom, where** or **when** are you **not** able to create sustainable solutions?
- **What** is stopping you in finding sustainable solutions?

RT-5.4: "Transformation & Transdisciplinarity in Africa": Grappling with practical dimensions

Time: Thursday, 16/Sept/2021: 11:00am - 12:30pm

"Transformation & Transdisciplinarity in Africa": Grappling with practical dimensions

Jessica Jane Cockburn[1], Nadia Sitas[2], Margaret Wolff[1], Nosiseko Mtati[1], Wandile Paul Mvulane[1], Gladman Thondhlana[1], Chipo Plaxedes Mubaya[3], Alice McClure[4], Sheunesu Ruwanza[1], Akosua BK Amaka-Otchere[5], Anthony Van Wyk[6], Nadine Methner[4], Alexandra Lissa[7]

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Sub-session 3 of 3: "Transformation & Transdisciplinarity in Africa": Grappling with practical dimensions

The African continent is rapidly changing, faces a range of sustainability challenges, and holds deep potential for being a leader in finding new ways forward. The notions of transformation and transdisciplinarity have found their way into research and scholarship on the continent, and are offering scholars a way to challenge existing norms and grapple with urgent questions around decolonisation, social justice and social-ecological sustainability across a wide range of sectors, fields and areas of practice. This session is part of a 3-part set of sessions where 'pracademics' (people working at the interface of academia and practice) from the African continent will gather to share, question and grapple with their work on transformation and transdisciplinarity. The three sessions are structured around the idea that transformation takes place within and across three spheres: the personal, the political and the practical (O'Brien, 2018). We see transformation as a key process taking place within and through transdisciplinary (TD) processes.

Our emphasis will be on sharing the context-specific challenges of putting the ideals of TD into practice in various case studies from Africa. We hope to prompt discussion and sharing on some of the "tough" or "messy" aspects of TD including for example power dynamics, emotional and inter-personal discomforts and difficulties, personal reflections and changes, resource constraints, practical and logistical frustrations, etc. Through these sessions, we aim to offer deeper insight into the realities of implementing TD in resource-constrained and highly heterogeneous contexts often characteristic of postcolonial and Global South contexts, as in most of Africa. We hope to cultivate an appreciation for the ways in which African pracademics are bringing TD to life despite these challenges, and to celebrate their successes. We welcome other pracademics, researchers and practitioners working in similar postcolonial and Global South contexts, and anyone with a curiosity and/or experiences of the tough and messy side of TD work.

This is sub-session 3 of the set of three sessions on Transformation & Transdisciplinarity in Africa. Here, case study presenters will grapple specifically with the 'practical' aspects of transformation and transdisciplinarity that have emerged in their work. The practical sphere relates to behaviours and technical responses needed to bring about transformative change. In TD work this relates to the following broad themes: the day-to-day realities of implementing TD projects within existing systems characterised by certain ways/systems of doing things; the behavioural barriers to realising TD in practice; and the logistical, resource, and other technical issues which frustrate efforts to bring about transformative change through transdisciplinary research.

Format (structure/design): The session will begin with a brief introduction setting the scene for the set of three sessions, and introducing the focus on the 'practical' dimensions for this sub-session. The session will focus on four African case studies. Presenters will provide short presentations (max 10 minutes each) on their work with TD, sharing specific insights on the practical dimensions.These will be followed by break-out group discussions, and then a closing plenary panel discussion, drawing on cross-cutting insights and experiences offered by 2-3 panellists. Session coordinators and facilitators will use a range of online tools to facilitate an interactive discussion among participants within the different parts of the session.

Session coordinators: Jessica Cockburn, Nadia Sitas.

Case studies:

1. Towards sustainable and just landscape management through transdisciplinary praxis: challenges of engaged research in rural South Africa in the COVID-19 pandemic experienced in the Tsitsa Project (Margaret Wolff, Nosiseko Mtati, Wandile Mvulane, Jessica Cockburn).

2. Facilitating urban sustainability through transdisciplinary research: Lessons from Ghana, South Africa and Zimbabwe (Gladman Thondhlana, Chipo Plaxedes Mubaya, Sheunesu Ruwanza, Alice McClure, Akosua BK Amaka-Otchere).

3. Ecosystem-based adaptation in Eden district, South Africa: Working with the private sector, researchers, NGOs and practitioners to understand interconnected risks and shared responsibilities with managing catchments and restoring ecosystems to mitigate hazards including (fire, flood, drought and storm waves (Nadia Sitas).

4. Using a Genius of SPACE approach to address environmental pollution through biomimicry in informal settlements, Villiersdorp, Western Cape, South Africa (Anthony Van Wyk).

Facilitators/Panellists: Nadine Methner, Alexandra Lissa.

RT-5.5: Towards design principles for the transdisciplinary university classroom

Time: Thursday, 16/Sept/2021: 11:00am - 12:30pm

Towards design principles for the transdisciplinary university classroom

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Introduction

At Wageningen University and Research, we are developing three master courses on the subject of Managing Public Spaces. The program is delivered in a transdisciplinary classroom meaning that master students and professionals learn together. This

setting transcends the conventional academic and professional disciplinary structure (Wall & Shankar, 2008). Combining professionals and master students in one classroom is quite unique. Due to this innovative character, there is still a lot to discuss and think about when it comes to designing transdisciplinary courses. This is what we will do in our workshop, together with participants.

The context: managing public spaces

The domain of managing public spaces needs a shift in how challenges in the field are approached. Traditionally, professionals in this domain are specialized in planning, design or management. This segregation no longer meets the demands of our current societal challenges. This is due to the fact that many Dutch public spaces need to be renewed according to the current needs of their users. Professionals need to come up with both practical and strategical solutions, asking for an interdisciplinary approach, integrating the areas of management, design and planning (Duivenvoorden et al., 2021).

This has implications for education. First, master students need to be educated according to this interdisciplinary approach. But the same counts for professionals: they need to be re-trained. Our needs analysis revealed that working professionals are looking for a more scientific foundation for their work. Next to that, we know that master students like to get a better feeling for what their professional domain entails.

Furthermore, the domain of Managing Public Spaces asks for an integration of academia and society. In order to foster current transitions a new approach for managing public space that goes beyond common, pragmatic and operational approaches is needed. Managers of public space lack integrated and strategic knowledge.

An explorative study was conductive to prepare the design phase of this course. The study indicated that professionals need new knowledge and skills to deal with transitions and with the complexity of interconnected social and physical domains (Brinkhuijsen et al., 2020; Duivenvoorden, 2019). This can be solved by offering additional training to management professionals and adding the perspective of management to existing educational programs. These insights incited the design of a transdisciplinary mixed classroom learning space where master students contribute their strong theoretical foundation, and professionals can contribute with their real-life practical experience, learning from each other.

Set-up of the first course

The first course in a pilot of three courses is called "Planning, design and management: public space and transitions". The study load of the courses differs between the two groups: 6ECTS for master students and 3EC for professionals. In the course design, several instructional design theories were incorporated, with cognitivism, social constructivism and boundary crossing as the most important approaches. This resulted in a course in which real-life, interactive and collaborative learning takes place throughout a wide variety of learning activities, both synchronous and asynchronous. Think of lectures, quizzes, discussions, peer feedback assignments, Q&A sessions and group work.

Several assignments in the course specifically aim to enable transdisciplinary learning in this course:

- An explanation of what boundary crossing entails. Boundaries are a potential source for learning, but making use of boundaries as a source of learning requires boundary crossing competence. That is the ability to cross boundaries between one's own and others' practices and perspectives with the aim of making new connections, learning from 'the other' and co-creating new practices (Akkerman & Bakker, 2011).
- A personal development plan. In this plan, participants track their progress when it comes to the development of their boundary crossing competence.
- A real-life case of a neighbourhood from the 1960s in which professionals and master students work in mixed groups. The participants share their disciplinary knowledge and bring in practical and theoretical approaches to develop plans and to discuss alternatives from both practical and theoretical perspectives.
- An assignment 'Stand in the shoes of", in which professionals act as commissioners for the students. Each student is confronted with a project from a professional's daily practices and asked how they would approach the project.

About the workshop

The first course of the program is created and taught. Our design choices aimed at enabling transdisciplinary learning in the classroom. In our workshop, we will present these choices. Next, workshop attendants will reflect on these choices and provide feedback in breakout rooms. Following, participants will come up with new suitable learning activities.

For workshop attendants, the main takeaway is that they get examples of how you can design for transdisciplinary learning in the mixed classroom. In our case, the context is that of Higher Education, but we believe that gained insights can also be applied to other levels of (formal and informal) education. So the workshop is relevant for everyone involved in designing transdisciplinary learning.

The objective of the workshop is to collaboratively gain insight into how the transdisciplinary mixed classroom can become an engaging learning experience.

This is the structure for our workshop:

- Introduction (5m)
- Presenting the course (10m)
- Presenting design choices (10m)
- Breakout session: participants capture their first thoughts about our design approach and report back in the plenary session (15m)
- Boundary crossing interventions and corresponding student activities (10)
- Break (5)
- Presenting evaluation outcomes (10)
- Breakout session: participants come up with new possible learning activities and report back in the plenary session (20m)
- Closure (5m)

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RT-5.6: Utilization of TD co-generation of knowledge as proxy for understanding research (for development) impact

Time: Thursday, 16/Sept/2021: 11:00am - 12:30pm

Utilization of TD co-generation of knowledge as proxy for understanding research (for development) impact

Aymara Victoria Llanque-Zonta[1], Johanna Jacobi[2], Stellah Mukhovi[3], Eliud Birachi[4], Per Von Groote[5], Carmenza Robledo-Abad[6]

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We present the results of our research as an input prior to a planned work shop within the conference. The following contents will prepare the scientific community to approach the subject with more information about our academic and political contribution.

The effect of research projects on sustainable development pathways is a matter of ongoing debate in the context of development cooperation (Wiek et al., 2012; Brandt et al., 2013; Miller et al., 2014; Schneider and Buser, 2018) and has long become a concern for governments and public sectors (Archibald et al., 2016; Thornton et al., 2017). Transdisciplinary research has been portrayed as one option for increasing the contribution of science to transformative process in part because transdisciplinary approaches aim at increasing the relevance, credibility, and legitimacy of scientific research by securing the active participation of non-academic actors in research (Russell et al., 2008; Bunders et al., 2010; Basche et al., 2014; Thompson et al., 2017; Hansson and Polk, 2018). However, a clear attribution of transdisciplinary projects' contributions to or impacts on development pathways remains challenging (Thompson et al., 2017; Belcher and Palenberg, 2018; Schneider and Buser, 2018; Matenga et al., 2019).

We aims to contribute to this debate by hypothesizing that assessing who is using research knowledge and for what, can be a proxy for understanding impact of transdisciplinary research on development. The question at stake is whether evidence exists that shows how co-created knowledge is being utilized, in which areas, at what scales, and which mechanisms favour more utilization of co-produced knowledge. In order to answer this question, we analysed the level of utilization of research knowledge in three realms: science, policy, and practice, on a sample of 43 research for development projects included in the Swiss Programme for Research on Global Issues for Development (r4d programme) that have been implemented in XX countries in Africa, Asia and Latin America since 2012.

With our contribution to the ITD 2021 we will share both the analytical framework as well as the results of almost two years of analysis, regarding tree objectives: 1) presenting a framework for analysing the utilization or research knowledge in science, policy-making and practices as a proxy for understanding impact of such project; 2) presenting the results of our specific analysis, including the achieved stages of utilization of knowledge across scales, the mechanisms utilized for achieving these stages and the enabling and/or hindering factors related to the specific contexts; and 3) triggering the discussion with other TD researchers and funding organisations interested in understanding how to promote the utilization of co-created knowledge.

This contribution will insights regarding all three questions of the stream on "TD on-the-ground: making TD tangible: 1) What tangible transdisciplinary processes and practise are taking place on the ground?; and 2) How can we use these examples to improve exiting transdisciplinary practices and to facilitate inclusive and equitable research?

The target audiences for this workshop are researchers as well as donors interested in understanding how transdiciplinarity can contribute to sustainability transformation. The participants will get evidence about who is using co-created knowledge for what and which mechanisms have facilitated a wide utilization of co-created knowledge. This will be useful for both designing future projects and programmes and creating founding mechanisms.

In addition our contribution will help to incentivize research donors interested in understand the advantages of TD for research activities in North-South partnerships (stream on institutionalizing and funding TD)

The design is a combination of pre-crafted and real-time elements. The pre-crafted material will facilitate mobilisation of interest, and the real-time workshop will give possibilities of interaction, debate and social learning process.

If the ITD21 organizers want, we offer to make the pre-crafted elements available even before the conference starts.

Real-time workshop

The real-time workshop will be held in three steps:

1. Presentations of the analytical framework and key results of the analysis (30')
    2. Working groups: In order to facilitate an in-depth discussion with participants to the conference (30´). We propose 3 working groups:
        1. Analytical framework
        2. Results on utilization of co-created knowledge on science, policy and practice across scales, that include actors participation
        3. Mechanisms that facilitate/promote utilization of co-created knowledge, connected with the results
        4. Context factors that hinder or enable knowledge utilization
        5. General conclusions plenary (20´).

Outputs

The discussions and recommendations will be documented and made available for the proceedings of the ITD 2021.

Topics:

Please select the topic(s) from the list that best suits your submission. This is to assist with the review process and the creation of the conference program itself.

Utilization of TD co-generation of knowledge as proxy for understanding research (for development) impact

Aymara Victoria Llanque-Zonta[1], Johanna Jacobi[2], Stellah Mukhovi[3], Eliud Birachi[4], Per Von Groote[5], Carmenza Robledo-Abad[6]

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We present the results of our research as an input prior to a planned work shop within the conference. The following contents will prepare the scientific community to approach the subject with more information about our academic and political contribution.

The effect of research projects on sustainable development pathways is a matter of ongoing debate in the context of development cooperation (Wiek et al., 2012; Brandt et al., 2013; Miller et al., 2014; Schneider and Buser, 2018) and has long become a concern for governments and public sectors (Archibald et al., 2016; Thornton et al., 2017). Transdisciplinary research has been portrayed as one option for increasing the contribution of science to transformative process in part because transdisciplinary approaches aim at increasing the relevance, credibility, and legitimacy of scientific research by securing the active participation of non-academic actors in research (Russell et al., 2008; Bunders et al., 2010; Basche et al., 2014; Thompson et al., 2017; Hansson and Polk, 2018). However, a clear attribution of transdisciplinary projects' contributions to or impacts on development pathways remains challenging (Thompson et al., 2017; Belcher and Palenberg, 2018; Schneider and Buser, 2018; Matenga et al., 2019).

We aims to contribute to this debate by hypothesizing that assessing who is using research knowledge and for what, can be a proxy for understanding impact of transdisciplinary research on development. The question at stake is whether evidence exists that shows how co-created knowledge is being utilized, in which areas, at what scales, and which mechanisms favour more utilization of co-produced knowledge. In order to answer this question, we analysed the level of utilization of research knowledge in three realms: science, policy, and practice, on a sample of 43 research for development projects included in the Swiss Programme for Research on Global Issues for Development (r4d programme) that have been implemented in 57 countries in Africa, Asia and Latin America since 2012.

The infographic will the analytical framework and some key results of our scientific analysis.

With this infographic we will share information about the results of a two years assessment process regarding utilisation of research knowledge into sustainability transformations, including results about actors involved in transdisciplinary process, and how the stages of utilization of research knowledge were achieved simultaneously and at multiple scales, from local to global.

This infographic target scientific research community and donors, into transdisciplinary processes towards sustainability, guided by tree questions: 1) At what stages, and scales the knowledge have been used? 2) How the actors were involved? 3) How transdisciplinary processes occurs when there is co-creation of knowledge?

This material is linked to a real time-contribution the infographic should trigger the interest of participants in the IDT 21 conference to come to our workshop. The infographic is in the process of being edited, the statistical data will be presented as a scientific article, and its impact will depend on the dissemination process after publication.

RT-5.8: Knowledge exchange for sustainability-focused transdisciplinary research: Training in co-design and co-implementation

Time: Thursday, 16/Sept/2021: 11:00am - 12:30pm

Knowledge exchange for sustainability-focused transdisciplinary research: Training in co-design and co-implementation

Gabriele Bammer[2], Margaret Krebs[1]

[1]Earth Leadership Program, Future Earth, US; [2]Australia National University; mkrebs@stanford.edu

In this session, we will bring together leading thinkers and practitioners of transdisciplinary research so that they can share the tools, structures, and approaches they are developing and using, and each talk will explore how their work is supporting the

development, testing, dissemination or scaling of curricular resources, practices, or approaches that will allow this work to grow and spread. The participants in this session are all taking part in a community-supported research initiative aimed at establishing a common set of core curricular resources for transdisciplinary training.

Gabriele Bammer, The Australian National University: Moderator

Patty Balvanera, Universidad Nacional Autónoma de México: *Tool for opening online transdisciplinary interactions*

Tobias Buser, Global Alliance for Inter- and Transdisciplinarity: *From projects to institutional changes: Pathways to link td processes to participants institutions and communities.*

Lorrae van Kerkhoff, The Australian National University: *Using a problem framing template to start transdisciplinary thinking: recognising multiple perspectives, interests and understandings of complex problems*

Hein Mallee, Research Institute for Humanity and Nature, Japan: *Explore how we often (semi-) unconsciously use devices (e.g. diagrams, maps, indices, storylines) to integrate knowledge across disciplinary and sectoral boundaries.*

Tolu Oni, Cambridge University and University of Cape Town: *Entry points approach to intersectoral collaboration for healthy sustainable development: by setting, principle, sector or outcome*

Katsia Paulavets, International Science Council: *Self-reflection Workshop Design: Participants reflect on their experiences of practicing TD research and adjust their research actions.*

Christian Pohl, ETH Zurich, Switzerland: *Three types of knowledge tool: tailoring research questions to (societal) knowledge demands (short link: bit.ly/2IRfluz*

Structure: Individuals who attend this interactive session will have the opportunity to hear from any of the presenters. We are using a unique marketplace framework for this session so that each attendee will have the opportunity to hear from multiple speakers.

We will break the time into 15 minute segments, each run the same way: Prior to the interactive small groups, the session organizer will explain the format briefly, and ask each speaker to introduce themselves and the subject of their intervention (the method, tool, structure, or framework they are bringing to the discussion about transdisciplinary research, co-design and integrated, implementation science).

After these introductions (10 min, total), those in attendance will choose their breakout rooms and each of the speakers will have 7 minutes to present their work. Speakers can use a poster, a laptop, or any other visual aids they bring, and they are expected to speak for no more than 7 minutes, and provide at least 8 minutes for audience questions. After the end of the 15 min period, the audience will choose a different breakout room, and the speakers will have another 15 minute interval to engage the next audience - providing the same presentation to a new audience. Each speaker will do this a total of 4 times (each lasting 15 minutes, using a total of 60 minutes).

The final session will provide the panel of presenters with an opportunity to share a summary of what they learned and how they will continue to reflect and iterate on the feedback. This will be added to the conference website so that conference participants can both continue to interact, offering feedback.

Aims: Our aims in this session are to: 1) outline the work done by several researchers in the area of transdisciplinary research; 2) provide a space for additional voices to join this work, 3) use the voices of the participants to iterate on the work in order to develop a common language, common frameworks, and eventually to develop a core curriculum for transdisciplinary training, and 4) connect the attending audience with the work of research and practice leaders advancing curricular resources, training tools, and methodologies for transdisciplinary research and leadership training in the broad area of sustainability and global change work.

RT-6.1: How to move beyond the individual transdisciplinary research project? Strengthening institutional knowledge sharing

Time: Thursday, 16/Sept/2021: 1:30pm - 3:00pm

How to move beyond the individual transdisciplinary research project? Strengthening institutional knowledge sharing

Jillian Student

Wageningen University & Research, the Netherlands; jillian.student@wur.nl

Researchers are increasingly exploring transdisciplinary approaches to answer their research questions. Steered by funding requirements, more universities are also promoting transdisciplinarity in large international projects. However, transdisciplinary research is difficult to execute. Much of the knowledge and experience gained is not shared beyond the individual project. Knowledge sharing is important for improving conceptual theories, method applications, stakeholder involvment, and training. Candidly discussing what went wrong, differently than planned or where theoretical conceptualizations of transdisciplinary research were incongruent with practice can encourage critical reflection.

Nonetheless, research departments are typically set-up to focus on a particular discipline or type of challenge making it difficult to foster ongoing knowledge transfer. As transdisciplinary research does not typically fall within a specific department, there are not often people dedicated to knowledge sharing within or among institutional departments. Moreover, the challenges and how they were faced in projects are not often discussed in published research papers leaving many to reinvent the wheel instead of building on past experiences. These are missed opportunities and the goal of the proposed online interactive workshop is to share experiences on how to encourage knowledge sharing and incorporate transdisciplinarity in broader research programs at a university or research institute.

This workshop is directed more to individuals who want to expand knowledge sharing opportunities within their institute. The format will start with a presentation of the case of Wageningen University, WIMEK (Wageningen Institute for Environment and Climate Research). WIMEK endeavours to take the lead in Wageneningen University & Research to create space where

transdisciplinary insights can be shared. However, WIMEK, like many other institutes, is still considering what such a hub should look like, what researchers need, and what conceptual frameworks and best practices can transcend different research departments. This is critical so that the limited capacity and funding can be directed where it can make a difference.

The workshop will make use of Mentimeter and online breakout rooms to create opportunities for interactions among participants and with host(s). Attendees will have the opportunity to speak candidly of challenges and opportunities of knowledge sharing with other researchers and stakeholders. They can take away ideas of how others have faced these challenges and draw inspiration on how others are integrating transdisciplinary knowledge at their institutes. Attendees will share ideas on how to build a sustainable knowledge hub on inter- and transdisciplinary theory and methods to strengthen, embed, and further develop transdisciplinary research approaches at their institutes.

RT-6.2: Institutionalizing interdisciplinarity and transdisciplinarity: dynamics of cultures and communities

Time: Thursday, 16/Sept/2021: 1:30pm - 3:00pm

Institutionalizing interdisciplinarity and transdisciplinarity: dynamics of cultures and communities

Bianca Vienni Baptista[1], Julie Thompson Klein[1,2], Danilo Streck[3]
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This panel builds on discussions that began at two peer-reviewed double sessions we organized at the 2017 and 2019 conferences of the International Transdisciplinary Conference, focused on institutionalizing interdisciplinarity (ID) and transdisciplinarity (TD). The discussions explored historical and geographical conditions that shaped institutional settings in particular national and regional contexts, modifications and transformations over time, and related challenges and opportunities.

As a product of such discussions, over the past year, we compiled fifteen case studies from different continents for a forthcoming book that analyzes varied ways of institutionalizing inter- and trans-disciplinarity, including countries in the double sessions as well as new ones (such as Armenia and Georgia, Japan and Mexico). This topic is of increasing interest, driven by proliferation of related approaches and efforts to systematize factors and consequences of institutionalizing ID/TD both within and across countries. The cases advance both understanding of and action on related challenges of knowledge production with emphasis on institutionalization in the context of cultural transformation and characteristics of communities where they emerge. Representatives from projects and programs in Asia, Africa, Australia, Europe, Latin America, and North America join in fostering comparative perspectives on both theory and practice, in the process also describing strategies and models of change as well as patterns of success in institutionalizing ID and TD.

Each case identifies dimensions inherent in fostering lasting and effective practices of ID and TD. They include larger historical, social, and cultural contexts of knowledge production, institutional arrangements, and conditions for creating and experiencing new ways of doing research and teaching. The cases support innovative practices that present alternatives to dominant disciplinary academic culture, and personal commitments of professionals. Applying a comparative perspective, we then reflect on components of a framework.

This workshop will present main key lessons in relation to the following guiding questions:

- How have historical and geographical contexts conditions shaped institutional possibilities and limits in your country?

- How are inter- and trans-disciplinary research and teaching organized in time and space, including immediate communities where they emerged and any special initiatives to accomplish national and regional goals?

- Are changes transformative or modifications and/or integrations that illustrate 1st- versus 2nd-order change, trying to fit into an existing structure? Do they also reflect contextual simplification of an essential mission or a more complex understanding of how institutions operate?

- Are changes shaped by theories of institutional change or ad hoc and piece-meal approaches? In the first case what is the defining strategy, and in the second case what do you advocate for theory and practice of change that results in a robust portfolio that combines strategic targeting and general loosening of barriers across bottom-up, mid-tier, and top-down efforts?

- What future potentials and advantages do inter- or trans-disciplinary research and teaching present in your country, including contributions to solving complex societal problems?

As an outcome of the comparative study of the fifteen cases, we elaborated a framework that provides a sound basis for productive dialogue and mutual learning within and across contexts, avoiding pitfalls of thinking only in terms of simplistic and universalist transfers of knowledge and practices while overcoming fragmentation in literature due to differences in cultural, institutional, and community contexts. Toward that end, convenors offer an enriched framework based on empirical evidence, pertinent literature, and insights from case studies.

What communities do you want to reach?

The workshop is open to researchers, educators, funders, policy makers, university and research centre administrators, and practitioners, students of interdisciplinarity and transdisciplinarity, and members of funding agencies, professional organizations, and science-policy bodies concerned with institutionalizing new approaches. Thus, it is aimed at people who study, practice, teach, fund and promote inter- and transdisciplinary research.

The number of participants will be limited to 30 (incl. convenors).

Description of the preliminary structure and design

The session will be structured as follows:

- Brief introduction of the problem and guiding questions by the convenors (10').
- Answers to the questions by the panellists representing three case studies (30'). Some of the confirmed panelists are (in alphabetical order):

- Prof. Dr. Karri Holley, University of Alabama (US)

- Prof. Dr. Yasuhisa Kondo, Research Institute for Humanity and Nature (Japan)

- Prof. Dr. Catherine Lyall, University of Edinburgh (UK)

- Prof. Dr. Paulo Nuno Vicente, Universidade Nova de Lisboa (Portugal)

- Prof. Dr. Rick Szostak, University of Alberta (Canada)

- Dr. Tigran Keryan

- Dr. BinBin Pearce

- others to be determined

- Brief introduction to the framework by the convenors (10').
- Discussion of the framework by participants (4 breakout rooms, facilitated by the convenors, 45').
- Report-back sharing insights (plenary, 30').
- Wrap-up by convenors (5').

Participants of this workshop will have the opportunity of testing the proposed framework and discussing main implications for their institutions and countries together with the convenors and panelists. Results of report-backs from the breakout rooms will be recorded in written form and shared with participants by email after the session.

RT-6.3: (Un)clear boundaries between TD practices and professional consultancy – the case of the TD research project Co-Creating Mobility Hubs

Time: Thursday, 16/Sept/2021: 1:30pm - 3:00pm

(Un)clear boundaries between TD practices and professional consultancy – the case of the TD research project Co-Creating Mobility Hubs

Katja Dunkel[1], Stefan Markus Müller[2], Philippe Stadler Benz[1,2], Cédric Wehrle[3], Beat Hürzeler[1], Michael Wicki[2]
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1. Project background

Integrated site developments and mobility solutions contribute to the careful use of scarce land resources and create livable urban space. Specifically, the future development of railway stations into intermodal mobility hubs could improve the interface between different mobility practices, particularly in suburban areas and regional population centers. As a result, railway service providers, such as the Swiss Federal Railways (SBB), are driving forward with integrated mobility and spatial planning.

When considering mobility hubs, the usual perimeter of development is expanded, connecting inner-city and supra-regional modes of transportation and seeking a strengthened urban integration of railway stations. Accordingly, this perimeter expansion leads to the inclusion of additional stakeholders, thus transforming existing cooperation patterns. For this reason, the TD research project Co-Creating Mobility Hubs (CCMH) of SBB, together with ETH Zürich and EPF Lausanne, devises methods for collaborative development and for assessing societal demands at mobility hubs.

2. Alignment with the conference stream "TD on-the-ground: making TD tangible"

Our real-time contribution aims to elicit, describe and discuss key elements to consider when setting up and running a TD project in an industry context to make it effective and impactful. Tracking and evaluating their effectiveness and impact is a challenge for TD practices (Hansson & Polk, 2018; Lang et al., 2012). Attention will be given to how unclear boundaries to professional consultancy might reduce the perceived impact and effectiveness of TD practices. Unclear boundaries might lead to wrong (consultancy-like) expectations in TD contexts and negatively affect the approach's quality.

Although not always clear-cut, TD practices differ from professional consultancy regarding several aspects, such as problem framing, process outputs, and quality control (Penker & Muhar, 2015). Further distinctions, for instance, between TD and applied research, intensify the challenge of defining clear boundaries (Hirsch Hadorn, Bradley, Pohl, Rist, & Wiesmann, 2006). Professional consultancy services are widespread, and thus TD projects are confronted with expectations and working styles that probably hinder realizing the full potential of TD practices. As a result, unclear boundaries need to be addressed and actively approached.

3. Real-time discussion enriched with pre-crafted video statements

The discussion highlights different expectations and goals within TD and consultancy contexts, presenting the CCMH project as a case study and deriving key elements from it for setting up and running a TD project. The discussion intends to address TD researchers, practitioners, and industry representatives alike. Before the conference, we hold conversations with stakeholders around the CCMH project to identify the key elements to consider when embarking on a TD project. Specifically, we focus on different expectations and how misperceptions may alter a project's outcome.

The conversations are held in two segments: First, explorative questions about the project's impact and effectiveness are discussed to raise potential key elements. Second, the stakeholders are asked to assess whether these key elements are characteristic of the project's TD practices. Enabling this assessment, the main characteristics of TD practices and boundaries to professional consultancy are explained to the stakeholders between the two interview segments (Penker & Muhar, 2015). These conversations are filmed and edited; single statements are shown to the participants during the real-time discussion. In each segment, participants and present project members will react to these statements and discuss their implications. The contribution follows the preliminary schedule below:

00:00-00:05: General introduction

- Involved roles: Co-moderators (Dunkel, Stadler Benz)

- Learnings: Goals and schedule

00:05-00:15: Presentation of the CCMH project with an infographic

- Involved roles: Co-moderators
- Learnings: Project background, common thread for following the discussion, and introduction of the stakeholders in the video statements and present project members (Hürzeler, Müller, Wehrle, Wicki)

00:15-00:20: Introduction of the first segment: Potential key elements

- Involved roles: Co-moderators
- Learnings: Overview of the goals and questions addressed in the first segment

00:20-00:45: Screening and discussion of video statements from the first segment

- Involved roles: Co-moderators, participants, present project members
- Learnings: Potential key elements and reflection

00:45-00:50: Introduction of the main TD characteristics and second segment: Comparison of key elements with TD practices and boundaries of TD practices to professional consultancy

- Involved roles: Co-moderators
- Learnings: Overview of the goals and questions addressed in the second segment

00:50-01:15: Screening and discussion of video statements from the second segment

- Involved roles: Co-moderators, participants, present project members
- Learnings: Potential differences in expectations, reflection, and experience-sharing

01:15-01:30: General open discussion and reflection, and farewell

- Involved roles: Co-moderators, participants, present project members
- Learnings: Concluding remarks and implications, limitations, and suggestions for further research

At the conference, we discuss findings derived from the conversations with participants, project members / experts from SBB (Hürzeler), TD (Wehrle, Wicki), and consultancy (Müller). This discussion also leads to a debate about the role of (un)clear boundaries between TD practices and professional consultancy, and how these can be applied and communicated. A short preliminary presentation of the CCMH project with a meaningful infographic provides the common thread for the participants. This infographic displays the tangible TD processes and practices that have taken place in the project. This procedure allows for focusing the discussion on the debate about key elements for the impact and effectiveness of TD research projects in industry contexts and the role of (un)clear boundaries towards consultancy. Finally, together with the participants, we explore how we can use the knowledge gained from this case study in TD.

4. References

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RT-6.4: Workshop Placemaking - Develop your own campus

Time: Thursday, 16/Sept/2021: 1:30pm - 3:00pm

Workshop Placemaking - Develop your own campus

Rosanne van Wieringen, Katusha Sol

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International Transdisciplinary Conference - 2021

Proposal: Workshop Placemaking – Develop your own campus

Names and affiliation/s of the presenter/s

- Rosanne van Wieringen – Education developer, Interdisciplinairy social sciences, University of Amsterdam (UvA).
- Katusha Sol – Researcher and education developer, Institute for Interdisciplinairy Studies (IIS), University of Amsterdam (UvA).

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Introduction Placemaking as transdisciplinary approach

Get to know Placemaking! We like to contribute to the conference by presenting an innovative, transdisciplinary practice to tackle an array of urban issues collaboratively. Both science and policy sometimes are far removed from what happens on the ground. As local urban development is tangible and contains different stakeholders and interests, it is very useful to create awareness about potential tensions between theory and practice and strive for an approach of equal relations between involving stakeholders to jointly develop solutions to urban challenges.

Placemaking is a philosophy and method originated in the 1960s, based on theories from environmental psychology, sociology and urban planning. It is a form of action-research taking local qualities and local knowledge as a starting point for development of (semi-) public spaces. In our practice at the UvA we use the campus and surrounding and neighbourhoods as a laboratory where we experience and analyse the interplay between theory and practice, between a bottom-up and a top-down approach. Hereby we work with external partners (local foundations and initiatives, municipality, etc.). We developed the course Placemaking whereby interdisciplinary student teams research and improve their own campus in a transdisciplinary way.

By using the placemaking method, a set of research and design tools are used to explore local social, political, economic and ecologic development. For example, doing observations on location, gather local needs, take wishes of different stakeholders and qualities as starting point for analysis and action, generate insights by 'mapping' various aspects of the area, combine fieldwork and statistics, and using digital mapping tools. This 'mapping' analysis leads to organizing a physical intervention as a real time experiment, a next step in obtaining valuable contributions and insights. With both scientific (disciplinary) and newly acquired practical knowledge, a place can be created in co-creation to give substance to the transdisciplinary approach.

Goals and take away's of the workshop

During the placemaking workshop we focus on

1. A short introduction on theory, policy and implementation of the placemaking method.
1. Discuss how placemaking relates to transdisciplinary education and research.
1. Apply the placemaking approach by handing a set of research and design tools to research and 'map' a place.

This workshop can be of interest for educators and researchers who are willing to address the interplay between theory and practice and apply placemaking as an educational and/or research practice.

Structure and design of the workshop Placemaking

- In a real-time session, we like to start with introducing placemaking briefly and present good practices by giving voice to students and external partners. We will share our experiences and discuss how placemaking relates to transdisciplinary education and research (20 minutes).

- The second part consists of practising the methodology: taking your own campus as the on-the-ground context. How can we improve the campus for different groups and involve them in the process? We will do a 'mapping' of the context, identify stakeholders and related challenges (50 minutes).

- Discussion of the outcomes & potential follow-ups (20 minutes).

RT-6.5: Grasping Transformation as a Learning Outcome in Higher Education: a co-creative exploration

Time: Thursday, 16/Sept/2021: 1:30pm - 3:00pm

Grasping Transformation as a Learning Outcome in Higher Education: a co-creative exploration

Carla Oonk, Karen Fortuin, Judith Gulikers, Nynke Post Uiterweer, Cassandra Tho
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Grasping Transformation as a Learning Outcome in Higher Education: a co-creative exploration

Aim and general design of the workshop

This workshop aims to grasp what *transformation* as a learning outcome in higher education looks like, and how it could be practiced and measured. We start presenting our understanding of *transformation* from a boundary crossing perspective; i.e. from working and learning across the boundaries of practices and perspectives (Akkerman & Bakker, 2011). Next, we show how we try to trigger *transformation* in various university courses and present our preliminary insights in what *transformation* as a learning outcome could look like. The co-creative exploration that follows aims to step-by-step explore other universities' experiences with *transformation* in education by discussing (1) definitions of *transformation* as a learning outcome (2) learning activities that stimulate *transformation*, and (3) ways to measure student development in adopting *transformation*.

Participants and what they bring and gain

This workshop is meant to become a round-table discussion in the conference stream 'TD learning for transformation'. We hope to meet educators, researchers and educational designers who are interested to think along with us about the use and measurement of *transformation* as a learning outcome of educational learning activities. Participants bring their own experience with the design of learning outcomes and the assessment/measurement thereof in their cross-boundary (e.g. inter-, transdisciplinary or intercultural) courses and research. Participants gain shared insights in the operationalisation of the multi-faceted concept of *transformation*, and how to assess or measure it for educational or research reasons. Ideally, the workshop triggers enthusiasm to further exchange among participants on this topic after the conference.

Practical and theoretical background

The ability to work together with others outside one's own scientific domain, institute, or culture (i.e. outside one's own *practice*), is regarded as crucial for professionals to be able to respond to emerging global challenges (Fortuin et al., 2020). To properly prepare future professionals, educational institutions develop 'cross boundary' courses, e.g. transdisciplinary courses in which students collaborate with stakeholders from outside the university.

The boundary crossing theory (Akkerman and Bakker, 2011) provides helpful insights for designing education that supports students' learning across practices (e.g. Oonk, 2016). The theory distinguishes four learning mechanisms, i.e. Identification, Coordination, Reflection, and Transformation, that are understood as efforts of people to learn across practices (see Figure 1). Translating these learning mechanisms into performance criteria (i.e. process or product outcomes) appears to help design learning objectives, activities, and outcomes.

Figure 1. Boundary Crossing Learning Mechanisms and questions learners ask themselves when adopting the learning mechanisms

(translated from Akkerman and Bakker, 2011)

Wageningen University (The Netherlands) aims to facilitate boundary crossing learning at all levels of the institute including student and teacher education, research, and policy making (Fortuin et al., 2020). We implemented boundary crossing learning trajectories in various BSc programmes for which the four learning mechanisms served as the starting point. Critical question, both relevant to educational and research advancement, is: how to measure boundary crossing learning? Measurement of learning across practices, though experimented with, is considered underdeveloped and under-discussed (Van den Beemt et al. 2020). In our case, especially *transformation* appears to be difficult to grasp.

To better understand what *transformation* means in terms of a learning outcome, we observed students in transdisciplinary courses, analysed their final project reports and reflection papers, and discussed the concept with the teachers involved. Our preliminary insights distinguish between *transformation* as a *process outcome* and transformation as a *product outcome*. *Transformation at the process level* refers to changed personal behaviour as a result of the effort to incorporate norms, values, or perspectives from one practice into other practices. *Transformation as the resulting product* of a boundary crossing learning process refers to a transformative practice, i.e. a new, innovative, hybrid practice across the boundaries of existing practices. We like to discuss with the workshop participants whether they recognise this distinction, regard this to be a useful understanding of *transformation* for educational purposes, and if so, how to measure student development in this respect.

Set-up of the workshop

Participants will be posed to the following questions and start a dialogue by using various online brainstorm and discussion facilities in the online tool nearpod.com.

1. What do we mean with *transformation* as a learning outcome of courses?

Short pitch introducing transformation as a construct, including examples of learning activities and student learning outcomes (10 min.)

2. How do you define *transformation* as a learning outcome of your course(s)? How does this definition link to the boundary crossing approach to *transformation*?

Sharing experiences and short plenary reflection (15 + 5 min.)

3. Which learning activities trigger *transformation*?

Sharing experiences and short plenary reflection (15 + 5 min.)

4. What are crucial aspects to consider when assessing or measuring such a rather complex construct e.g. quantitative vs qualitative data, self-perception vs. observed behaviour.

Sharing tips and tops and short plenary review (15 + 10 min.)

5. What will you be doing tomorrow to make use of the insights of this workshop? Any ambitions to collaboratively further the outcomes of the workshop?

Plenary exchange of workshop findings and link to own context using implementation intention (10 min.).

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RT-6.6: Embedding place-based STEAM into teaching and learning

Time: Thursday, 16/Sept/2021: 1:30pm - 3:00pm

Embedding place-based STEAM into teaching and learning

Anita Mckeown[1], Rebecca White[2]
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- What is the goal of your proposed online workshop or interaction?

Muinín Catalyst – developing a place-based STEAM design thinking curriculum for second-level education.

The world of education and work is changing at a rapid pace. It is crucial to prepare learners with 21st-century skills to prosper in a more globalised and digitalised society. We want young people to be well-rounded, articulate, and confident; able to survive

and actively engage in the future world they will face themselves in, with an economic, political, and technological landscape that is far different than the ones that their parents grew up in. But how do we do this effectively with the current education system that focuses on academic performance, to the detriment of skills development? How do we use the local to help shape and develop their views, experience, and skills as global citizens?

As a legacy of Environmental Protection Agency funded CoDesRes, www.codesres.ie the Muinín 'Catalyst' project continues to explore learning interventions in South-West Kerry, Ireland as a case study to contribute to the development of a place-based STEAM curriculum, that works with some of these critical 21st-century skills; collaboration, communication, presentation, design-thinking and critical-thinking. As a particular pedagogical approach, STEAM places value on the arts for their creative methodologies, ways of knowing the world, and tangible modes of knowledge production (Mckeown, 2018).

In addition, the arts can also disseminate STEM knowledge in a more accessible manner by 'making connections between diverse ideas and provok[ing] unexpected conversations' (Wellcome Trust, 2017, para 3). This has particular relevance for the needs of a 21st Century, post-disciplinary education system where learning occurs at the intersection of the five fields, transforming how we know and investigate the world. As a pedagogical innovation, the STEAM agenda offers an approach to teaching and learning 'that encourages and facilitates unorthodox methods and strategies' (Rose and Smith, 2011, 8).

Further, a place-based approach is not specific to a geographic location; indeed it provides a road map to providing learning grounded in 'local communities and contexts, that is relevant and engaging and inquiry-based (White, 2020). Through local and tangible opportunities for agency and autonomy, students gain a better understanding and appreciation of the world around them (ibid, 2020), which becomes a foundation for global connections. This is critical given the challenges we will face and the need to adapt continuously to a rapidly changing world with agile solutions.

- What communities do you want to reach?

This session is suitable for individuals working in post-primary/undergraduate education, or industry professionals seeking to understand the benefits of integrating art / design practices for 21st Century competencies. It promotes inter and transdisciplinary planning and teaching, increasingly recognised and necessary for complex challenges and agility. Place-based STEAM within a transdisciplinary context links knowledge and competencies within real-world, solution-focused contexts and through inquiry-led / investigations supports the development of core skills for applied research and pro-social impact.

- What could attendees of your online workshop or interaction take away from it?

The attendees will leave with practical examples of sample modules for place-based STEAM learning aligned to the Sustainable Development Goals and the Earth Charter using project and inquiry-led learning that is grounded in using their local context. This also includes an introduction into service and community learning opportunities and would be of interest as an existing case study's process of development outcomes, which involved trials and iterations with 329 students and teachers from Science, Maths, Geography, Irish, Home Economics, Art and Business Studies.

The session enables discussion and gives practical examples of how to use place-based STEAMmaterial with learners and reflect on ways to embed it into their own teaching and learning plan or professional practice beyond galleries and academies.

RT-6.7: Strategic Synthesis - cultivating creative knowledge integration practices

Time: Thursday, 16/Sept/2021: 1:30pm - 3:00pm

Strategic Synthesis - cultivating creative knowledge integration practices

Andrea Kahn[1], Lisa Diedrich[2], Jonas Bylund[3], Caroline Wrangsten[4]
[1]Design-Content; [2]SLU; [3]JPI Urban Europe; [4]IQS; jonas.bylund@jpi-urbaneurope.eu

This session takes as its start point recent developments in the ongoing Strategic Synthesis Project, and will examine potential applications of imaginative and design-based approaches to synthesis work. Previously presented during the 2019 ITD conference session, "CROSSING THE LINE - REIMAGINING SYNTHESIS WORK", the Strategic Synthesis Project is an open, transdisciplinary initiative that reimagines synthesis-work as a means to illuminate and suggest paths of action in complex situations. Over the past two years, it has focused on compiling a "strategic synthesis toolkit", drawing on ideas of craft, as well as imaginative and design-based approaches to assist with knowledge-integration in collaboration and co-creation projects involving the multitude of knowledge practices required to tackle today's most pressing societal challenges.
Why Strategic Synthesis?
Actors aiming to collaborate on academic-driven or practice-led transdisciplinary projects represent diverse work arenas. These can include distinct communities of practice, each familiar with their own particular tools and techniques; dedicated thematic or issue-oriented sectors and publics in society at large, each accustomed to following their own protocols; and varied scholarly research disciplines, each fostering their respective habits of mind and specialised techniques for formalizing experience and observation, not to mention ways of life. Habituated to dissimilar ways of operating and co-operating, such diverse actors often struggle to effectively generate, communicate and/or apply knowledge outcomes (even, at times, arriving at the opposite result - substantial misunderstanding and estrangement).

Despite good intentions around acknowledging plurality, reaching consensus, and striving for inclusivity, projects involving variously trained and experienced members can (even if unconsciously) amplify wicked issues and engage in counter-productive actions. Cultivating imaginative, synthetic knowledge integration capacity provides one pathway to reduce this real (individual and collective) risk augmenting other approaches like basic awareness and reflexivity-on-the-go.

Creating spaces and cultivating mindsets for learning and experimentation requires broad and robust synthesis competence by all actors, including (but not only) academic participants in transdisciplinary efforts. Why? Because communication 'gaps' and knowledge-integration hurdles are intensified as ever more initiatives focused on wicked societal challenges (e.g., sustainable urbanization, equitable transition, urban transformation and the like) get advanced through experimental modes (e.g., every day-life labs, living labs, social innovations, and transition test-beds). An expectation for increased connectivity across sectors and silos brings with it previously unencountered 'dis-connects' that can make, or break, project ambitions, depending on how

resourcefully such breaches can be navigated.
The Strategic Synthesis open project
If knowledge integration can be described as combining knowledge-outcomes from different sources to a create a whole, knowledge synthesis aims toward a coherent whole. In strategic synthesis, that coherence derives from the art of planning and designing knowledge-outcomes in considered, deliberate and purposeful ways.
Strategic synthesis, an "open project", brings together core team members from JPI Urban Europe and the SLU Urban Futures research platform (charged with building stronger transdisciplinary capacity at SLU) with German, British, and Swedish researchers operating within and outside academia committed to exploring Strategic Synthesis as a possible approach to knowledge-integration challenges accompanying transdisciplinary research and practice. With this project, we ask:

• What do design and imaginative practices have to do with synthesis work?
• What does a strategic synthesis toolkit offer?
• Who benefits from strategic synthesis?
• Why cultivate an imaginative, strategic, synthetic mindset?
• How do we encourage adoption of a strategic synthesis approach?
• Where can we further test these knowledge-integration tools?

The project unfolds around two core intentions: first, make better use of research and second, model a synthetic mind-set.

To make better use of research, Strategic synthesis looks for creative and imaginative ways to dynamically mobilize existing knowledge resources, using knowledge generation processes that involve criticality, design-thinking and reflexivity-on-the-go. It reinforces the importance of knowledge co-creation, in a world increasing oriented toward commodification of knowledge as product, and relatedly, institutions increasingly interested in keeping control over such knowledge products so as to maximize (economic) benefits.

To demonstrate a synthetic mindset, strategic synthesisers embrace, rather than avoid (or obscure) their positionality. They accept that knowledge is always situated – it is knowledge for something. So doing, they intend to help bring forward not only what matters but to whom it matters; shifting towards making knowledge outcomes relevant and useful in specific situation and for particular audiences. (In this, they steer away from more normative, abstract academic synthesis models such as literature reviews that collate and identify the 'already known' and 'as-yet known'.) Strategic synthesis wants to distil research relevance and render it readily accessible.

This session has a straightforward goal: look at how the imaginative and design approaches adopted in Strategic Synthesis work might help advance transdisciplinary concepts and methodologies more broadly, as well as strengthen their potential for addressing societal needs, by creatively connecting people operating from very different start-points, but aiming collectively towards the same ends.

RT-6.8: Inter- and transdisciplinary research in intercultural context: learnings in dealing with complexity from research for development projects

Time: Thursday, 16/Sept/2021: 1:30pm - 3:00pm

Inter- and transdisciplinary research in intercultural context: learnings in dealing with complexity from research for development projects

Carmenza Robledo-Abad[1], Manuel Flury[2], Monica Berger[3], René Eschen[4], Johanna Jacobi[5], Elizabeth Jiménez[6], Aymara Llanque-Zonta[7], Urs Schaffner[4], Mirko Winkler[8,9], Jakob Zinsstag[8]
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Inter- and transdisciplinary research in intercultural context: learnings in dealing with complexity from research for development projects

Transdisciplinary (TD) research deals with complexity at multiple layers, including thematic complexity (i.e., socio-ecological systems), disciplinary complexity (i.e. multiple disciplines are necessary for addressing the specific research problem) and social complexity (academic and non-academic actors)[1–3]. When conducting TD research in North-South partnership aimed at addressing development challenges in the South an additional layer of complexity appears, namely what one can call "cultural complexity"[4,5]. Although we recognise that within a single country different cultures are present, we also highlight that in the context of North-South research partnerships additional elements are to be expected (KFPE)[6].

Thus, cultural complexity has to do with multiple languages, cultural backgrounds (history, religion, geographical set-up) as well as with different views and perspectives regarding inequalities in perceived supremacy in research activities (e.g., research agendas defined in the global North and to be applied in the global South)[4,7].

How does transdisciplinarity contribute to navigate cultural complexity?

Our proposed contribution presents the experiences in and learnings from dealing with cultural complexity in North-South partnerships in the Swiss r4d Programme. The workshop will pursue discussion and validation with the conference's participants. The research for development programme (r4d.ch) is a joint funding initiative by the Swiss Agency for Development Cooperation (SDC) and the Swiss National Science Foundation (SNSF) aimed at solving global problems with a focus on developing countries. It has funded over 50 research North-South partnerships in almost 60 partner countries. During the past year we have conducted an in-depth reflexion process with the teams of five research projects active in nine countries in the global South and based on medium to large North-South partnerships.

The workshop will foster dialogue between the participants in order to discuss three key questions:

- "what" is the impact of cultural complexity on the research activities?
- "how" have transdisciplinary approaches contributed (or not) to dealing with it? and

- "what are recommendations" to researchers and donors interested in North-South transdisciplinary research?

Objectives

- To present the results of five learning cases aimed at reflecting on dealing with complexity – and cultural complexity in particular - in TD North-South partnerships.

- To trigger discussions about experiences on dealing with cultural complexity in TD research.

- To contribute mainstreaming transdisciplinarity (by donors and research organisations).

Target audiences

The target audiences for this workshop are researchers as well as donors interested in understanding the advantages and challenges of TD research in North-South context. The participants will get first hand experiences on how to deal with thematic, as well as intercultural complexities related to research for development. Thus, participating in the workshop will provide insights useful for preparing new north-south TD research proposals as well as for adjusting funding mechanisms

Design:

Our contribution will combine pre-crafted and real-time elements **(separate submission)** with a Real-time workshop

The real-time workshop will be held in three steps

1. Getting the information through pitches from each Learning Case as well as the summary of the stories placed by ITD 2021 participants in the D-Group platform. For this step we will use the market place method 6 times pitches @ 12 Minutes plus moving around 20')
2. Discussing experiences and possible recommendations or next steps according to different target audiences (donors/funders, researchers, research organizations). For this step we will use the method "world café" (45', i.e. 15' per round). According to the number of participants we will offer 1 to 6 tables
    1. Tables 1&4: *tell the donors*

i. Round 1: "what" do donors need to know about the impact of cultural complexity on the research activities?

ii. Round 2: "how" have transdisciplinary approaches contributed (or not) to dealing with it? and

iii. Round 3: "what are recommendations" to donors interested in North-South transdisciplinary research?

    1. Tables 2&5: *tell other researchers*

i. Round 1: "what" do researchers need to know about the impact of cultural complexity on the research activities?

ii. Round 2: "how" have transdisciplinary approaches contributed (or not) to dealing with it? and

iii. Round 3: "what are recommendations" to other researchers interested in North-South transdisciplinary research?

    1. Tables 3&6: *tell research organizations*

i. Round 1: "what" do research organizations need to know about the impact of cultural complexity on the research activities?

ii. Round 2: "how" have transdisciplinary approaches contributed (or not) to dealing with it? and

iii. Round 3: "what are recommendations" to research organizations interested in North-South transdisciplinary research?

    1. Wrap-up or putting the pieces together: in this step the reporters in the world cafe will inform the plenary about the discussions in and recommendations from each table (25')

Outputs:

The discussions and recommendations will be summarized in infographics and/or policy briefs and distributed to Swiss and international TD funders and research organisations with the specific mention to the ITD 2021.

The pre-crafter elements (separate submission) should be available during the conference and will deliver inputs and incentives to potential participants in the workshop.

If the ITD21 organizers want, we offer to make the pre-crafted elements available even before the conference starts

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Inter- and transdisciplinary research in intercultural context: learnings in dealing with complexity from research for development projects - PRE-CRAFTED ELEMENT

Carmenza Robledo-Abad[1], Manuel Flury[2], Monica Berger[3], René Eschen[4], Johanna Jacobi[5], Elizabeth Jiménez[6], Aymara Llanque-Zonta[7], Urs Schaffner[4], Mirko Winkler[8,9], Jakob Zinsstag[9]

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Transdisciplinary (TD) research deals with complexity at multiple layers, including thematic complexity (i.e., socio-ecological systems), disciplinary complexity (i.e. multiple disciplines are necessary for addressing the specific research problem) and social complexity (academic and non-academic actors)[1–3]. When conducting TD research in North-South partnership aimed at addressing development challenges in the South an additional layer of complexity appears, namely what one can call "cultural complexity"[4,5]. Although we recognise that within a single country different cultures are present, we also highlight that in the context of North-South research partnerships additional elements are to be expected (KFPE)[6].

Thus, cultural complexity has to do with multiple languages, cultural backgrounds (history, religion, geographical set-up), institutional set-ups as well as with different views and perspectives regarding inequalities in perceived supremacy in research activities (e.g., research agendas defined in the global North and to be applied in the global South)[4,7].

How has transdisciplinarity helped to navigate cultural complexity in research for development?

Our proposed contribution for the International Transdisciplinary Conference 2021 focuses on experiences in and learnings from dealing with cultural complexity North-South partnerships in the Swiss r4d Programme. The research for development programme (r4d.ch) is a joint funding initiative by the Swiss Agency for Development Cooperation (SDC) and the Swiss National Science Foundation (SNSF) aimed at solving global problems with a focus on developing countries. It has funded over 50 research North-South partnerships in almost 60 partner countries. During the past year we have conducted an in-depth reflexion process with the teams of five research projects active in nine countries in the global South and based on medium to large North-South partnerships.

The pre-crafted elements is a series of 5 short publications summarizing the strategies used in 5 transdisciplinary North-South partnerships in order to face and use cultural complexity.

The insights of these document will be used as starting point in a workshop (with the same name) aimed at fostering dialogue between the conference's participants in order to discuss three key aspects:

- "what" is the impact of cultural complexity on the research activities?
- "how" have transdisciplinary approaches contributed (or not) to dealing with it? and
- "what are recommendations" to researchers and donors interested in North-South transdisciplinary research?

During the workshop we will jointly elicit key recommendations for researchers and research donors

RT-6.9: Linkages between Transdisciplinarity and Education for Environmental Citizenship: Implications and Approaches

Time: Thursday, 16/Sept/2021: 1:30pm - 3:00pm

Linkages between Transdisciplinarity and Education for Environmental Citizenship: Implications and Approaches

Andreas Ch. HADJICHAMBIS[1], Ralph HANSMANN[2]
[1]Cyprus Centre for Environmental Research and Education, Cyprus ; ENEC; [2]TdLab ETH Zurich; a.hadjichambis@cytanet.com.cy

Linkages between Transdisciplinarity and Education for Environmental Citizenship: Implications and Approaches

–A Joint Discussion between transdisciplinarity experts and the European Network for Environmental Citizenship (Cost Action CA16229)

In the European Network for Environmental Citizenship (ENEC) Cost Action more than 135 academics, researchers and scientists from 36 European countries as well as from Australia, Israel and USA are participating. Environmental citizenship (EC) is understood within ENEC as: "the responsible pro-environmental behaviour of citizens who act and participate in society as agents of change in the private and public spheres on a local, national and global scale, through individual and collective actions in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, achieving sustainability and developing a healthy relationship with nature. 'Environmental Citizenship' includes the practice of environmental rights and duties, as well as the identification of the underlying structural causes of environmental degradation and environmental problems, the development of the willingness and the competences for critical and active engagement and civic participation to address those structural causes, and to act individually and collectively within democratic means, taking into account inter- and intra-generational justice" [1]. Education for Environmental Citizenship (EEC) can be regarded as the type of education which considers environmental citizenship as its prime concern and ultimate aim.

Transdisciplinarity and transdisciplinary approaches towards education obviously play an important role for the promotion of environmental citizenship and for the design and implementation of corresponding education formats. It is therefore high time that research communities on environmental citizenship (ENEC) and on transdiscplinary (TD-Net) exchange their opinion on interlinkages between transdisciplinarity and environmental citizenship and corresponding implications for education.

This session would represent a real time contribution to the International Transdisciplinarity Conference 2021 "Creating spaces and cultivating mindsets for learning and experimentation" (September 13-17, 2021, Online).

The topics of the discussion include the following:

Which are the main similarities of the ideas and principles between EC/EEC and TD/TD-education?

What can the EC/EEC and TD communities learn from each other?

How can the EC and Td communities engage in a more systematic exchange to allow for such mutual learning?

Which opportunities for shared development of EC/EEC and TD exist or may be generated?

Further questions and topics for discussion can be suggested before and during the session.

The idea is proposed by the following scientists including the leaders and steering committee members of ENEC:

Dr Andreas HADJICHAMBIS (CY), Cyprus Centre for Environmental Research and Education CYCERE, Cyprus (ENEC Action Chair & Scientific Director, Grand Holder SR)

Dr. Ralph HANSMANN (CH), ETH Zurich, Switzerland (Member of TdLab ETH Zurich & ENEC)

Prof Pedro REIS (PT), University of Lisbon, Portugal (Action Vice-Chair)

Dr Marta ROMERO ARIZA (ES), University of Jaen, Spain (WG Primary Formal)

Dr Jelle BOEVE-DE PAUW (BE), University of Antwerp, Belgium (WG Primary Non Formal)

Dr Niklas GERICKE (SE), Karlstad University, Sweden (WG Secondary Formal)

Dr Demetra HADJICHAMBI (CY), Cyprus Centre for Environmental Research and Education CYCERE (WG Secondary Non Formal)

Dr Andri CHRISTODOULOU (UK), University of Southampton, UK (Early Carrier Investigator and Gender Equality Coordinator – STSM Coordinator)

Dr Marie-Christine KNIPPELS (NL), Universiteit Utrecht, Netherlands (Dissemination Board Coordinator – Communication Manager)

The suggested format is a Zoom meeting chaired by Andreas Hadjichambis and Ralph Hansmann (and/or further expert of EC and Transdiscplinarity such as e.g. Prof. Stauffacher) as integral event or side event of the Td Conference 2021 where all members of ENEC and conference participants could take part.

References:

Hadjichambis, A. Ch., Reis, P., Paraskeva-Hadjichambi, D., Činčera, J., Boeve-de Pauw, J., Gericke, N., Knippels, M.-C. (Eds.) (2020). *Conceptualizing Environmental Citizenship for 21st Century Education*. Cham: Springer Nature. https://link.springer.com/book/10.1007/978-3-030-20249-1

PC-5.1: Pre-crafted contributions - session 5.1

Time: Thursday, 16/Sept/2021: 5:30pm - 6:15pm

Rumia Project: a collage approach between biology, philosophy, poetry and movement in Patagonia

Gabriela Klier[1,2,3], Juan Francisco De Rosa[1,2]
[1]Proyecto Rumia; [2]Universidad Nacional de Río Negro, Río Negro, Argentina; [3]CONICET; gabrielaklier@gmail.com

Rumia is a process. Rumia is a symbiotic process, an alliance between different organisms. Rumia is also the ability to digest, to integrate external elements and make them nutritional. This project starts from these two principles: symbiosis and digestion.

We find ourselves in the need to think and inhabit this damaged planet: the end of the worlds linked to pollution, extinctions and climate change. The environmental crisis forces us to invent other ways of inhabiting, other ways of bonding, other ways of thinking and living Nature that do not place it as a slave site for resource extraction or as a pristine place for conservation. We need other story telling beyond humans, that plays with different species and with different thoughts. Following Donna Haraway, this is moment for sim-poiesis, joint creation of monsters for survival.

We understand symbiosis as a living metaphor for relationships: joint life. So we started this project to co-construct stories that consider the relational character of life, that situate us in ecological complexity. Also, ruminate is the symbiotic process to approach knowledge from a highly material perspective: we are bodies that learn, bodies that study and bodies that relate. In this bodily gaze view, digestion is that process by which we can assimilate, excrete and incorporate different foods, concepts, knowledge, thoughts, stories and gestures.

Our research is especially interested in the place where we live: Argentinean North-Patagonia, its forests, steppes and cities. The coexistence with lichens, mountains, coihues, stories of colonialism, indigenous people, national parks, nuclear plants and tourism. We conform as a collective with friendship as a political principle that arises from the encounters in the mountains and integrates different trajectories and the common desire to entangle, contaminate and share our knowledge.

In this intervention we are seaking to create an art-graphic using the collage technique as a way of combine different ellements –fotographes, archive material, texts and drawing- that shows our processes and projects. Particulary resuming the "Symbiont thought" course, the philosophical walks and the danceable philosophy meetings to open up questions about how to involve movements and poetry in the environmental approaches that goes beyond arts and sciences. This graphic contains a transdisciplinary research that seek to generate thoughts and practices about the environment in an experiential, theoretical and affective way. In particular, from we weave from philosophy, biology, poetry, visual arts, dance and performance around stories in Patagonia.

There are two big concepts that perform our collage. The first one is the notion (and reivindication) of the Monsters in Donna Haraway as a way to free ourselves from previous and hegemonic classifications and dominions. The second is the Anna Tsing reivindication of contamination, as a way to escape of the notion of purity. We need to learn from fungi, build collaborative ways to live on a damaged planet and contaminate contaminate ourselves with different knowledge, bodies and forms of life.

Precrafted Poster- Methodological aspects of social power relations in Td interactions

Maria De Eguia Huerta, Esther Meyer
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This is a pre-crafted contribution connected to an online workshop also named "Methodological aspects of social power relations in Td interactions". Behind both contributions is the Lighthouse gGmbH team, working in transformative Td research projects in Europe North and South.

This is a pre-crafted poster with the goal to share our Td experience form being on-the-ground starting from a very concrete Td experience (which will be presented with a video in the workshop format, that is following the same goal). In this poster we will show some selected pictures which show concrete aspects of the mentioned experience, an international Antidiscrimination Lab.

By sharing concrete methodological aspects of our experience, we would like to contribute to the broad debate about Td methodology and the mechanisms through which social power relations, privileges, discrimination, and exclusion may find their way to the heart of a Td interaction.

Our main goal with this contribution is to invite those participants "visiting" our poster to reflect about the complex mechanisms behind social power relations during Td interactions in which participants experience privilege and discrimination in unequal ways. A further goal is to share some of our challenges and learned lessons in our work on-the-ground about aspects to consider when designing a social power relations conscious Td interaction.

Our poster will consist of representative images, an explicative text and a link for those wishing to contribute to a collective reflecting about this issue. The link will be made to a digital whiteboard, in which contributions can be written. A reaction to a contribution of a previous participant will also be possible.

The aspects we will highlight in the poster which consider were despite all challenges key to the success of this Td experience are:

a) Living together in basic conditions. The common humanity takes place and arises when participants are sharing sleeping room, washing clothes per hand outside together or sharing a kitchen work slot.

b) The surroundings, Pyrenees. For example, hiking in the mountains was intertwined with an activity of deeper reflection on violence, in which individual and group work reached high intensity because of the issues that arose. This could be balanced through the parallel hiking activity.

c) A transformative, qualitative, creative, transdisciplinary research methodology constantly and consequently connecting three axes: an analytical one, the lab; a body-connected one, the corporeal; and a crafts one, the creative.

d) We asked ourselves uncomfortable questions beyond political correctness.

We would like to reach practitioners and academics interested in advancing knowledges and collective reflecting as well as sharing concrete aspects when facing the challenge of taking social power relationships into account when designing Td interactions.

Challenge accepted! – Coping strategies for developing Theories of Change in ITD contexts

Lisa Deutsch[1,2], Brian Belcher[3,4], Rachel Claus[3], Sabine Hoffmann[1,5]
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'Theory of Change' (ToC) has been promoted as useful tool in inter- and transdisciplinary sustainability research for visioning, planning, communication, monitoring, evaluation and learning. This pre-crafted contribution aims to create an infographic based on a recently published peer-reviewed article on lessons learned from developing ToCs in a large inter- and transdisciplinary research program. The paper analyses the experience of leading such a ToC process with researchers from multiple disciplinary backgrounds on sustainable urban water management and presents coping strategies to deal with the challenges that were encountered. The intention of this contribution is to (1) synthesize insights on challenges and coping strategies when developing ToCs in large programs, (2) present these insights in a novel and digestible format (in contrast to a classical research article) in order to support other program leaders in such ToC processes, (3) apply principles of science and visual communication to assure understanding across scientific communities, and (4) make these insights more easily shareable. To make sure that the infographic is indeed useful, we will solicit feedback from the envisioned target audience, inter- and transdisciplinary program leaders, ahead to the conference. This iterative process will end with feedback received during the virtual discussion slot at the conference and its subsequent refinement. We will post this iteratively developed infographic on our various social media channels (e.g. Twitter, LinkedIn) and its respective subgroups and thereby envision that it will be further shared across those channels to reach our target audience.

Overall, by preparing the article's insights in a more condensed and practical way, we want to make the findings overall more accessible and facilitate the uptake beyond its presentation at the ITD conference in September 2021. We further want to create awareness about challenges among researchers leading projects and programs, interested in developing ToCs for increasing the societal impact of their activities, but also to equip them with strategies to address these challenges effectively. Challenges include (1) managing time constraints (2) balancing between concrete and abstract discussions, (3) ensuring diversity in group composition while balancing comfort and discomfort, (4) fluctuating between reservations and appreciation, and (5) fulfilling both service and science roles. Coping strategies are among others alternating formal and informal interaction formats, ensuring heterogeneous group formation, involving early-career scientists, being responsive to emergent needs and making the added value of ToCs explicit and tangible for all participants. We believe these lessons are critical for program leaders to design effective programs in order to make substantial contributions to societal change.

This contribution relates to the stream '*TD on-the-ground: making TD tangible*', particularly to the question '*What tangible transdisciplinary processes and practices are taking place on-the-ground*?' as the contribution refers to the application of the ToC approach and provides empirical insights on an interdisciplinary integration process. It further aligns with the question '*How can we use these examples to improve existing transdisciplinary practices and to facilitate inclusive and equitable research?*' as it derives tangible lessons learned for future ITD practices (Deutsch et al., 2021).

A Quality Assessment Framework for Transdisciplinary Research: Lessons from Evaluating Graduate Research Projects

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University-based research has a major role to play in addressing urgent social and environmental challenges. Graduate research remains underdiscussed in the literature and is an untapped means to influence social transformation. Students, whether they continue in academia or as practitioners, are part of the next generation of researchers, professionals, decision-makers, and members of society, and the learning, skills, and values brought to and gained through the research experience can translate to other areas of students' personal, social, and working lives. As part of a broad effort to increase societal impact, research approaches are evolving to be more problem-oriented, engaged, and transdisciplinary. New approaches to research evaluation are therefore needed to learn whether and how research contributes to societal change. We used the principles and criteria presented in Belcher et al.'s (2016) Transdisciplinary Research Quality Assessment Framework (QAF) to assess the transdisciplinary research design elements of three completed Royal Roads University doctoral research projects. The cases were selected purposively based on their potential to contribute to real-world impact and to generate lessons about the change process. The student researchers were all mid-career development practitioners, each tackling a different development issue in Africa (e.g., post-conflict transitional justice in Uganda, private aid in Tanzania, and water, sanitation, and health in Nigeria). The four principles of the QAF are: relevance, which refers to the appropriateness of the problem positioning, objectives, and research approach for intended users; credibility, which pertains to rigour of the design and research process to produce dependable and defensible conclusions; legitimacy, which refers to the perceived fairness and representativeness of the research process; and effectiveness, with criteria that assess the degree to which research is positioned for use. Paired with an outcome assessment of each of the three doctoral projects, application of the QAF enabled us to analyze projects' design and implementation to draw connections between transdisciplinary elements and contributions to realized outcomes (Belcher et al., in press). Results indicated that stronger transdisciplinary characteristics were associated with more pronounced outcomes and diverse contributions to change processes (i.e., research, organizational practice, governmental policy, professional development). QAF results also uncovered transdisciplinary qualities supported by training as well as those which were inherent in the student researchers. We draw lessons from our testing of the QAF on the doctoral case studies, learning about: (1) design and implementation of effective research projects; (2) how higher education institutions can provide training and support for impactful student research; and (3) how to improve the QAF tool. This presentation provides an overview of the key theoretical concepts of the QAF, presents examples from our application of the QAF to graduate research case studies, and concludes with lessons learned.

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QAF 2.0: A Refined Transdisciplinary Research Quality Assessment Framework

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Transdisciplinary research (TDR) aims to solve complex societal issues through systems transformation. TDR approaches continue to evolve at an ever-increasing pace. As the boundaries between disciplines are crossed and blurred, more and more diverse stakeholders are engaged in and co-generating research. Traditional research quality definitions and criteria are insufficient to assess the variety of new research approaches characteristic of TDR. New, more comprehensive, and multi-dimensional principles and criteria are needed to guide and evaluate TDR design and implementation. Belcher et al. (2016) conducted a systematic review of literature on defining and measuring research quality in an interdisciplinary or transdisciplinary context, and used the findings to develop a prototype Transdisciplinary Research Quality Assessment Framework (QAF). The four QAF principles are: (1) relevance, which refers to the appropriateness of the problem positioning, objectives, and research approach for intended users; (2) credibility, which pertains to rigour of the design and research process to produce dependable and defensible conclusions; (3) legitimacy, which refers to the perceived fairness and representativeness of the research process; and (4) effectiveness, with criteria that assess the degree to which research is positioned for use to contribute to positive outcomes and impacts. The QAF was designed for a range of users and uses, including research funders and research managers assessing proposals; researchers designing, planning, and monitoring a research project; and research evaluators assessing projects *ex post* to learn about effective research practice. Our team has subsequently tested the QAF tool in evaluations of completed research projects in a range of TDR, graduate student research, and research-for-development contexts. On that basis, we have revised the principles, criteria, and definitions to improve clarity, reduce ambiguity and potential for double-counting, and add new criteria as needed. We have also developed guidance for the application of each criterion. This contribution presents the revised set of QAF criteria, definitions, and guidance, as well as scoring tools and templates, and discusses how to apply the QAF.

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Belcher, B. M., Rasmussen, K. E., Kemshaw, M. R., and Zornes, D. A. (2016). Defining and assessing research quality in a transdisciplinary context. *Research Evaluation, 25*(1): 1-17.

PC-5.2: Pre-crafted contributions - session 5.2

Time: Thursday, 16/Sept/2021: 5:30pm - 6:15pm

tdAcademy – a new interactive (online) platform for the transdisciplinary research community

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Researchers from the global South and North have contributed to a sophisticated understanding of the concepts, methods, and practices of transdisciplinary research, while often coming from different fields of research and institutions. Transdisciplinary researchers with their expertise, skills and experiences, however, still remain somewhat scattered around the globe, which limits exchange and strengthening of individual researchers as well as the overall community. In recent years, several local, national, and international initiatives have emerged to connect researchers and create spaces for the transdisciplinary research community, such as the Global Alliance for Inter- and Transdisciplinary Research and Education (ITD), the International Network for the Science of Team Science (INSciTS), and the Network for Transdisciplinary Research (TD-net). They all use various formats such as conferences, working groups, newsletters, workshops, and blogs to connect the community and enable discussions. In addition to these comprehensive efforts, tdAcademy seeks to provide a dynamic online platform for the global community to network, initiate collaborations, exchange experiences and ideas, pool capacity-building opportunities, and reflect on the further development of current concepts, practices, and methods.

In this short animated video, we introduce the new tdAcademy website and invite transdisciplinary researchers to participate. First, we present the idea of the tdAcademy, which is a platform for transdisciplinary research and studies. Second, we explain the community area on the tdAcademy website with its functions. For example, researchers can create individual user profiles, search for researchers with similar interests, and identify online events relevant for their work. Third, we highlight the potential benefits of this new website and invite transdisciplinary researchers with different levels of experience to participate and further develop the platform.

The online platform has been developed by the project "tdAcademy – Platform for transdisciplinary research and studies", which also conducts research on four issues relevant for transdisciplinary research: context-dependencies, new formats, societal and scientific effects. The project is funded by the Federal Ministry of Education and Research (BMBF) in their funding scheme Social-Ecological Research. Founding partners are the ISOE - Institute for Social-Ecological Research, Leuphana University, the Center for Technology and Society (ZTG) at the Technische Universität Berlin and the Oeko-Institut. tdAcademy is supported by more than 30 leading institutions from the international research community that jointly conduct, promote, and shape transdisciplinary research.

Liberating research and education: transdisciplinary methodologies based on Paulo Freire

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The Brazilian pedagogue Paulo Freire has developed an approach to literacy and liberation in the second half of the 20th century that incorporates ground-breaking principles for individual and social transformation. The idea of learning to 'read and to write the world' embraces the appropriation and understanding of the world, and a belonging to a world that we transform by inscribing ourselves to it. His work had an outstanding influence on educational reform processes around the world and strongly informed the emergence of Participatory Action Research. His approach to research and learning can contribute significantly to foster transformation through transdisciplinary research and education.

The short video presentation introduces the methodological learnings out of a series of research projects, workshops and publications, conducted and published in Latin America and Europe, on how principles of research and learning developed by Paulo Freire can inform transdisciplinary research methodologies. It aims at creating sensitivity for the liberating and transforming potential of different approaches. The research projects in the background include cases of conceptual work in interdisciplinary sustainability science, learning journeys by stewards of protected areas, systematization of collaborative experiences with peasants, generative picturing with high school pupils and theatre of the oppressed processes.

The video presentation itself will focus on the outcomes that are relevant for the development of transdisciplinary methodologies. It addresses methodological questions and will provide an overview on how the principles of research and learning are incorporated in methods that contribute to transformative inter- and transdisciplinary research in heterogeneous fields and team constellations. It aims to inspire transdisciplinary research communities and open space in order to discuss the transformative potential of different methodological approaches. Within a Freirean approach, power relations need to be subject of continuous reflection and negotiation, requiring methodological strategies to tackle existing quality criteria of research and mechanisms of legitimation.

Further, the research cases present bridges between discourses of Participatory Action Research and transdisciplinarity, and seek to support the exploration of overlaps and mutual learning between the two approaches. Both target at envisioning and co-producing alternative futures. Paulo Freire was not only the pedagogue of oppression, but also a representative of a pedagogy of hope. This is true not only for a pedagogical perspective, but also for transdisciplinary methodologies based on Paulo Freire

The authors are the coordinators of a series of events on the subject and the editors of a Special Issue on '*Methods for inter- and transdisciplinary research and learning based on Paulo Freire*', published in the Journal of Development Studies (vol. XXXV 3-2020) and a book on '*Aprendiendo de Paulo Freire: Métodos para la investigación inter- y transdisciplinaria*' that will be published by the end of 2021 in the series 'Constuyendo lo Común', Copit ArXives, National Autonomous University of Mexico.

The short video presentation will introduce core principles of Paulo Freire's approach to research and learning and will provide snapshots with insights into how these can be incorporated in transdisciplinary research methodologies. It will be built on videos and images from the underlying research processes.

Moving from interdisciplinarity to transdisciplinarity: A case study of boundary crossing among students participating in virtual international and interdisciplinary community service-learning module

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Moving from interdisciplinarity to transdisciplinarity entails not only crossing boundaries between disciplines, but also between science and society. The complexity further intensifies when international collaborations are sought, which require crossing cultural boundaries. With the current state of pandemic, as all works have moved to virtual platforms, an additional layer of complexity has been introduced to such boundary crossing initiatives.

This case study explores the concept and experience of boundary crossing among students involved in the virtual interdisciplinary community service learning (iCSL) module convened by Vrije Universiteit Amsterdam. The module engenders interdisciplinary collaboration between students to address complex societal issues, while introducing transdisciplinarity through engagement of local stakeholders and experts as group advisors. The students in the course participated from universities in the global south (Indonesia, Philippines, Brazil) and north (EU), and from different cultural and disciplinary backgrounds.

The 5-month online module focused on fostering interdisciplinary collaboration between 38 students (from 7 Universities and 22 Master programs) to jointly address complex issues related to four global topics, viz. COVID-19, Circular economy, Food, and Digital inclusion. The students collaborated to create a joint research report by assimilating knowledge from their disciplines, and research data from their own research internships. Through means of weekly team meetings, exercises, and reflection sessions conducted via various online tools and platforms (zoom, canvas, slack, mural, jamboard), the students experienced interdisciplinary collaboration. In order to move from interdisciplinarity to transdisciplinarity, the module also connected the student groups with relevant stakeholders and experts from the Netherlands and USA to help them understand the issues from the local context.

The following findings were uncovered through thematic content analysis of data obtained from four individual semi-structured reflection sessions (interviews) and ten written frame reflection exercices with students over the course of the module:

While the students commenced the module with skepticism over interdisciplinary collaboration and co-creation, they later found it helpful in understanding the issues-at-hand and their global impact in a holistic way. The module was largely helpful in fostering cross-disciplinary and cross-cultural understanding, knowledge sharing and integration.The connection with societal stakeholders and experts helped students ideate and recommend local targeted solutions from their global and interdisciplinary insights.This demonstrated how students were able to move a step further from interdisciplinary collaboration to transdisciplinary co-ideation and co-creation. The virtual module adapted in this course provided a speedy, low-cost, and low-resource platform for interdisciplinary collaboration among students from global south and north, and in connecting them with stakeholders and experts located in the Netherlands and USA. While there were many opportunities as such, some challenges related to language, time zone, and socio-cultural values, beliefs and attitudes were also encountered.

This case study shows that disciplinary and cultural boundary crossing, and knowledge sharing and co-production is possible in a virtual, international and interdisciplinary environment. Further, it shows that through engagement of societal stakeholders and knowledge experts, interdisciplinary initiatives can be further enriched and extended to elicit transdisciplinary co-ideation and co-creation. This study recommends the use of virtual transdisciplinary collaboration by engaging global stakeholders and their diverse experiences and insights to engineer local contextualized solutions.

[Note: The video presentation will also showcase the joint research products co-created by the students and feature testimonies from students, teachers, and societal partners involved in the module on the virtual inter/transdisciplinary teaching and learning experience.]

Collaboratively training transdisciplinary scholars and practitioners: Exploring challenges and opportunities in the COVID-19 pandemic context

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Building the capacity and skills of the next generation of practitioners and scholars in transdisciplinary learning and research is now widely recognised as one of the important frontiers of transdisciplinary science and education. Worldwide, there has been a growth in training initiatives, communities of practice, and research to build capacity of transdisciplinary scholars and practitioners. While the early stages of this growth took place within specific institutions, there has recently been a shift to more collaborative, cross-institutional and cross-country training initiatives which bring together scholars, practitioners, senior researchers, and other relevant experts into networks or communities of practice to enhance learning. Moreover, training is beginning to draw on the knowledge and experience of societal actors and partners beyond academic. This has no doubt been fuelled by the increasing globalisation of the academic endeavour, along with expectations of early-career researchers to have a global reputation and networks, whilst maintaining place-based relationships and research activities.

We looked into these emerging international collaborative initiatives for transdisciplinary training to identify some of the key challenges and opportunities experienced in these communities of practice. We conducted literature reviews, interviews and workshops with academics involved in transdisciplinary training initiatives to tease out the challenges and opportunities. What has become clear is that this collaborative training for transdisciplinarity has been enabled by the globalisation of academia in the context of a highly mobile world. The arrival of the COVID-19 pandemic has raised questions about the on-going feasibility of such highly mobile academic interactions dependent on international air travel. The multiple socio-political-economic challenges raised by the COVID-19 pandemic (e.g. related to socio-economic inequalities, the digital divide, and so on) also require us to pay closer attention to who benefits from such training and how we can make our training more inclusive and sensitive to goals associated with equity, diversity and inclusion. Moreover, there is an interesting tension with respect to mobility and deep TD learning: the tension between contextual place-based learning (reinforced by those who work with Indigenous and local peoples) and the lure of cross-cultural and international learning elsewhere that may foster comparative analysis.

There is a likelihood that we will move to a hybrid model, in recognition that not all of this training can be accomplished virtually or remotely. The COVID-19 pandemic has simultaneously shown the potential of collaborating virtually and the importance of in-person, on-the-ground interactions for contextual and cultural learnings.

We therefore add another layer to our analysis, asking how collaborative transdisciplinary training can and should be done virtually and remotely - what the challenges are, and what creative solutions might look like, and how to integrate this with meaningful place-based research and relationships. We present some of the early insights from this work here, inviting

feedback and discussion from all in the conference audience who are likely to also be learning-by-doing in this new virtual world which we now inhabit in the global COVID-19 pandemic.

Rethinking hybrid interaction to foster cross-disciplinary collaboration: A case of GradLounge for Early Career Researchers (ECRs)

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A key challenge for sustainability research and education at Higher Education Institutions (HEIs) worldwide is how to foster meaningful cross-disciplinary, cross-sectoral collaboration. The creation of several digital platforms at HEIs (e.g. Microsoft Teams, Yammer) is a testament to this challenge. However, we argue that current investment into these platforms tend to overlook the social and emotional aspects of human interaction, as well as the fundamental challenges for inter-, multi-, and transdisciplinary exchange. In this presentation, we use a student-initiated project, 'GradLounge', as an example to explore ways to create an enabling hybrid environment for direct and sustained exchange between diverse actors at HEIs.

GradLounge is a web-based academic collaboration platform specifically focused on fostering face-to-face research interactions across all disciplines among early-career researchers (ECRs) of a single institution. The central features of GradLounge allows ECRs to quickly identify the skillset of other peers, reach out to them for support, refer their peers based on subject expertise, and arrange face-to-face meetings within a safe campus environment.

Drawing on the theory of system thinking in sustainability transformation (Abson et al. 2017), GradLounge focuses on addressing the underlying assumptions about academics' digital networking. For example, by specifically targeting cross-disciplinary connections, we directly counter-act one of the main issues of modern social networks and existing researcher networks: the existence and reinforcement of information bubbles that are detrimental to open discourse and progress. Moreover, we focus on ECRs, as they are rarely the target of large-scale, for-profit corporations; hence, their needs have been largely overlooked in the existing social platforms for academics.

User surveys (n=50), stakeholder interviews (n=7), and a focus group with 5 ECRs were conducted at two HEIs in Canada and Switzerland. Key findings include:

- Benevolence, career-building, and discovering new research are the main motivations for ECRs to use GradLounge.

- ECRs are naturally looking for novel research avenues, and willing to invest more time and energy into building new collaborations beyond traditional research lines.

- Although there are already multiple ways to sustain a collaboration once it is started, there are very few tools to find the right people to collaborate with. This lack of means to facilitate more cross-disciplinary exchange within the current academic system was recognized by all interviewees.

- Existing social platforms (e.g. ResearchGate, Twitter,) rely heavily on 'global presence'. This primarily rewards a subset of established actors who typically are senior researchers at prestige institutes in the global North where financial means and collaboration networks are already plenty. Thus, ECRs reported the desire to have a place-based platform that is safe, collaborative, and tailored to their needs, such as peer-support, trust building, and learning how to engage in cross-disciplinary exchange and collaboration.

Through a 'living lab' approach, we plan to continue generating lessons on how a wide range of university users network, connect, and collaborate across disciplines via a campus-based platform like GradLounge. The long-term goal is to foster inter-, multi-, and transdisciplinary exchange between diverse stakeholders starting within academia itself, and then progressing to the academia-industry and academia-society interfaces.

Global Perspectives: Multi-spatial trajectories at the nexus of art and science discourse

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Living in a globalized society requires attaining interdisciplinary and intercultural communication skills; in order to understand cultural, institutional and educational systems that assist in fostering dialogues, navigate through altered working spaces and remove cultural barriers by being more open to other worldviews. According to Sorrell's (2019) process there are six points to navigate intercultural spaces consisting of inquiry, framing, positioning, dialogue, reflection and action. In the context of globalization we need to understand how we inhabit 'spaces' interpersonally, communally and internationally and the shift from a 'local universalism' to a 'global contextualism'. (Nowotny, 2017, p.3)

Curatorial frameworks within discourses among art and science practices, emerging technologies and spatiality, designate a fragmented domain often determined by institutional, geographical and disciplinary parameters. 'Mediation' is therefore required to transmit messages from one party to another, by reconciling altered approaches. (Lind, 2013). In Bhaskar's (2017) view the concept of 'curation' resonates as a powerful and wide-ranging skill in terms of creating content, selecting information and adding value in a world of excess; from numerous new technologies, media companies, cultural organisations, laboratories, scientific research output to artistic practices. As a result, the motivation for this research is to address the spatial trajectories that art and science entangle, to develop a global transdisciplinary framework for cultivating meaningful discourse, and to reflect on virtual environments and tools that facilitate such complex dialogues.

The methodology used is primarily comprised of digital research methods such as online observation, participatory action research and semi-structured narrative interviews. During the conference, I will present a pre-crafted storytelling audio contribution based on case studies and examples from communities of practice and spaces in between that occurred during COVID, specifically a taxonomy of spaces and curatorial approaches where these transnational interactions occurred between artists, scientists, entrepreneurs, humanists, technologists and policy makers. Essentially, a meta-analysis of the transitional spaces for art/science collaboration & discourse.

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PC-5.3: Pre-crafted contributions - session 5.3

Time: Thursday, 16/Sept/2021: 5:30pm - 6:15pm

The underused potential of art-science collaborations: improving the balance in collaboration practices between artists and scientists can impact knowledge production

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There is widespread optimism that collaborations between artists and scientists can develop solutions to complex problems, co-create new knowledge and contribute to (scientific, philosophical, personal etc) discovery and understanding. However, art-science pairings are often based on similar subject areas alone, and without (structured) efforts of cooperation. Embedded in their own disciplines, specialised ways of communication and knowledge exchange, such collaborations of far-removed disciplines often face difficulties in finding a true balance. In addition, for artists and scientists, the path towards meaning-making is not guided by the same principles. The artist is not bound to scientific goals or facts and there is no obligation to produce truth, which makes art-science collaborations a unique aspect within inter- and transdisciplinary research.

For scientific institutions or organisations, such collaborations are often perceived as "art in the service of science" (Roughley 2018) where outcomes of art-science collaborations are primarily seen as a means to communicate difficult scientific concepts to the public. It is rare that art becomes an acknowledged, integral ingredient in *producing* scientific knowledge. This is surprising given the special psychological relationship of humans with art: experiencing art can lead to new ways of understanding and meaning-making— crucial for solving the complex and "wicked" problems we are facing in the world today. With its unique blending of bottom-up processing of features with top-down contributions of memory, personality and context, experiencing art has measurable benefits and can lead to a change of a core aspect of the self (Pelowski 2017). If we experience art, new connections can emerge and reflection turns into learning (Kolb 1976). Without this human aspect, any research is incomplete.

In this paper presentation, I willl give a conceptual analysis about transdisciplinary collaborations in general and for artists and scientists in particular, explore reasons for the common disparity between anticipated involvement and outcome, and offer ways of working together. Combining insights from the ongoing academic debate and my personal experience as an astrophysicist and artist who has actively worked in art-science collaborations for the past 12 years, I found that a guided translation between the two disciplines and dedicated time and space for exploration to gain a deep level of familiarity of the history and methodology of the other discipline is vital. These can be facilitated in mediated residency programs or through co-created exhibitions. Importantly, this includes confronting ones own prejudice and biases towards the other discipline. Like for successful collaborative work within one discipline, the group of individuals trained in different fields relies on personal communication, the willingness to learn from all participants, and the ability to openly question ones own notion. The recognition that art can push aspects of scientific research forward in the same way that science can push art, reinforces the sense of involvement on a level playing field.

Piloting Fairer Futures: Reflections on youth engagement with just and sustainable future cities through flash fiction

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The traditionally elite and highly technological models for creating future scenarios have not, to date, led to sufficient improvements in sustainability practices to address the global climate and biodiversity crises. In response, there is growing attention to, and experiments with, more diverse approaches to scenario building. This work builds on this trend, contributing the concept and method of fairer futuring; that is a just process for thinking about, and planning for, the future in an inclusive manner. Specifically such processes are fairer in terms of procedural justice (e.g. participation opportunities), which could lead to more distributional justice (impacts). SHARECITY, an ERC-funded research project examining the practices and sustainability potential of urban ICT-mediated food sharing (from community gardening and collective cooking to the redistribution of seeds, food and compost), has been developing experimental practices for creative youth engagement with sustainable urban food futures. A desirable future scenario was developed from analysis of in-depth ethnographic work undertaken internationally with urban food sharing initiatives in association with findings from a multistakeholder workshop – Sharing Futures. We then worked in collaboration with an artist to visualise a desirable future from this data as an additional means to engage young people on issues of just and sustainable urban food sharing. As a pilot study, SHARECITY held workshops and ran a 'flash fiction' short story competition based on participants writing a fictional 'day in the life' account based on the visual scenario of a sustainable desirable future with Transition Year (15-16 year olds) students in a local school. The motivation for this work is an academic inquiry as to whether the development and visualisation of future scenarios, and creative engagement with them: 1. Engages and facilitates new and different kinds of dialogue on creating a supportive

environment for sustainable urban food sharing and sustainability; and 2. Specifically, is an appropriate tool for improving engagement of young people in discussions about future possibilities for sustainable urban food and food sharing. This presentation will share the initial learnings from this pilot based on students' survey responses regarding the potential impact of workshops and visualisations of sustainable futures on youth engagement, as well as experiences developing methods and undertaking youth engagement within the school. Finally, we will reflect on approaches for fairer futuring and share our plans for further in-depth youth engagement on more just and sustainable futures.

Art, science and society: Reflections on TD practices on the intersection of disciplines and their impact.

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Transdisciplinary practices have gained popularity, therefore universities - art universities in particular - increasingly facilitate exchanges and collaborations beyond institutional, disciplinary and geographical boundaries. Yet, one area which remains a niche is the work that happens at the intersection of art, science and society: Hybrid Plattform, an initiative by the University of the Arts Berlin and the Technische Universität Berlin, and Angewandte Innovation Lab at the University of Applied Arts Vienna, both combined look back at over 20 years of expertise in this cross-disciplinary field.

At the ITD Conference 2021, we will share our knowledge and experience on transdisciplinary processes and practices, and talk about the role of the institutions and facilitators in particular. We tackle the questions of how to facilitate inclusive and equitable research, how to realise specific projects and how to build strong (institutional) structures for cooperation and joint proposals.

There are many approaches when conducting transdisciplinary projects, many of which share characteristics with those that include the arts. The difference is maybe most visible when it comes to describing the outcomes of the latter in terms of creativity, self-reflection, dissonance and communication. However, these outcomes will not appear automatically but need to be nurtured throughout the process. In this presentation we look at examples, reflecting on what has worked and what has worked less well in these collaborations.

We stimulate a shift of perspective allowing new ways of thinking and bringing about promising future forms of work, research, teaching and output. In doing so, we offer space for encounters with an open, creative and innovative aim. Thus, such projects and exchanges address a world that is growing ever more complex, requiring multidimensional perspectives and research approaches in order to achieve holistic solutions.

Within the short video presentation we will provide an overview over processes and practices as they take place on-the-ground, present formats and suggestions as to how such an inclusive approach to research and knowledge exchange can be facilitated.

The ITD community will gain direct insights into how to cooperate with all parties on equal footing and how to make it an enriching experience for all. Finally, we want to convince the audience of how much inter- and transdisciplinary projects benefit from artistic skills, expertise and contributions.

This session on "Art, science and society: Reflections on TD practices on the intersection of disciplines and their impact" will provide inspiration on how TD can be approached in an ever more inclusive manner, leading to innovative change and acknowledging the role of art in the process of generating new ideas.

Converging arts, science and technology - A Q-Study: Is transdisciplinarity the shared language?

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Purpose and scope: This abstract is submitted as a pre-crafted contribution to the transdisciplinarity on-the-ground stream. The paper will discuss the preliminary findings of an ongoing Q-Study investigating the social and cultural constructs which characterize the experience of collaboration between artists, scientists and technologists. The study, provides insights into the question of how artists, scientists and technologists experience collaboration as a form of wide interdisciplinary (ID) or transdisciplinary (TD) creative and cultural practice. Other pertinent questions include how key TD concepts such as integration and complexity are perceived by artists and collaborating scientists / technologists in the process, and how collaboration is defined when working across seemingly disparate disciplines of art, science and technology. Given that the art-science domain is extremely diversified in a way even resisting a unified term, the study focuses on the types of collaborations demonstrating a keen interest in critically approaching the relationship between scientific and or technological matter, its context and its function within society through creating boundary expanding, societally progressive at times even scientifically interesting works. (Bernstein, 2011, Wilson, 2002, Koek, 2019). As such, this research is situated at the intersection of TD/ wide ID research (Klein, 2008, Nowotny, Scott, Gibbons, 2001, Hirsch-Hadorn et.al., 2008), art-based research (Borgdorff, 2012) as well as collaborative art (Kester, 2011) as its theoretical compass.

Preliminary findings will focus on dominant factors of collaborative experience across participants. A digital data driven art piece as a work in progress will be included alluding to the connection between study participants and their shared opinion spaces.

Relevance / Significance: Collaboration is a widely studied concept with theoretical underpinnings mostly in organization studies, public administration, social work, with limited focus on cultural and creative industries, where it is predominantly discussed in relation to innovation and policy. Collaboration is also investigated largely in science driven contexts such as team science, healthcare and sustainability. However, there is scant information on how we can conceptualize wide interdisciplinary interactions between artists, scientists and technologists, as well as on to what extent TD methods and practices are impacted by the purposeful integration of arts in the process. (Klein, 2017)

Methodology: Given the diversity of collaborative experiences in the field of art-science stemming from different motivations and forms of collaboration, this research employs Q-method, which is known as the systematic study of human subjectivity (Watts and Stenner, 2012). Current paper includes initial analysis from 35 participants (Study total 40-42) with diverse cultural backgrounds currently originating from 15 different countries across Europe, South America, North America, Africa, South East Asia and Australia. Q-participants are artists, scientists and and 'hybrid' profiles engaged with diverse interdisciplinary

orientations (Barry et.al., 2008) and team sizes and having different experience levels in art-science collaborations. Recruitment for the study was done through approaching well known professional global networks such as the Sci-Art Initiative, Science Gallery, as well as leading science art residencies such as CERN Arts and SymbioticA. After the first round of interviews, snowballing method is used to expand the reach for additional participants.

AExpertirience

Daniel Hoernemann

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How can artists and scientists work together in order to foster a sustainable municipality? The artist Walbrodt and the scientist Prof. Dr. Harald Heinrichs created a prototyp as a first answer and named it AExpertierience.

Walbrodt and Heinrichs started their work 2020 with a kick-off workshop in the Samtgemeinde Wathlingen. Together with the mayor and other representatives they figured out that it would be good, if the theme "sustainability" would be more accepted by every citizen. After that Heinrichs started his research and Walbrodt visited different places in the municipality. They worked parallel, with short exchanges to reflect on what happened. In Mai 2021 they presented their findings as separate results to the workshop team. In this presentation emerged associations related between scientific knowledge, political experience and artistic perception.

In June 2021 Walbrodt will bring scientific results and social sculpturing together in a "Petersburg Hanging" (called Wathlinger Atelier) placed in the town hall of the Samtgemeinde Wathlingen. This process will be presented as a short video.

https://hoernemann-walbrodt.de/aexpertirience/.

PC-5.4: Pre-crafted contributions - session 5.4

Time: Thursday, 16/Sept/2021: 5:30pm - 6:15pm

Cut the Crap – Teach for Future! Transdisciplinary Learning for Sustainable Development

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Are you a lecturer in a higher education institution concerned about current unsustainable development? If you believe that education can play a key role in transforming society towards more sustainability, the question is what *you* can do about it.

Sustainability contexts are often characterised by complex society-environment interrelationships with ill-defined and wicked problems – typical settings predestined for transdisciplinary research (td). Knowledge co-production and social learning processes are key features when an interdisciplinary team of scientists collaborates closely with other societal actors to elaborate sustainable solutions jointly. But how do we prepare young scientists to master these situations? Given the prevailing disciplinary structures of academic institutions, it becomes clear that many current educational formats are ineffective for supporting td learning and research. Some indications to change this arise out of the above understanding of td: focus on real-world contexts with complex problem settings; solution-orientation; involvement of various disciplines; and interaction with practitioners.

Unsustainable development is, among other things, a result of problematic, often taken for granted mind-sets and patterns of behaviour. Envisioning a great transformation towards SD means, first of all, transforming such mind-sets. Transformative learning (TL) involves a deep shift of meaning perspectives that steer our daily routines. It is usually triggered by a fundamental dilemma, e.g. in the form of emotional personal experiences, or less spectacular, by an artificial disruption of expectations created by a teacher. For us as lecturers, this is the critical point, because we might want to achieve more effectiveness in our teaching on the one hand, but we are not supposed to misuse it to overwhelm and manipulate students on the other hand. Both the individual and the social learning for transformation demands leaving the personal comfort zone, which involves a certain level of disruption from our current ways of thinking and doing. Higher education must create spaces for transformative moments of learning. The question arises, how to implement this.

Educational research provides empirically supported principles that enhance transdisciplinary learning for sustainable development (SD), such as:

- Metacognitive strategies – "thinking about one's own thinking" – to develop self-reflective and responsible personality
- Competence orientation – building academic knowledge, professional skills, and critical awareness (attitude, values) simultaneously;
- Avoid inert knowledge – combining theoretical ideas with practical application (experiential learning)
- Active involvement of students – less teaching, more learning
- Situational didactics – situations (cases studies) as starting points serving as memory anchors for associated knowledge
- Constructive alignment – creating coherence between learning outcomes, learning activities, and assessment.

A team of researchers, lecturers and educational developers at the University of Bern elaborated a comprehensive documentation: *Transdisciplinary Learning for Sustainable Development – Sharing Experiences in Designing Courses and Curricula*. The document will soon be available online as as a print version, containing tips and tools for designing td learning activities, combining long-term experience in transdisciplinary education with a solid body of evidence from educational research. It includes a number of detailed examples of td courses that we applied and gradually optimised over many years.

TD approaches to upskilling: A model of motivation and impact on digital platforms

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We propose a transdisciplinary model to learning and education, which cuts across century-old boundaries between higher education institutions and industry. Our approach puts the 'learner' at the center and is transdisciplinary in nature as it aims for learners from diverse backgrounds to learn from each other whilst they apply the knowledge they have gained. It combines research on neuroplasticity (to leverage what we know about brain adaptation in adults to generate learning formats that deliver results), learning sciences (to generate contents and feedback mechanisms that motivate people to keep learning), design sciences (to develop tools that deliver an enabling user experience) and industrial practice (to maintain a clear focus on impact and transformation). Our model has been co-designed by learners, customer organizations (i.e. learning and development professionals) and researchers.

Our model builds on three steps: learning, applying, impacting. First, personalized learning, based on the idea that individual level differences matter (e.g. Laureiro et al 2014) and that cognition and emotions interact at all times (e.g. Brusoni et al. 2020). We develop a personalized learning strategy which motivates people to learn. Digital learning, now endemic because of COVID, has very low retention rates. By valuing individual level differences, in terms of initial skills and needs, we enable each participant to customize their learning journey. Second, learners have to be able to learn by doing, and utilize their learning efforts directly in their daily professional life (Glynn et al 2011; Liaw et al 2013). Two strategies are taken: first, a hands-on series of exercises and templates are introduced into the learning experience; personalized feedback is given continuously in order to improve the learners' confidence. Third, scalability is important for impact, yet often it comes at the expense of personalization. Our user-driven digital platform enables the development of cohorts of (30 to 50) participants, as well as the flexibility to enable each participant to pace, adapt and to some extent customize their own learning journey.

Since 2017, we have developed and tested various prototypes of such model, which has lead us to invaluable lessons in regards to managing team dynamics, motivation through behavioral sciences, cognitive profiles and their relationships to certain areas. On this basis, in collaboration with our users, we have engineered our contents in way that allows to determine at a granular level what elements were more effective in each participants learning journey and which need to be adapted for his or her specific profile. We have established a company called Sparkademy that offers a learning journey to entry to mid level corporate teams on the subjects of innovation and leadership. Our team is based in 5 countries, composed of 10 nationalities, has 13 different academic degrees, speaks 11 languages, but has one common vision: a world where education enables people to achieve their full potential. We support our learners round the clock and so far in more than 56 countries in the world through an insightful and impactful learning journey.

Going beyond the AHA! Moment: Insight discovery process as a transdisciplinary competence

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In this contribution, we would like to present a paper where we develop and apply the concept of 'insight discovery' as a key competence for transdisciplinary research and creating an environment to promote transformative practices in higher education. To address complex societal and environmental problems, expertise is needed to identify new connections between different knowledge fields, integrate diverse perspectives from a wide range of stakeholders and develop novel solutions. In this context, a competence in insight discovery is a means for becoming aware of one's assumptions and enables the integration and the emergence of novel perspectives. We define 'insight discovery' and its related competences and processes based on experiences and empirical observations that early career researchers acquired in a "real world lab" (RwL) educational program for Master's students, PhD candidates and post-doctoral researchers. Based both on literature and empirical observations, we identify two states and three phases of the insight discovery process (IDP). A person begins with the "original state of knowledge" or mental model, experiences a "trigger", processes new information within the "liminal space", formulates an insight and eventually arrives at a "new state of knowledge". We argue that there is a potential for establishing "insight discovery" as a fundamental competence for understanding context, identifying relevant problems and coming upon creative solutions for complex systems, which can be trained by providing an adequate learning environment to tackle complex sustainability problems. Our presentation will introduce the framework and explore its implications for both transdiscplinary learning and confronting complex, societal problems.

Learning and experimentation in daily life practices due to the COVID-19 pandemic – results from the "Logbook of Change"

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Transition scholars have discussed in the last months whether the COVID-19 pandemic might be a window of opportunity for deep sustainability transitions by changing unsustainable routines and practices (e.g. Schot 2020, Cambridge Sustainability 2021). Yet to test this assumption, empirical insights into ongoing and potentially prevailing processes of change are needed (Nölting et al., in review). Yet, learning in transitions generally faces difficulties from limited conceptualisation (Van Mierlo and Beers 2020) and thus generating empirical evidence. The Citizen Science project 'Logbook of Change' (https://logbuch-der-veraenderungen.org/) invites (German speaking) citizens to record their personal impressions in times of the COVID-19 pandemic in a digital logbook. Citizens are affected by the consequences of the health crisis in different ways, which makes them 'individual experts' on the daily life adaptations forced by COVID-19. The data material obtained through this longitudional qualitative diary study allows for insights from very different perspectives into processes of change in the making since shortly after the first lockdown began in Germany. By beginning of July 2021, observations were documented in 1,188 logbook entries

in six survey phases between 26.3.2020 and 07.07.2021, which cover six fields of action (Mobility; Shopping & Supply; Family & Leisure; Work; Care & Support; Information & Communication), a general qualitative situation assessment and other.

The project's overarching research question is: What conclusions can be drawn from the observed changes on societal learning and transformation potentials with regard to sustainable development? Specific research questions are: a) What has changed? b) How are the changes to be discussed from a sustainability perspective? Based on answers to these two questions and logbook entries, we explore further whether the adaptation of practices and daily routines to COVID-19 regulations and circumstances has triggered processes of individual and societal learning and experimentation that can be analysed and reflected upon in the citizen science project. A third question is: c) Have individuals and actor groups based on their experiences gained acquired general change competencies that are valid beyond COVID-19 adaptations and thus open up windows of opportunity for sustainability transformations?

In order to identify and analyse behavioural changes and possible learning processes in dealing with them, we adapted a practise theory perspective (Reckwitz 2003; Shove et al. 2012), allowing to reconstruct changed practices on the basis of the heterogeneous logbook entries.

Using the method of qualitative content analysis, logbook entries were evaluated to identify and reconstruct practices and bundles of practices. In total, 30 everyday practices and bundles of practices were identified that emerged in the pandemic. (Being forced to) avoiding the materiality of other people lead to changes through adaptation (re-crafting), substitution up to interlocking/recombination of old and new practices. Examples for re-crafting or adaptation of practices for avoiding other people are new forms of office-work, communication and information for work and leisure. Along with these, new competencies for some practices were documented, e.g. living together, riding the bicycle for longer distances, testing new digital work and communication tools, restricting digital time and information, cooking or taking care of one's own wellbeing. Meanings of practices are often linked to temporal measures to combat the pandemic, but also after (enforced) experimenting new meanings were documented, of which reflexions on the long-term impacts on social relations were prominently found.

We discuss empirical findings and aspects of this citizen science diary study with regard to its relevance for TD learning: 1) What influences learning from a practice theory perspective? 2) How can indications for individual learning found in the empirical material be discussed in the light of individual transformative learning?

How to Leave a Comfort Zone: Transdisciplinary Education and Academic Learning Spaces Beyond the University

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1 Goal

Today's major challenges, such as environmental conflicts, urbanization, and health protection, increasingly require a research and teaching attitude of tied cooperation with representatives from civil society, politics, business, and culture. However, how can knowledge resources that originate outside the university be convincingly integrated into an academic seminar? Are there experienced methods to develop and institutionalize course formats in which field experts work together with university staff on an equal footing? How can Universities respond to the need of a transdisciplinary learning beyond the discipline?

This pre-crafted contribution takes up a philosophy of science perspective on the paradigmatic shift from "traditional" towards *transdisciplinary* education, and aims at initiating a critical discussion about the preconditions, the impact and the implications of transdisciplinarity in teaching and learning. Participants exchange views on latest developments, practice experiences and innovative learning spaces of transdisciplinary education. Basic forms of cooperative teaching such as citizen science, real-life laboratories, service learning, open science, etc. will be explored comparatively, and evaluated with regard to their functions, potentials and limits.

Additionally, we will present the new publication *Handbook Transdisciplinary Didactics* to the audience (in print and open-source, published August 27th, 2021) and provide an invitation to contribute to an international follow-up publication in English language (2023).

2 Targeted Communities

The pre-crafted contribution is open to all those interested in teaching and learning at the university level. Prior knowledge in the field of transdisciplinary research, instructional design, philosophy of science, or epistemology may be helpful but will not be required. We specifically address University students and teachers, higher educational professionals, academic staff involved or interested in transdisciplinary research or education.

3 Prelminiary Structure & Design

- **Screencast (5 min):** Science Pitch on current state of and latest developments in transdisciplinary teaching
- **Multimodal supplements**: Complementary audio- and image-files with dynamic content (Links to URLs).
- **Written text**: Invitation to join the authors' team of new publication project on global views on transdisciplinary didactics (scheduled for 2022/23)

PC-6.1: Pre-crafted contributions - session 6.1

Time: Thursday, 16/Sept/2021: 6:15pm - 7:00pm

Tangible Infrastructures for Living Labs

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We propose a pre-crafted format that explores contradictions, purposes and implementations of sustainable infrastructures in living labs for medium-sized towns in germany. As part of such transdisciplinary infrastructures, the format becomes foundation, transmitter and object of discussion, inviting long-term exchange to make living lab structures more tangible.

Motivation and Purpose

MaaS L.A.B.S. develops and tests approaches for sustainable mobility in a living lab in Potsdam, Germany. As this cross-sectoral challenge cannot be met by monodisciplinary research, various actors from the scientific, private and public sectors are involved. The lab extends the boundaries of academic work through learning formats and experimentation spaces.

The project considers transdisciplinarity a research mode supported by methods of knowledge transfer, management and integration. This results in two research perspectives: transformative research, that addresses societal challenges by creating actionable knowledge, and transformation research, which explores processes of change and their transferability.

Here we identified methodological contradictions and would like to suggest some coping mechanisms. Those approaches are field-tested with academic and non-academic partners.

a) Limitation vs. Sustainability – Infrastructure Approach
Living labs are limited spatially and thematically by definition. The MaaS L.A.B.S. innovations exist independent of the duration of the one specific living lab. Otherwise the developed transdisciplinary processes would risk not to be usable after the end of the project. So we decoupled them as an open TD-infrastructure, that can exist beyond those boundaries.

b) Hiddenness vs. Tangibility – Visualization Approach
The public focus of living labs lies mainly on innovations and their test procedures. Needed infrastructures, in contrast, remain usually hidden. To make them usable, they must be designed in ways that directly connect to the actors' practice. By making processes and methods visible and actor-specific, they become tangible and customizable.

c) Specificity vs. Transferability – Network Approach
Living labs operate within a specific content-driven framework. That means, there is a lack of comparability and transferability, forcing living labs to develop individual methods from scratch. To allow for this transfer and scaling, the contextual findings need to be generalized. By actively exchanging and developing tools with other living labs transdisciplinarity can be fostered and integrated more deeply into the infrastructures.

Toolbox as Living Lab Infrastructure

Using those mechanisms MaaS L.A.B.S. is developing a toolbox, which can be adapted as a flexible framework. It is understood as a living lab infrastructure because it is open for different uses, enables other processes and will persist across our specific spatial and thematic contexts.The living lab findings will be presented on an open platform, ensuring connectivity through standardization, visualization and practical relevance. As a decoupled collection, the toolbox offers methods, best practices and instructions for transdisciplinary work. Future living labs can build on this infrastructure and move into action more rapidly.

Our format introduces the concept and functions of the living lab toolbox. The format itself should have a long-term and cross-border impact by being reused in different settings. Recipients can directly interact with the format. As information and hybrid reaction format, it is part of the toolbox. In an asynchronous exchange its contents shall be discussed, criticized and further developed also after the ITD21 conference. That way, the format will create a feedback circle between TD theories, practices, formats and people.

Designing transition spaces for sustainable futures in Latin America: the case of SARAS T-Lab

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The various socio-ecological crises that characterize these transitional times demand new ways of understanding, thinking and acting. In this presentation, we outline the model and current program of a new platform known as the Transition Lab, hosted at the South American Institute for Resilience and Sustainability Studies (SARAS Institute), located in Uruguay. By drawing inspiration and integrating the approaches of Transition Design (Irwin 2015), Resilience Thinking (Olsson et al. 2014) and Policy Design (Peters 2018), we crafted an experimental space for transdisciplinary and trans-sector collaboration with multiple actors from academia, public and private sectors, as well as civil society (Zurbriggen & Juri 2021).

SARAS T-Lab is conceived as a platform to promote critical reflection, collective learning and to build capacities to address complex and systemic challenges. The tools and practices explored aim to amalgamate theory and mind-sets that cross various fields and knowledge systems (from living systems and complexity theory to post-normal science, from transition theory and social practice theory to indigenous knowledges, among others), and promote new collective onto-epistemic ways of being and knowing through action, engaging fully with the concept of the pluriverse –a world where many worlds fit (Escobar 2018).

Aiming for systemic transformations requires the adoption of several principles that emerge from multiple theories and approaches, and more importantly, the development of a series of skills and capacities. As outlined in Figure 1, these capacities are: 1) Anticipation in managing uncertainty, 2) Transdisciplinary synthesis of knowledge, 3) Experimentation in designing ecologies of systemic interventions to materialize ideas into practical actions, 4) Innovative monitoring and evaluation processes from a paradigm oriented to learning and adaptation in complex dynamic systems, and 5) Creativity for the development of wisdom, as a capacity that is required to balance and articulate all other elements.

This way, the lab emerges as an active learning platform open to host new proposals for initiatives and to support ongoing projects, where different topics or issues can be approached, especially recognizing the particular realities and contexts that exist across the continent. This wide regional reach seeks to offer a new space that formally embraces the Transition Design approach with an explicit focus on the socio-environmental challenges faced in this region while critically exploring the differences and nuances that local minds and voices bring to the table.

At present, the lab consists of two main types of activities: research (on sustainable food systems and integrative water management) and education. Given that this platform was launched in the midst of the COVID-19 pandemic, its online modality has further motivated participation and cross collaborations within the continent and beyond, transcending the typical structural and funding limitations usually found in Latin American contexts. A broad understanding of space of practice enables expansive

fluidity, continuous emergence and evolution through regional and international networking and exchange including North-South collaboration through partnerships with the *Transition Design Institute* (www.transitiondesigninstitute.net) and *Observatorio La Rábida de Desarrollo Sostenible y Cambio Climático para Iberoamerica* http://liiise.org/iniciativas/.

The CareLab for People and Planet – a photovoice approach for creating a transformative learning space at a Portuguese Higher Education Institution

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Sustainability is inherently linked to questions of relationship: How do we relate to ourselves and to the world around us, and how can we enhance our transformative capacity to thrive within the planetary boundaries? In the current times of multiples crises, e.g. the climate crisis, the pandemic due to COVID19, as well a global crisis of trust, the aspects of intertwined inner and outer care are highly relevant: The personal care for ourselves (physical, emotional and mental care) will impact and reflect the care for our communities and environment and draws on the social-ecological system perspective. With the aim to focus on the links between care and sustainability, an inter- and transdisciplinary learning space is currently being created at a Portuguese higher education institution: the CareLab for People and Planet at NOVA School of Science and Technology, NOVA University Lisbon. This space strives for transformative capacity building, combining in particular aspects of inner and outer sustainability (Pereira et al, 2018; Ives et al., 2020) and seeks to integrate participatory action research, experiential learning and co-creation in order to provide meaningful training opportunities and reflections on personal development as cornerstones for capacity building. The overall concept of a caring mindset (Moriggi et al. 2020) shall serve as an umbrella to inspire the activities to unfold in such a space. In the current preparatory phase for the first semester of activities, a photovoice approach (Wang et al. 1997) was chosen to explore values of care of the campus community and create the ground for dialogue and reflection on the questions: (1) *"What do I do to take care of myself?"* and (2) *"What helps me to take care of the planet?"*. Photographs and audio-records of the participants (students, staff (i.e. administrative, catering, cleaning, teaching, technical staff), staff, suppliers and local neighbours of the faculty) were taken and summarized into a 6 min. video, integrating the answers into the theoretical and conceptual framing of the CareLab. The video concludes with an invitation to explore the links between care and inter- and transdisciplinary approaches to sustainability and broadens the debate on agency and capacity building.

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Breaking paradigms: challenges and opportunities of the institutionalization of transdisciplinarity by the national research council of Mexico

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Transdisciplinary research has been increasingly recognized for its potential to address strategic problems in the field of sustainability. Collaboration among members of different communities of practice has shown to be highly relevant for a thorough and deeper understanding of social-ecological systems, thus conducive to the creation of suitable and therefore effective decisions and actions. Despite the growing recognition of the need to link science and social decision making in the generation and implementation of alternatives towards sustainability, the institutional adoption of transdisciplinary discourses and practices is still limited, especially at the national level. Few university programs, research centers and academic networks employ transdisciplinary approaches and even fewer count on high-budget, long-term, national-scale funding schemes and governmental structures supporting this type of collaborative research. In this context, the National Strategic Programs (PRONACES) implemented by Mexico's National Council for Science and Technology (Conacyt by its Spanish acronym) constitute an exception by calling for projects that articulate technical-scientific capacities and collaboration with social actors from different fields of practice. PRONACES' central objective is to contribute to the co-generation of knowledge about national key problems and the co-creation of practicable and effective solutions. PRONACES offers financial and academic support to research and advocacy projects linked to strategic priorities that coincide with the Sustainable Development Goals in their 2030 agenda. The challenges around the institutionalization of the transdisciplinary approach to tackle national strategic problems are multiple. Considering the recent adoption of these institutional discourses and practices, it is crucial to generate reflexive processes to discuss the main challenges and opportunities related to the transdisciplinary vision and practice prompted by

Conacyt. As members of the managing interdisciplinary committee of the National Strategic Program on Socio-ecological Systems and Sustainability (SS&S), we analyzed 198 transdisciplinary research pre-proposals from all over the country. The proposed projects include various topics (agroecology of important edible tropical species, implementation of environmental technologies and infrastructure, sustainable forestry, fisheries, aquaculture, etc.) of national interest for transdisciplinary research. These proposals include multi-actoral collaborative processes (public decision-makers, academics from different knowledge fields, industry, members of civil society organizations, rural and urban communities, etc.) to foster sustainability in its different dimensions. At this first stage, 49 proposals were selected for their quality and relevance. The proposals include collaborative processes with different actors (public decision-makers, academics from different knowledge fields, industry, members of civil society organizations, indigenous, rural and urban communities, etc.) to foster sustainability in various complex socio-ecological regions. The short video we will present is based on interviews that address the main challenges, opportunities and strategies faced by the academics of our SS&S committee and institutional actors of Conacyt in the implementation and sustained support of transdisciplinary research. The video shows a series of narratives on how to strengthen the institutionalization of transdisciplinarity to address socio-ecological problems in Mexico. Through this audiovisual material, we intend to contribute to similar processes in other countries, especially in the south, and to raise awareness on the intrinsic difficulties in transforming institutions and research teams into transdisciplinary long term learning communities. The lessons learned indicate that there is a strong need to break away from established institutional paradigms to overcome bureaucratic and epistemological barriers, in the pathway to foster more just and sustainable futures.

Co-constructing knowledge with family farmer organizations in the Brazilian Amazon: mutual learning between farmers and researchers

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In this video, we present an experience of co-construction conducted by the authors in partnership with the family farmers and rural workers' unions of Santarém, Belterra and Mojuí dos Campos (Brazilian Amazon). Specifically, we bring the voices of young farmers, community leaders, and researchers about what they learned from this experience.

This research was held as a pilot study within the framework of the Observatory of Socio-Environmental Dynamics (ODYSSEA-ODISSEIA), aiming at testing possibilities to enhance the possibilities of bringing science and society closer together through an observatory.

The researchers had been working in the Santarem region for several years, and approached the farmer unions in 2016, seeking to define possibilities for collaboration. Progressively, we discussed the main changes that were occurring, collectively mapped out the actions that already existed to support rural communities, and what still needed to be better understood. The farmer unions voiced the need to have more liable data about their reality and asked to carry out a survey, along with empowering young farmer leaders.

Although conducting a data collection campaign was not part of the initial objectives of the research, the team up-took the challenge to co-produce the data the unions asked for. The data collection campaign "Consolidando a Agricultura familiar" was conducted in 2019, by the young farmer leaders, identified as "community researchers". Along with community meetings across the region, 544 questionnaires were applied among farming families, dealing with their living conditions, their production activities, and the impacts of large-scale soy monoculture in the region.

The great originality of this survey is the participation of non academic partners in all phases and aspects of the research: research design, field data collection, analysis and output. Three major lessons were learned: a) despite the risk of (re)production of asymmetries, statistics proved a valid research strategy with potential for methodological innovation; b) defining the objectives jointly allowed for a strong engagement of the local actors; c) collectively debating the results enriched the interpretations and strengthened its appropriation by the local actors.

Based on the testimonies of the participants (university researchers, community researchers and union leaders), we also reflect on the local impacts of this research: on the one hand, on the transformative potential of the data and its use in the framework of the unions' strategic actions; on the other hand, on the learnings of the community researchers linked to their field experience, in particular for their commitment as young community leaders.

This experience contributes to the defense of a committed research, which takes seriously the plurality of knowledge, defends the involvement of researchers in the life of the community and the production of a useful science, which enables a sense of ownership by local actors (Norström et al., 2020). We are part of the theoretical legacy of Paulo Freire, who claims citizen participation as a condition for a strong democratic construction (Freire, 1968), but we also situate ourselves within the framework of Latin American critical thought (Lander, 2005), which affirms the need to reconsider the conventional premises of socio-environmental research (Martínez Alier, 2007) and advocates the emergence of new political-intellectual subjects (Portela, Nogueira and Guimarães, 2019).

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Laboratorio de diagnóstico COVID-19 en el CAMPUS Interinstitucional de Tacuarembó

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Nunca el ritmo de cambio ha sido tan rápido, el COVID-19 ha desafiado el sistema de ciencia y tecnología de todos los países, así como el sistema de salud y políticas.

El 31 de diciembre de 2019, las autoridades chinas notificaron al punto focal del Reglamento Sanitario Internacional (RSI) de la Oficina Regional de la OMS para el Pacífico Occidental sobre la declaración de prensa de la Comisión Municipal de Salud de Wuhan sobre los primeros casos de COVID-19. Desde ese anuncio, el virus se ha propagado rápidamente y se ha reconocido la situación de la pandemia. Los primeros casos en Uruguay se reportaron el 13 de mayo de 2020.

Los desafíos del COVID-19 potencian a los equipos multidisciplinarios y transdisciplinarios que trabajan en una experiencia sin precedentes. Un grupo de aproximadamente 60 científicos, de diferentes áreas de conocimiento como especialistas en medicina interna, familiar y comunitaria, epidemiólogos, matemáticos, virólogos, unen fuerzas para asesorar al gobierno uruguayo en el control del COVID-19.

Desde un enfoque holístico se hace más evidente la necesidad de generar procesos de trabajo más participativos e inclusivos para empoderar a ciudadanos, científicos y tomadores de decisiones juntos en un diálogo de conocimiento, para abordar mejor tanto los problemas del COVID-19 como las posibles soluciones e interacciones que existen a nivel social, ambiental, económico e institucional.

Presentaremos, un breve currículum del Webinar organizado el4 de diciembre de 2020, por el Nodo Latinoamericano de Estudios Interdisciplinarios y Transdisciplinarios (ESIT), el Departamento de Economía del Centro Universitario Regional del Nordeste y la seccional Tacuarembó de la Universidad de la República (UDELAR), el Instituto Nacional de Investigaciones Agropecuarias, Agropecuarias y Pesqueras (MGAP-DILAVE) y gobierno de Tacuarembó con el apoyo del Consejo Nacional de Innovación, Ciencia y Tecnología (CONICYT).

Esa experiencia demuestra el valor y la importancia de haber asentado un campus interinstitucional de recursos humanos altamente capacitados en diferentesdisciplinas,así como compartir equipos e infraestructura de laboratorio y logística.

El webinar ha sido un instrumento clave para valorar la experiencia de Uruguay en el frente a la pandemia. La iniciativa del laboratorio de diagnóstico covid-19 en el CAMPUS Interinstitucional de Tacuarembó está alineada con la estrategia que el país ha definido -a nivel nacional y regional- para enfrentar esta situación de emergencia,destacando el trabajo interinstitucional, interdisciplinario y transdisciplinario de los actores en ambos niveles.

A través de la discusión se destacó la importancia de la búsqueda de sinergias interinstitucionales que permitan la formación de diálogo de conocimiento crítico entre los equipos de trabajo y el trabajo conjunto en grupos de equipos transdisciplinarios, multidisciplinarios e interdisciplinarios. Eso, aumentar la inteligencia colectiva y el diálogo de conocimiento a través de la potenciación de los procesos de integración, cohesión y articulación, con el fin de contar con un instrumento que permita ampliar la visión, visibilidad de la universidad en busca de soluciones reales para la sociedad.

El reto es desarrollar un sistema de evaluación que pueda fortalecer los grupos de equipos interdisciplinarios y transdisciplinarios entre un grupo muy amplio de ciudadanos, científicos, gobierno, parlamento, académicos, empresarios, sector público y privado.

PC-6.2: Pre-crafted contributions - session 6.2

Time: Thursday, 16/Sept/2021: 6:15pm - 7:00pm

A multi-actor, multi-staged approach to building transformation pathways for water-related dynamics in periurban India

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With recent urban expansion and growing population of Indian metropolitan cities, research is increasingly directed towards the periurban, as zones in transition decisively shaped by these dynamics. Here, transformation processes are particularly visible regarding natural resources, especially water, as periurban spaces face changing water ecologies from within and increasing demands for water resources from urban centers. Closely related to these water dynamics are altering livelihood strategies, shifting mechanisms of water supply, and restructurings of associated institutions. These transformations are affected and co-produced by multiple actors with different values, strategies and knowledge levels and thus need to be approached through grassroots stakeholders and actors from higher level social and political scales.

The collaborative project "H2O – T2S in urban fringe areas" addresses these transformations in the periurban areas of three Indian metropolitan cities (Pune, Hyderabad, Kolkata). It investigates the plurality and contexts of water-based livelihoods, water as a basic consumption good, and water-related institutions and governance. The project follows a multi-staged, mixed-methods research technique in studying existing pathways in six periurban villages in order to provide building blocks for future adaptive pathways. Thereby, the project contributes to understanding site-specific drivers of vulnerabilities and engages periurban capacities and potentials towards a more sustainable future.

After the initial field phase, it became impossible to conduct the planned participatory action-research phase of the project for co-developing transformation pathways with multiple local stakeholders on-site due to the COVID-19 pandemic. The method was thus amended to a virtual and remote, multi-actor, multi-stage approach. Therefore, a modified Delphi study was designed for transdisciplinary engagement with local periurban communities, political decision-makers, and Indian and international experts to gradually build sustainable transformation pathways through a process of visualizing future scenarios and sequencing adaptive responses to periurban hydrosocial dynamics towards these futures.

This Delphi study applies two strands: 1) from the bottom-up, engaging with local actors of different caste-livelihoods and gender groups and local government affiliations in three periurban settings, and 2) from the top-down, consulting Indian and international experts from academia, planning, civil society, and the private sector. In three iterative rounds the Delphi study is designed to identify actions and institutions leading towards ideal future scenarios, consecutively prioritize these scenarios and

determine possible tipping points, and comparative reflections on the varied final pathway schematics emerging from different stakeholder groups.

The paper discusses the virtual, remote, and collaborative nature of this approach and the design of reflexive, innovative tools to facilitate a transdisciplinary stakeholder dialogue in a structured pathway-building exercise. These tools were designed to respond to challenges of Covid-19 impacts, digital divides, disparate literacy levels, plurality of stakeholders and knowledge systems, language barriers, and the translation of complex theories into everyday periurban realities.

This presentation focuses on the methodological design process of the Delphi study, its conceptual opportunities, methodological challenges and collaborative learning processes. Some preliminary observations from the ongoing data collection and analysis will be presented, highlighting pluralities, differences and similarities in actors' objectives and experts' visions for future periurban transformation, based on which the project contributes to enabling local communities in reflecting on possible futures towards sustainable development, with a focus on water in particular.

Intercultural One Health Research in Guatemala: Patients as Bridges Between Knowledge Systems

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The One Health Poptun project was conducted as an intercultural transdisciplinary project from 2016 to 2019 in Guatemala, under the collaboration of the Swiss Tropical and Public Health Institute, Universidad del Valle de Guatemala, the Ministry of Health, the Ministry of Cattle and Food Production, and the ACGERS Council of Indigenous Elders. It **aimed** to assess the burden of zoonotic diseases on the health of individuals living in an impoverished area with little access to official healthcare services, as well as to implement a surveillance and response system based on culturally-sensitive syndromes. In order to work amongst a plurality of cultures, languages and knowledge systems, the project designed several tools meant to break barriers of historical racism and epistemic superiority in order to provoke reflexive pathways amongst participants. These reflexive pathways targeted preconceptions and assumptions of a particular medical system towards another (for example indigenous Maya medical systems misrepresenting Western veterinary medical systems), pushing discussions between participants to reach some degree of mutual understanding. The overarching goal was that participants could better assess potential collaborative frameworks for future healthcare systems more culturally pertinent for the study region. One of such tools was inviting sick human patients, and owners of sick animals, to become 'bridging subjects' to facilitate discussion between medical doctors, veterinary doctors and traditional healers. Employing this aspect of boundary science showed that the common goal to heal a sick patient made participants bridge social and epistemic divides, facilitating joint diagnostics and even joint treatment meeting the standards of Western Medicine and the cultural expectations of Maya traditional medicine. The short film presented here portrays this tool as it was employed to generate a process of mutual learning between representatives of extremely different medical knowledge systems. The discussion session will reflect on challenges and lessons learned while implementing this tool.

Exploring relational capacities in transdisciplinarity for dealing with complex climate change challenges in an African, urban context

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Transdisciplinarity is lauded as an effective approach for science and society to co-produce knowledge for dealing with complex climate change challenges. Climate change risks are better understood, and more effective context-specific responses considered, when a diversity of stakeholders come together during transdisciplinary learning processes to offer equally important, different perspectives. Apart from specialist expertise, new approaches and practices are required of researchers involved in transdisciplinarity to nurture productive relationships with societal stakeholders that can support transdisciplinary learning. While relational skills are acknowledged as important in transdisciplinary literature, few (if any) empirical studies have been undertaken to investigate the approaches and practices that are required of researchers to develop and nurture relationships with societal stakeholders.

This study explores the relational approaches and practices required of researchers engaged in transdisciplinarity for dealing with complex African, urban climate change challenges. A qualitative case study methodology is combined with a theory of relational capacities (Edwards, 2017) to investigate these new approaches and practices in the context of the Future Resilience of African CiTies and Lands (FRACTAL) project. FRACTAL (2015-2021) was implemented in nine southern African cities to support climate-resilient decision making and resulted in notable impacts in several of these cities (www.fractal.org.za). Researchers from different scientific disciplines across southern Africa, Europe, the United Kingdom and the United States worked alongside societal stakeholders in these cities during FRACTAL.

Edwards (2017) suggests that relational expertise must be practised (above and beyond specialist expertise) to understand "what matters" to others (i.e. to develop common knowledge), and to align thoughts/motives to effectively respond to complex problems (i.e. to practice relational agency). These concepts of "relational expertise", "common knowledge" and "relational agency" will be used as a lens to explore the approaches and practices that supported productive science-society relationships during FRACTAL.

Investigating Abuses against Asylum-Seekers: Advancing the Collaborative Model of Investigative Journalism Across the Global South and the North

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My work elaborates on collaborative investigative journalism – an under-researched model of multiple media outlets across countries using digital innovations to share information and expose wrongdoing (Carson & Farhall 2018). My work advances this model by examining collaborative efforts between U.S. and Central American journalists, human rights activists, and academics investigating abuses against Central American asylum-seekers in the United States. Asylum-seekers especially from Guatemala, El Salvador, and Honduras have become objects of hate speech following U.S. past president Trump's policies and determination to build a wall on the U.S.-Mexico border. This border also marks a geopolitical and symbolic boundary between the Global North and the Global South. My work develops a novel approach on collaborative investigative journalism by examining how technological tools enable journalists, activists, and academics with different disciplinary backgrounds from both sides of the North-South border to jointly investigate and expose concealed crimes committed by powerful actors in the North against vulnerable populations from the South. This effort is transdisciplinary in that it integrates insights generated between academic and non-academic actors, delivering socially robust knowledge that retains its relevance and value in the real-world contexts of its application (Klein 2010). My contribution connects with the theme of "Global and virtual TD – how we can use virtual environments to leverage transdisciplinary collaboration, especially in a Global South-Global North context."

My work shows how investigative coverage co-produced between U.S. and Central American journalists, activists and academics contains multifaceted contextual knowledge about complex realities in Central America, usually lacking in U.S. mainstream news but fundamental for increasing the U.S. public's understanding of the root causes of the migration (e.g. Andersen 2020). Moreover, my work shows that the North-South collaboration enhances the impact of investigative journalism, helping to hold the powerful accountable while protecting the investigators and their sources. At the same time, my research reveals some challenges in the process of developing trust between the Northern and Southern journalists, activists, and academics involved. Hence, my work contributes to the questions "What opportunities and challenges occur in applying TD in diverse geographical, social, political, and cultural contexts?"

Theoretically and methodologically, my work builds on field analysis, tapping into field theory's unexplored potential for explaining processes of trans-nationalizing journalism beyond the Global North (Benson 2015). My research reveals how the collaboration with Central American activists and journalists transforms norms of neutrality in the U.S. journalistic field, while the social scientists involved are increasingly legitimizing methods used by the investigative journalists in their academic field and vice versa. This way, my work also provides insights to the question "How can we navigate between positions of neutrality, activism, and emancipation in a TD process?" Finding that geopolitical and symbolic borders are increasingly permeated in the digital investigative spaces characterized by mutual commitment to truth and global justice, my research challenges field theory's insistence about the borders of fields always being a site of struggles, pushing field theory to better account for collaboration and social change.

Contextualising Transdisciplinary Research: Insights from Asia, Africa and Latin America

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Development of TDR theories, principles and methods have largely been steered by researchers of the global North, reflecting context conditions of the global North. To contribute to a context sensitive TDR framing we investigated what context characteristics affect design and implementation of TDR in six case studies in Asia, Latin America, and Africa, and what this means for TDR as a scientific approach. To achieve our objective, we distinguished four TDR process elements and identified several attributed context dimensions that showed to influence them. Our analysis showed that context characteristics prevalent in many Southern sites such as highly volatile socio-political situations and rather weak support infrastructures can make TDR a challenging endeavour. However, we also found that context characteristics greatly vary, namely between Asian, Latin American and Asian sites (e.g. the role of deliberation in opinion formation, research freedom, and dominant perceptions of the appropriate relation between science, society, and policy). We argue that TDR in these contexts require pragmatic adaptations, but also more fundamental revisiting of underlying epistemological concepts related to what it means to conduct 'good science' as some context characteristics affect what might be considered core epistemological values of TDR.

Research and pandemic-related restrictions: Reflections on transdisciplinary research practice

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In the last year, the global research community has been thrust into a new normal that has resulted in considerable changes to conventional ways of conducting research. Data collection approaches have been significantly affected by restrictions to movement and face-to-face interactions as the world battles to contain a health pandemic that requires physical distancing. This has had considerable effects on transdisciplinary research (TDR) practice, which at its core involves interactions between stakeholders for collective definition of challenges, and co-creation of solutions. Virtual spaces have emerged to fill this gap. Using a project whose activities were affected by the COVID-related restrictions, we present reflections under three themes: Ethics, Stakeholder inclusivity, and Non-verbal communication. Under the ethics theme, we discuss issues including modifications to stakeholder privacy in online environments that may be beyond the control of the researcher e.g., unauthorised recordings or participants. Adapting to this challenge would require the researcher to explicitly inform stakeholders beforehand to ensure accurate informed consent. Under stakeholder inclusivity, we contend that because non-verbal communication can significantly affect stakeholder interactions and the data collected, face-to-face interactions may be inevitable in research involving stakeholders with limited access or familiarity with communication technology. An in-depth reflection is therefore required of TD researchers, to determine the suitability of online methods to ensure the acceptability and benefit of solutions to stakeholders. Finally, despite the challenges brought on by non-verbal communication, we will discuss ways through which researchers can limit conflict and ensure enriched stakeholder engagements in online environments.

Transformative transdisciplinary research with sustainability initiatives: challenges and future directions

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Transformative transdisciplinary research in which scholars work with sustainability initiatives to foster change is increasing globally. Despite acknowledged relevance of initiatives for transformations and collaborative research practices to support change, methodological guidance for such research remains limited. We review state-of-the-art research projects from early-career researchers that have collaborated with initiatives to foster transformative change in diverse systems in the global South and North. Our meta-analysis identifies key challenges that limit transformative research with initiatives. Moreover, we provide key lessons to advance and direct transformative transdisciplinary research with sustainability initiatives. These are relevant for scholars who seek to be part of actions that shape more sustainable futures with and for local people.

Green Health Project: What does it mean to make transdisciplinary methods on ethnobotanical research? A fieldwork experience

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Maya Q'eqchi' phytotherapy is a main part of the socio-natural capital in Guatemala. Up to 40% of healthcare services are centralized in urban and peri-urban areas, leaving marginalized local populations with poor access to official healthcare services relying mainly on traditional Maya practitioners (Berger et al. 2016). In recent years, there has been an increase in the use of medicinal plants in many countries as they contribute to the public health system (Rabearivony et al. 2015). Biodiversity loss and habitat degradation are rapidly increasing due to urbanization, African palm plantations, cattle farms (Shriar, 2014) and even ecological factors such as low population or invasive species (Amusa et al. 2010). These factors hinder the access to and risk the availability of medicinal plants on which traditional knowledge relies to access basic needs, including medicinal plants and food sources. Ethnobotanical Research in Guatemala resembles a process broken into pieces without continuity, falling short by presenting data only on the collection, identification and classification of plants and diseases they treat, with some bioassays and guides. Usually, community researchers are not considered for collection, reproduction, bioassays processes or pharmacological research in an integrated way to recognize the cultural relevance of the use of medicinal plants. The project aims to propose an implementation framework for the sustainable use, access, and distribution of benefits of biological species (ABS), as well as generating ethnobotanical information on the traditional medicine of Guatemala. This is done under a transdisciplinary format with the collective participation of the Council of Spiritual Guides "Releb'aal Saq'e" ACGERS, Universidad del Valle de Guatemala (UVG), UCL School of Pharmacy, CONAP (the National Authority on Protected Areas), and the private sector. Together with ACGERS and 16 "aj'ilonel" (therapists specializing in traditional medicine), an ethnographic and ethnobotanical research was carried out on plants in Maya Q'eqchi phytotherapy in Poptún Petén. A total of 32 transectwalks were carried out in 14 communities of Petén, Izabal, and Alta Verapaz. A total of 253 specimens were collected from which community researchers actively collected 42% of the data and specimens. This led to identify a total of 93 species belonging to 77 genera and 48 families. Of these, a list of 40 medicinal plants with relevant cultural appreciation by the Aj´ilonel was put together and a local botanical garden and agroforestry nursery is being built.

In this presentation, we share the fieldwork experience and insights on the perspectives that must be considered when working with community researchers, on sharing resources and time into trainings, validating approaches in the field according to different constructs of 'usefulness', coping with pandemic situations, and power sharing. The ethnobotanical methodology in the project brings a new scope to assess the importance of a TD process to academics in Guatemala and abroad, by employing plants as boundary objects to aid deeper discussions between varying epistemologies, empowering and considering Q'eqchi' therapists' interests and learnings. This scheme allows proposing mechanisms for public policies in research, recognizing traditional medicine in the normative framework of the country, and safeguarding biological assets.

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biopunk.kitchen: a local social innovation ecosystem embedded, transdisciplinary platform approach as experimental space for a sustainable bioeconomy transformation.

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Previous efforts to initiate discourses for a sustainable bioeconomy transformation in the society, failed. Applied approaches for this multidimensional process lacked in managing enough transparency on stakeholder's transformation-goals and -motivations, but also because of the rank of civil society engagement was too weak, not only in Germany. The German Ministry for Education and Research deputed different research projects to investigate novel formats of participation and infrastructure for sustainable bioeconomy discourses. Therefore, we designed and implemented an urban 'biology studio & science atelier' (wet lab) into an already performing FabLab infrastructure, operated by a science shop which acts itself as a connection to the local and regional research and education environment for a self-governing socio-cultural (youth) center in downtown of the ~160.000 population provincial capital of Brandenburg, Potsdam, in eastern Germany. The main aim here, was to initiate an ongoing involvement to the societal discussion for a bioeconomy transformation of the local community and beyond as one part of a regional 'future vision' process. Additionally, we experimented with different formats of design thinking, co-creation and hands-on to facilitate the inclusion of a range of stakeholders to this process. Settings of participation were installed centralized (into the bio-lab of the local socio-cultural center; biopunk.kitchen) or decentralized (with different mobile wet lab versions within a variety of community of interest). Topics varied from nature conservation to biotechnology and closed-farming-systems to digitalization. Approaches with the food-sector related topics were the most effectful for involvement. We were able to activate different actors from local and regional communities, academia, education, entrepreneurs, and international artist, in trans-age and -gender groups, to collaborate experimentally with bioeconomic issues and establish ongoing activities from that. We claim that this experimental and transdisciplinary platform offers a proper space for involving a broad range of stakeholders (capacity building) into a permanent and more inclusive transformation process towards a sustainable bioeconomy and can strengthen the role of civil society in it (empowerment). However, the facilitation processes within this approach were promising but still needs further investigations.

Beyond Rules and Obligations: Learning from Circular Citizens in Finland and Russia

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This work is an introduction of an ongoing three-year (2021-2024) transdisciplinary and transborder research project on Circular Citizens in Finland and Russia. Despite the political debates around the reasons and consequences of climate change, circular economy (CE) has been recognized by EU and the countries around the world like Russia, China and the US as one of the viable solutions for the future. In a tense and polarized world, it makes sense to start re-building relationships around the vision that helps to unite cultures toward a common goal and create feelings of solidarity. As Wahlen & Laamanen (2015) point out, lifestyles can bring together the otherwise disconnected individuals. ***Our project aims to study CE active citizens in Finland and Russia, analyzing and sharing inspirational stories of personal transformations to generate mutual learning that transcends the local contexts.*** On the citizen level, CE is often simplified down to recycling activities. In reality, even the famous "3R" principles include reduce and reuse before recycling, emphasizing the importance of preventative action in waste generation. Finnish and Russian institutional contexts are strikingly different in their waste infrastructure and what is required of citizens. Yet in both contexts, there emerge individuals and grass-root movements that go beyond the societal norms and obligations. In Finland, Zero Waste movement has gained traction, focusing on "precycling": how to prevent waste generation in households and lead a simpler life with improved well-being. In Russia, citizens are not required to sort waste due to the current lack in recycling infrastructure and waste disposal by landfilling. Despite this, in some cities of Russia grass-root citizen initiatives are emerging to advance waste sorting, recycling and more responsible consumption in the society. In our project, we combine theories that examine individual-level behavioural factors (motivations and skills), social movement perspectives and the economy-level perspective of CE. This enables us to generate both systems knowledge and transformative insights on how bottom-up citizen initiatives can speed up the societal transformations towards circularity. We apply a mixed methods transdisciplinary approach to explore what drives citizens in Finland and Russia to go beyond the formal requirements of waste sorting and recycling, how they become active in CE, and what strategies and routes they use as circular citizens. In the first phase, we collect stories of personal transformations via deep qualitative interviewing. Next, using the insights from personal interviews, we will design a geolocated survey among CE active citizens to visualize the "how" of waste sorting routes and responsible consumption practices in the context of a Russian city. In the Finnish context, insights from personal interviews will be utilized to design a survey on the wider public's attitudes towards waste prevention. The third phase of the project aims at engaging young people in high schools of Finland and Russia through online repurpose experiments to stimulate the co-production of shared understanding on CE across the country borders. While our project is in the early stages, first insights from qualitative interviews will emerge in May-June 2021.

Investigating conditions to experiment with transdisciplinarity - the case of maker platforms

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Dear IDT21 organising committee,

thematic stream: "Transdisciplinarity on-the-ground: making Transdisciplinarity tangible". Here, I address the question, *what tangible transdisciplinary processes and practices are taking place on-the-ground?* Additionally, my research specifically is adding the question, *under which conditions can collective innovation dynamics of maker platforms be institutionalised locally, and how can its transdisciplinary practices be fostered?*

Fabrication Laboratories (FabLabs) and Makerspaces, in short – maker platforms, are among prominent examples for community-based niches promoting collaborative knowledge production. By giving access to open hardware facilities and

versatile technological capabilities, such as 3D printer tools, maker platforms allow for participation in open design and experimentation processes beyond professional boundaries. Prototyping of artefacts becomes a collaborative networked-process due to social media platforms. Lately, maker platforms have been investigated mainly from a descriptive perspective assuming potentials of open community-based bricolage for transformative processes. Understanding about dynamics of collective experimentation as well as inter- and transdisciplinary practices in maker platforms relative to the local context is lacking. Thus, it is of crucial interest to learn more about conditions that favour the anchoring of collective innovation dynamics and knowledge production addressing societal problems on the local level.

The research conducted was part of the transdisciplinary research project "Emscher-Lippe^4", which investigated the potential of maker platforms for different forms of social innovation. The conceptual model is based upon the strategic niche management (SNM) approach. Essentially, SNM promotes that the development of path-breaking innovation is demands temporary protection, which is linked to processes of shielding, nurturing and empowering. The interplay of the three heuristic levels fosters niche innovations. Avoiding the trap of an instrumental stance, relations between maker platform actors and processes of institutionalization are understood as non-linear and dynamic. The research design is based on a comparative case-study approach. It is accomplished by using qualitative data. Cases were selected deliberately. Here, it was focused only on maker platforms in the German state of North Rhine-Westphalia delimiting the number of possible cases. A total of six maker platforms were selected for in-depth investigation and comparison. Data were collected by conducting a total of 19 semi-structured interviews with the managers in charge of each maker platform and, if possible, with key stakeholders collaborating with the local maker platforms selected. Moreover, triangulation was enabled by presenting the case studies results at a feedback workshop attended by all interviewed managers of the maker platforms investigated.

Findings indicate that maker platforms can be perceived as prolific seed beds for transdisciplinary practices especially when being affiliated to universities. Four out of six maker platforms in our sample were integrated into curricular application by realising projects with interdisciplinary student groups that collaborate with societal actors. The aim of these projects is to address concrete societal problems, such as disability, seniority, sustainability, by using facilities of digital fabrication and prototyping. Next to curricular projects, maker platforms provide an open and free platform for experimentation in/with different actor constalltions that integrates different viewpoints from a broad and dynamic community of makers.

For collective innovation dynamics to be institutionalised and transdisciplinary practices to be fostered, the main argument is as followed: Maker platforms can be institutionalised when experimenting with innovation co-production and transdisciplinary practices are not only carried out in the facilities solely, but when conditions are being created that enable relevant local actors to experiment with a maker platform itself. In that way, localised societal problems can be addressed. A total of four conditions is central for experimenting with maker platforms: (I) respecting self-governance of makers, (II) co-creation of expectations and goals, (III) learning mechanisms on the micro and collective level, (IV) capacities for a demand-oriented coordination.

L200 hybrid space: a boundary object and a collective learning process

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We put forward the ongoing co-creation of the L200 hybrid space in Zurich, after three and a half years of existence. In its first year of operation, at the Swiss Inter- and Transdisciplinary Day 2018 in Lausanne, we presented this project's founding as a claim of the right to the hybrid city. What initially was for NetHood <nethood.org> --our Zurich based research unit bridging the digital with the physical space-- the outcome of two transdisciplinary EU research projects has materialized into a hybrid community space, which during its process of co-creation functions as a boundary object between diverse social worlds. Our intervention will explain the interpretive flexibility of this boundary object, and how it has been facilitating L200's multiple social worlds to cooperate without consensus.

Briefly, L200 is a hybrid urban space, conceived across both physical and digital domains, that brings together the concepts of commons and infrastructure in three distinct ways. On the one hand, it is designed and governed as a common infrastructure. The L200 association rents the space from the City of Zurich, and its costs, use, and operation are shared between the members. On the other hand, from the beginning L200 has been infrastructuring the commons, by hosting various local initiatives that promote urban commons framings for key areas like food, housing, sustainable urban life, digital platforms, and more. The space facilitates exchanges, cooperation, and synergies between initiatives and has the potential to provide high visibility to a wider audience. At the same time, L200 is conceived as a prototype to be easily replicated, and through a continuous participatory design process it develops a model of a collectively governed space. The question is then not only how to design L200 but how to easily create such spaces in different locations. So a parallel process is generated, which aims to devise ways of infrastructuring a common infrastructure, an easily replicable model of a shared, hybrid, central, and self-organized urban space.

L200 is being developed in a transdisciplinary way within participatory processes, and it offers a venue where transdisciplinary cooperations can take place. Common group learning facilitates the translation process across these multiple social worlds. That takes place in iterations of back-and-forth movements between the specific and more generic spatial designations of L200 (e.g. collective hybrid space, urban laboratory, neighborhood stage), implying negotiations of the different meanings and particular needs, uses and implementations. In addition, collective learning offers new perspectives in interpreting the situations of use within a process of differentiation, and one of the goals is to allow lessons learned in a certain situation to inform the action taking place in another one. For instance, continuous knowledge exchange takes place between networking experiences at the neighborhood level and those developed in the hybrid laboratory that connects localities across the globe. We argue, moreover, in favor of the interpretive uses of learning, which provide that necessary shift toward shaping relational spaces where transdisciplinary cooperation is very likely to become productive.

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Apostol I., and P. Antoniadis, 2020. Central urban space as a hybrid common infrastructure. Journal of Peer Production Issues 14. online: http://peerproduction.net/wp-content/uploads/2020/05/Apostol-Antoniadis_Central-urban-space-as-a-hybrid-common-infrastructure.pdf

Star S.L., 2010. This is Not a Boundary Object: Reflections on the Origin of a Concept. Science, Technology, & Human Values 35(5): 601-617.

PC-6.4: Pre-crafted contributions - session 6.4

Time: Thursday, 16/Sept/2021: 6:15pm - 7:00pm

Unraveling Configurations of Participatory Collectives: A Literature Review on Effective and Meaningful Academic and Non-Academic Knowledge Integration

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To address societal challenges in a meaningful and inclusive way, effective and meaningful knowledge integration between academic and non-academic actors is needed. However, this remains a persistent challenge due to all sorts of barriers. There is a growing need for 'good participation' practices. This paper aims to gather and critically analyze processes of knowledge integration between academic and non-academic knowledge-holders. We suggest that this requires a constructivist science and technology studies [STS] perspective, where close attention is paid to the construction, performance, productive dimensions and effects of what we will refer to as 'collectives of participation'.

Approaching participation from an STS perspective, we conducted a literature review and applied a relational and coproductionist analytical framework to explore the orchestration and productive dimensions of participatory collectives, and better understand processes of knowledge flows, spillovers, exclusions and integrations. Our search in three databases [Scopus, ERIC and Web of Science] resulted in 119 articles for full-text screening, and final 31 articles. These were considered to have as a starting point an explicit recognition of the complexity of knowledge integration between academic and non-academic stakeholders, and while taking this into account, presented a novel methodology or analytical lens that enabled reflection on how effective and meaningful knowledge integration can come about.

Analyzing the studies we discovered a number of variations and configurations of participatory collectives. There is no single all-encompassing route to effective and meaningful knowledge integration. Multiple models of participation can co-exist within one participatory collective. Since various types of knowledge integration barriers can be present, various strategies - in the form of diverse tools, formats, procedures, negotiations and behaviours - can be implemented within a participatory collective to address these. Our results highlight archetypal configurations that were found in the articles. These configurations become powerful when visualised, as they trigger and stimulate reflexivity and mutual learning. Through these visualisations, gaps in knowledge flows can be discovered. Reflexivity, on the role of the researcher in particular, flexibility and 'time' seem to be two crucial aspects that can address asymmetrical interactions and epistemological pluralism.

Our analysis offers a new perspective on, and appreciation for, the effective and productive dimensions of participatory collectives in general, and the resulting knowledge integration in particular. Awareness about the varying degrees by which configurations of participatory collectives can come about, provides the consciousness to design, implement and evaluate participation endeavours while keeping a close eye on effective and meaningful knowledge integration between academic and non-academic actors. This offers a different (constructive) way of exploring 'valid knowledge' dynamics and politics, and which goes beyond elements of procedural justice and normative principles, that predominantly have determined what constitutes good deliberation and participation.

We aim to contribute to a more nuanced and integral interpretation of 'effective and meaningful participation' when addressing societal challenges. This requires appropriate experimentation with participatory research in general and transdisciplinarity in particular— an approach that takes time, provides room for contemplation, creativity and reflexivity, and that stimulates curiosity and appreciation toward the distinctiveness of non-academic knowledge and how this could substantially contribute to addressing complex societal challenges. By focusing on the latter, we will be able to develop technologies and policies that are not only inclusive, but also responsive toward society.

Serious Games for learning in sustainability transitions: Experiences from a transdisciplinary serious game development

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In recent years, serious games (SG) have been widely celebrated for their capacity to mirror real-world complexities, increase civic engagement and - in particular - to trigger and establish learning processes in transdisciplinary processes and sustainability transitions (Gugerell and Zuidema, 2017; Ampatzidou and Gugerell, 2018). SG are expected to deliver both: learning and entertainment experiences, and specific skills such as capacity building (Dörner *et al.*, 2016). The broad range of expected benefits poses various challenges on the development of SG, such as balancing learning and entertainment, or the development of content that is meaningful and well embedded in the transdisciplinary process and the broader context (e.g. contextually mirroring real-world-complexities of specific spaces). Co-design approaches have proven helpful to address these challenges (Khaled and Vasalou, 2014). While there has been a great deal of research on learning through SG (Ravyse *et al.*, 2017), only a limited number of studies have explored challenges and learning processes that may arise already during the SG development process within transdisciplinary teams (Korhonen *et al.*, 2017; Dimitriadou *et al.*, 2020; Stevens and Fisher, 2020).

Based on the TD project "Empowerment, self-organisation and regional transformation - the model of the Club of Rome Region Carnuntum", we discuss challenges and present learnings that emerged during the co-creation of a SG. The aim of this analogue adventure game "Römerland Carnuntum 2040" is to playfully experience transition pathways towards the regional vision 2040. This article analyses its co-design process involving 37 stakeholders and a follow up of semi-structured interviews with 21 participants reflecting on the transdisciplinary co-design process.

The interviews focused on insights gained throughout the SG development process with regards to the diversity of stakeholders; the communication, mutual understanding and collaboration among the transdisciplinary team; boundary objects (i.e. games, methods, exercises, that have been used in the workshops); challenges regarding the COVID-19 pandemic, resources; as well as the integration of learning in the SG.

Preliminary results show that involving more young local residents would have been beneficial to check if the game mechanics are understandable and the entertainment is given. The co-designers felt that more information about the goal and purpose of the SG as well as the co-design workshops would have contributed to better mutual understanding. In retrospective, more playtesting-workshops in the region would have been better as to temporal and resource effectiveness. In terms of learning, preliminary results indicate that the SG "Römerland Carnuntum 2040" is perceived to stimulate reflection processes about how the region could look like in the future and how to actively participate in developing its future. Furthermore, the SG is seen as a great opportunity to playfully test decisions and to explore possible impacts on the region, without being confronted with the real consequences.

The research contributes to the academic debate on SG and learning for sustainability transitions and provides practical support regarding challenges and possible pitfalls of transdisciplinary serious game design.

Using Augmented Reality to build layers of shared understanding

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At ITD 2019, our team demonstrated how the CoNavigator hands-on tool for interdisciplinary collaboration can be combined with other collaboration methods such as Charrettes or Agile working processes. Taking a modular, component-based approach to the tool's design and methodologies meant it could be integrated into multiple types of processes across a project's many phases. Since giving this presentation, the team has been focussing on how the tool can strengthen collaborations during phases of the project where teams will not be in the same physical location, and when there are large time gaps between collaborations.

The outcome of this focus is the AR function of the CoNavigator tool, which 'records' physical CoNavigator sessions, and allows teams to revisit a complete facsimile of their earlier collaborations, and build new knowledge and connections into the virtual space.

We will show the tool in action, and demonstrate how different types of information can be layered into these virtual spaces over time, so that they behave as a dynamic 'virtual memory palace' for team members. We will also present how both the physical tool and the AR function is to be a core component of an ambitious 5-year NSF funded interdisciplinary graduate training programme at University of Maryland, Baltimore County (UMBC). The initiative prepares under-represented minority students for careers in environmental problem-solving by placing them into teams with an academic supervisor, a professional scientist from a regional agency, and a community stakeholder. The teams will utilise physical CoNavigator sessions to created shared topographies of understanding and the augmented reality recordings to revisit and add new layers of shared knowledge and understanding to these topographies (these can be links to papers, video/audio recordings, or embedded links to other collaboration channels).

We will also show how we intend to research the impact of these methods on the teams over the course of the project. Of particular interest to us is each participant's perception of how much agency they have over aspects of a problem, both from an individual and group level. We will therefore aim to measure 'perceptions of agency' over the lifespan of the initiative.

Participative modelling as method for transdisciplinary integration in the planning of urban futures

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Motivation and purpose:

This short video tackles the question about how to use and build on knowledge integration to contribute to the envisioning and co-production of alternative futures through the implementation of social simulations. Drawing on the partial results of the transdisciplinary research project SmartUpLab, it examines concepts and methodologies of integrative transdisciplinary research combining participatory methods and simulation tools to deal with urban mobility planning. Our aim is to discuss participatory modelling as a transdisciplinary method for the integration of expertise from multiple fields of knowledge, and as a tool to enable strategy development by supporting the creation of a common vision in sustainable urban planning processes.

Conceptual approach:

Participatory modelling is an actionable learning process that engages implicit and explicit knowledge to create formalised and shared representations of urban issues, by integrating stakeholder involvement and social simulation. In the context of our case study, the transdisciplinary research design involves the joint knowledge production between researchers from different disciplinary backgrounds and stakeholders, engaging a) the existing knowledge – in form of data – about urban issues, b) different mobility concepts, and c) the procedural knowledge about planning as a communicative, learning-oriented process that combines different forms of local expertise, political opportunities and constraints together with broad urban-regional dynamics.

Methods:

We combine Agent Based Modelling, a computer simulation technique which represents actors and infrastructure as artificial agents embedded in a geographically explicit environment, with participative methods to 1) co-create the model and, by interacting with the model, 2) integrate different perspectives into the strategic envisioning phase of a sustainable mobility planning process. In order to set the ground for co-developing our participatory modelling approach, we have applied transdisciplinary methods for disciplinary integration within the project and to identify the needs and requirements of our stakeholders.

Results:

The video portrays not only the methods but also the criteria and considerations that we have taken into account to use social simulations as means to support transdisciplinary integration in the sustainable planning. We introduce the viewers to a transdisciplinary workshop format involving agile iterations of scenario development and model processing by presenting the application examples in the context of the envisioning of innovative urban mobility concepts. The interaction of stakeholders with the model is mediated by a dashboard that visualises the data and supports the comparison of results. Early stakeholder

involvement has been a key element to bring interests, perceptions, knowledge bases and goals of the non-scientific actors involved into the research process, resulting in the co-production of outputs that are simultaneously credible, transparent and comprehensible to trigger the discussion and the envisioning process.

Conclusion:

This contribution highlights the possibilities of participatory modelling as a method for integrative transdisciplinary research when co-producing alternative futures. We highlight the role of the comprehensibility of visualisations and validity of the model as key elements to support stakeholders in imagining urban futures. By bringing different kinds of knowledge together and comparing perspectives, this method is more akin to facilitating communication and generating collective understanding of complex issues necessary for policy coordination in the urban planning.

Serious Games as a tool for transdisciplinary communities of practice

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When integrating skills, knowledge, perspectives and action from different disciplines, the first step is meaningful communication and interaction. Gaps are caused by multiple factors including cultural norms, in-group jargon, lack of shared context and psychological barriers. Using Serious Games (i.e. games played for reasons other than mere entertainment) is a way to bridge such gaps and collaborate more effectively.

I report on the development of a dozen Serious Games for co-creative facilitation over a four-year period. Originating from my research with deaf communities in the Global South, extensions of this work have shown that games easily transfer to other contexts.

The game design methodology followed these steps:

- Identifying the overall design principles, in this case with a focus on face-to-face games in low-resource contexts.

- Designing each game according to its purpose, e.g. brainstorming, timeline planning, sharing perspectives, creating project teams.

- Repetitive prototyping to improve the design and gain experience with playing each game.

- Extensions to other contexts, including sequences of several games in events and online versions of games.

Observations indicated that Serious Games have inter-personal effects on communication and interaction in a non-threatening environment, cognitive effects such as emotional memory enhancement, and tangible outcomes from game sessions. In this contribution, I provide examples of how a visual shared context (provided by the game props) and a choreography of turn-taking (provided by the game rules) enhance group interactions.

The "Turntable" game is playable both offline and online, with pen and paper or a shared screen. This is a generic brainstorming game where players respond to a theme or question. As each response is uncovered, it is discussed between a random member of the group and the originator of the idea. "Turntable" is particularly useful in very diverse groups because it prompts a lively exchange between different perspectives. The game process generates a visual record of discussions.

The "Agenda mapping" game supports professionals from different disciplines or work areas to find points of contact or overlap between multiple domains. Each group provides a list of keywords that characterise their domain, from which the game process generates discussion and mapping. As the game unfolds, players co-create a diagram that reveals potential leverage points for collaboration.

Serious Games are particularly useful at junctures in project cycles. At the beginning of a transdisciplinary project, games support flexible perspective-taking and group bonding, both of which are essential to build common ground. Serious Games are also impactful at the point when discussions have matured enough for ideas to be turned into actions because the prevalence of visual representations helps groups imagine future scenarios.

The effectiveness of Serious Games is based on enhancing human capacities such as creativity, empathy, imagination, and collective will. They make a unique contribution in contexts that are otherwise dominated by the intellect, in particular research and other academic settings, and regular gaming contributes to the institutional culture of transdisciplinary groups. On the other hand, these benefits only materialise if participants are ready to engage with the game process open-mindedly in the first place. Cross-culturally, games are associated with different value judgements, and this can be a barrier to their acceptance. Another limitation is that many Serious Games work well in small groups but are more difficult to implement in larger groups.

I argue that Serious Games have great potential as an essential tool in transdisciplinary communities of practice. Rather than being mere icebreakers or mood enhancers, well-designed games achieve tangible outcomes (e.g. project planning, prioritisation of actions, domain mapping), alongside building relationships and human capacities beyond the intellect that are essential for effective collaboration in diverse teams.

Observing transdisciplinary-processes through Social-Network Analysis

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Transdisciplinary approaches have fostered project-collaboration between a broad spectrum of actors to solve complex problems. While scholars described in detail how transdisciplinarity develops in a project, most of the transdisciplinary-project evaluations happen ex post. There are few attempts to show how transdisciplinarity "happens", i.e. what are the overall structures that influence the transdisciplinary relationships between the actors, and how specifically different actors behave,

collaborate and integrate knowledge in such projects. Therefore, we propose a complementary approach to observe what happens in a transdisciplinary process by using social-network analysis (SNA). SNA can be defined as the study of connections between different actors, as well as their patterns and distribution of the ties they form together (Wasserman & Faust, 1994). Through this method, we aim to uncover the role of the relationship structures and the evolution of a transdisciplinary project by mapping the different connections between the involved actors through transdisciplinary concepts. Additionally, we aim to explore the positioning of the different actors in the networks and how the positions and structures change over time.

SNA makes it possible to observe how transdisciplinary concepts are expressed and disseminated in a given project. In this study, we operationalized three main concepts relevant to transdisciplinary processes (see Pohl et al., 2017): (1) three different *types of knowledge* (ProClim, 1997), (2) three different *levels of involvement* (Rowe & Frewer, 2005), and (3) three *rationales of involvement* (Fiorino, 1990). This enables us to display how the different actors involved in a transdisciplinary project exchange across disciplines and societal sectors, for instance for the production of system-, target- and procedural knowledge.

We collected the data in a transdisciplinary development-project happening in a similar way in four different countries: the Democratic Republic of Congo, Ethiopia, Rwanda and South Africa. In this project, "RUNRES - Establishing a nutrient-based circular economy to improve city region food system resilience", we aim to implement technologies to circulate nutrients from organic and human waste from urban areas, back to agriculture in rural peripheral areas. The project takes a transdisciplinary approach to co-design and co-implement nutrient recycling innovations. Our preliminary results show very different patterns, both within and between countries. The results of this study have threefold implications: (1) they align the fields of transdisciplinary research and project-evaluation with a state-of-the-art use of SNA, (2) they reveal existing structures and relations and may guide interventions that focus on strengthening such structures and networks, taking into account socio-political and sectoral factors, and (3) they pave the way for an evaluation of transdisciplinary projects by using SNA in regular intervals. For this latter point, we aim to carry out the same project evaluation through an SNA each year to see how the different actors come together, or get apart, and link this behavior with the way the project works. In this way, we can follow the transdisciplinary collaboration over time, observing how transdisciplinary collaboration shapes the project progress and how this relates to the success of the project.

PC-6.5: Pre-crafted contributions - session 6.5

Time: Thursday, 16/Sept/2021: 6:15pm - 7:00pm

An attempt to strengthen and assess transdisciplinary competences in an undergraduate course

Marlene Mader, BinBin Pearce, Leonhard Späth, Carmenza Robledo Abad Althaus, Urs Brändle, Livia Hess, Rachel Kunstmann, Gina Saccavino, Yuri Schmid, Christian Pohl

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Using the example of the bachelor course "Tackling Environmental Problems" at ETH Zurich, we reflect on how we promote transdisciplinary competences for sustainable development (Pearce et al. 2018; UNESCO 2017). 150 students work for one year on selected sustainability challenges in a region of Switzerland. They learn how to analyse the initial situation and together with stakeholders develop and implement measures by applying and combining design and systems thinking. In the process, the students acquire a set of knowledge, skills and competences, such as critical, systemic, strategic and creative thinking, identifying problems and imagining solutions, communication and collaboration competences as well as self-reflection and self-awareness.

In addition to selecting appropriate teaching activities to achieve the learning objectives and promote specific competences of the students, assessment is another challenge in td courses. Assessment in this course consists of three parts: a group work from the 1st semester, a group work from the 2nd semester and an individual oral exam. External stakeholders are involved in the grading and we additionally apply peer assessment among the student groups.

In a short video we would like to reflect on and initiate a discussion about the contribution td courses can make to strengthening students' competences for sustainable development and how we can also make these visible in the assessment (which is of course of essential interest to students). In various contributions:

- students will reflect their learning experiences (both individually and as a group), what competences they have developed and how appropriate they experienced the assessment;
- tutors will talk about their roles as coaches, lecturers and supporters in the learning process;
- external stakeholders will report on their motivation to engage in such a course, what they learn and how they benefit from it;
- a mediator will talk about potential conflicts in group work and how she supports students in reflecting about their self and others, communicating their motivation and values and in collaborating within their group;
- and the educators will provide background information about the idea and concepts of the course.

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Creating Transdisciplinary Teaching Spaces. Cooperation of Universities and Non-University Partners to Design Higher Education for Regional Sustainable Transition

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Teaching formats involving non-university partners are increasingly gaining importance to deliver key competencies needed in higher education for sustainable development. At the same time, more and more universities create sustainable development certificates programs in teaching. Against this background, this session focuses on how universities foster regional transition through teaching, particularly in collaboration with local non-university partners. Using the interdisciplinary certificate programs on sustainable development offered by the German Universities of Tübingen and Duisburg-Essen as case studies, we analyse the potentials and challenges of teaching programs on sustainable development for promoting regional transition. Leaning on the multi-level-perspective-approach, we have used qualitative interviews to shed light on the design of cooperation between the university and regional partners as well as the creation and integration of transdisciplinary learning spaces. Our main interest in the empirical research was to discover the perspectives and visions of the regional partners (such as local food policy councils, fair trade initiatives) for participating in transdisciplinary teaching formats with universities. Based on the findings, we discuss the role of the sustainable development certificate programs, its opportunities, and challenges on different levels (classroom, curricula coordination, university structures) to foster regional transition in transdisciplinary teaching formats.

For this session, we will outline the impact of such teaching formats on the regional transition consisting primarily of awareness and network building. We will talk about the most fundamental challenges: unequal power relations in terms of access to resources, financing, and course planning, and we discuss the role of co-design, mutual understanding, and collective decisions on responsibilities as well as empathy and trust as crucial factors for successful teaching cooperation towards regional sustainability. By situating local level collaborations between the university and non-university partners in larger debate on sustainability and how collaborative teaching methods can bring transformative and mutually beneficial changes, we would like to present our cases and findings as templates for such successful collaborations.

We are looking forward to discussing our results with the participants and learn about their experiences. We propose the following guiding questions for reflection and discussion in the live-session:

- According to your experiences, what are the potentials and challenges in the design of transdisciplinary teaching projects?
- What role can students play within the creation of transdisciplinary teaching programs and what are their visions for promoting regional sustainable change?
- What steps would be necessary to unfold the full potential of transdisciplinary teaching programs to foster long-term transitions at the interface of science and society?

(Re)designing university courses to foster transformational mindsets and capabilities to work in transdisciplinary teams

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Transformations towards sustainability would require capabilities on different levels (individuals, groups and organisations) to build upon the diversity of perspectives and problem framings, engagement in cross-silo collaborations, and reflexivity to continuously learn from practice. Universities are places for tipping interventions with great potential to enable the next generations of practitioners to be better equipped for bringing positive changes in society. Yet currently many university courses are not set up in a way that allows students to build important transformational skills and mindsets. In this study, we aim to push the boundaries of what higher education learning could be and develop new ways of how university courses can be designed. We also explore the shifting relationships and roles in courses aimed at promoting transdisciplinary collaborations.

The study is based on experiences and data collected within two editions of a university course "Transdisciplinary approaches for system innovations" (TASI) - physical setting 2020, digital setting 2021 - in KTH, Sweden, and a workshop focused on digital collaborations (DCW) conducted digitally in spring 2021. TASI is a project-based course based on modular Participatory backcasting (Pereverza et al., 2019) as an approach for addressing sustainability transition challenges. Students from different disciplinary and cultural backgrounds collaborate in heterogeneous groups to address a given challenge. DCW was designed as a transdisciplinary event connecting students and teachers/facilitators from several Swedish universities who were involved in different roles in collaborative courses in a digital setting during 2020-2021. Collected data was analysed using a process-based approach to follow the dynamics of participation and interactions, and to narrow down on separate activities within the course while still seeing them as a part of a whole. Conceptually we connect to the educational sciences (e.g. Prince, 2004; Dionne et al., 2020; Tejedor et al., 2018), but also considered other perspectives on learning used in transition studies (van Mierlo and Beers, 2020).

Our experimental approach to the course design was guided by the intention to enable active, collaborative and reflexive learning of students. Facilitation techniques and supportive spaces were designed to balance between guiding and enabling creativity so that students can develop their own approaches for structuring, visualising and organising their thoughts and findings. We followed a responsive approach to the course design, developing and introducing several feedback loops to get input from students along the way. Shifting the role of teachers to be facilitators of learning by evolving the student-teacher relationship, enabled the development of the creative experimental approach to DCW, which was co-designed by teachers and students of TASI.

The described approach proved beneficial for students to adopt exploratory and reflexive learning. However, a number of pre-conceptions became evident (e.g. being bound by predefined outcomes, undervaluing the process, overlooking unexpected insights), indicating a need to support unlearning of certain attitudes to learning. Insights from this study can contribute to the refinement of approaches aimed at fostering transformational mindsets and capabilities to work in transdisciplinary teams for addressing complex societal challenges.

Integrative Literature Review on Transdisciplinary Research: Towards a Multi-stakeholder Approach to Transdisciplinary Education

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The transdisciplinary agenda for developing higher education institutions (HEI) was first proposed in the 1970s by the Organisation for Economic Co-operation and Development (OECD) (CERI, 1972, see also Jantsch, 1972; Piaget, 1972). In the decades that followed, we have witnessed an increase in inter- and transdisciplinary research amongst the OECD member countries (Nicolescu, 1999; Klein, 1996). There is a growing body of research dealing with transdisciplinarity and more recently transdisciplinarity has also been expanded to look at how research can contribute to solving complex (or wicked, as per Rittel and Webber, 1973) environmental and social problems. Similarly, educational initiatives going beyond single disciplines have also been gaining momentum (Nicolescu, 2005; Russell et al., 2008) as a response to tackling wicked problems (Buchanan, 1992; Laasch et al., 2020) as well as acknowledging the disciplinary limitations (Brown & Katz, 2008; Bremner & Rodgers, 2013; Tully, 2013). Given that Jantsch and Piaget originally focused on transforming teaching and learning in HEIs, to what extent has the transdisciplinary agenda in education become institutionalized?

While the origins of transdisciplinarity are situated in higher education policy studies, contemporary transdisciplinary research agenda has predominantly broadened to environmental research (Max-Neef, 2005), future studies (Klein, 2004), and health sciences (Choi & Pak, 2006). However, as the transdisciplinary agenda in research has been gaining momentum (Brandt et al., 2013), at the same time transdisciplinarity has been more challenging to implement in the teaching domain of HEIs (Jahn, Bergmann & Keil, 2012; Remington-Doucette et al., 2013; Laasch et al., 2020). In this work-in-progress research, we take stock of the transdisciplinary research agenda between 1970 and 2021 by conducting an integrative literature review on transdisciplinarity covering fifty most cited studies (Elsbach & van Knippenberg, 2020).

Our initial analysis of the literature reveals the emergence of four dimensions seemingly core to the transdisciplinary agenda: skills, concepts, outcomes, and processes. Taken together, they form a framework that can be utilized to create transdisciplinary programs in HEIs. Furthermore, we devised a 4 x 5 matrix that covers HEI stakeholders together with the four aforementioned dimensions to map the status quo at each level and how they affect one another. As such, this literature review provides a strategic framework for pushing forward the transdisciplinary teaching agenda by showing key areas of influence. Main findings of the literature review draw attention to elements and aspects critical for advancing the transdisciplinary research agenda. In essence, this contribution argues that transdisciplinary teaching and learning can become more impactful if it simultaneously addresses multiple stakeholders.

To conclude, our integrative literature review yields further questions. Is the framework missing dimensions? How could educators, administrators and managers utilize the framework in HEIs? If transdisciplinary research and education is about transcending disciplines, should HEIs devote resources to transdisciplinary graduate programs? Furthermore, should graduate programs be only partially transdisciplinary?

Transdisciplinary approaches to transdisciplinary learning

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Educating the next generation of systems thinkers and game-changers through higher education institutions requires curricula that build a transdisciplinary skillset amongst students. This skillset includes the capacity for students to seek out and integrate diverse knowledges, to unpack the complexity of real-world contexts, and to guide themselves and other stakeholders through processes of reflexivity that critically analyse the roles played by pre-existing norms, values and worldviews. These elements form the core of the curriculum for the transdisciplinary Bachelor of Creative Intelligence and Innovation (BCII) at the University of Technology Sydney (UTS), Australia.

The BCII's unique double-degree model allows students from 25 different core degrees to come together to tackle complex real-world challenges in partnership with large corporations, government agencies, social enterprises, non-governmental organisations and start-ups. The BCII has recently been recognised as a cutting-edge higher education program in the Australian context through a 2019 AAUT (Australian Awards for University Teaching) award for educational partnerships and a 2019 BHERT (Business Higher Education Round Table) award for industry problem-solving. The design of the BCII program also draws on international experiences in transdisciplinary education over recent decades, including strategies for integrating knowledges in diverse student teams, accessing under-represented knowledge types, exploring the complexity of real-world challenges through systems thinking and practicing reflexivity to unpack the roles played by norms, values and worldviews in framing problems and evaluating knowledge.

While the BCII is designed to help our students learn how to practice transdisciplinarity, this in itself is not enough to justify it being called a transdisciplinary degree. Staff and other key stakeholders involved in the design of the program must also practice transdisciplinarity in the way we go about designing and adapting our teaching and learning model. Understanding how to educate students in the ways of transdisciplinarity is itself a complex real-world challenge that we need to apply a transdisciplinary approach to address. Such an approach is essential to ensure that the BCII curriculum draws on a diversity of knowledge types and does not blindly reinforce the prevailing values and worldviews of staff without questioning them.

This paper reports on some of the attempts undertaken by staff, students and industry partners at UTS to incorporate transdisciplinary principles into the way in which we have designed this transdisciplinary learning program. This includes curriculum co-creation with students and partners, double-loop learning and reflexivity exercises in which we have drawn on our diverse backgrounds to question prevailing norms and reframe our approaches to curriculum design. It also includes the creation of "third spaces" that allow traditional dichotomies such as teacher-student or expert-novice to be broken down in the interests of mutual learning. More recently, Covid-19 has created challenges for our original learning model but has also enabled new ways of working to emerge, along with an opportunity to integrate the real-world experiences of students living in a complex system into our co-designed curriculum.

"Collaborative decision-making under uncertainty": the importance of transdisciplinary learning and teaching in life-long learning and continuing education for societal transformation

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"Collaborative decision making under uncertainty" is a newly created life-long learning course at a Swiss University (ETH Zurich) which aims to use transdisciplinary learning methods and concepts to create is an exchange between expert practitioners and academics where concepts and frameworks from academia can be used to help organize and advance practical experiences in the realm of environmental problem solving. Collaborative group work is the main format in which learning will take place. Groups are organized according to common sustainability problems that are relevant or interesting for participants themselves, based on insights and experiences from their work and personal lives. Points of commonality are identified using systems thinking and joint problem framing. Mental models and rich pictures are used to exchange and compare the types of risks that each participant is confronted with in their own work. Each group develops a specific formulation for such a common problem and to develop an original solution to that problem, which is carried out in the real-world. The program provides transdisciplinary tools and concepts to solve this problem creatively (through the methodology of integrated systems and design thinking). The program becomes a forum for exchange between participants, for intellectual exchange, but also serves as a platform for experienced practitioners to confront complex problem of sustainability in their own areas of expertise and work. Through this case study, this presentation aims to demonstrate and discuss the future potential of transdisciplinary learning and teaching for empowering practitioners for complex problem solving related to climate change and sustainability, across sectors and with each other.

A typology of transdisciplinary learning and capacity development in sustainability science: who is doing what, where, and how?

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Sustainability challenges as expressed through the Sustainable Development Goals, are insistent, interconnected, growing, and complex. Students of sustainability science are required to conduct rigorous academic research while employing novel strategies to engage and address the needs of community partners and other relevant stakeholders. Despite these demands, in many institutions, we continue to train students in conventional research methods that do not account for addressing problems holistically or working effectively with communities and partners. Hence, we risk the well-being of students and their research partners, and jeopardise the potential transformative impacts of research.

In response to these concerns, scholars and practitioners around the world are beginning to pay more attention to transdisciplinary (TD) learning for transformative change. In doing so, the unique training and capacity development needs of transdisciplinary scholars and practitioners are being acknowledged, and courses and programmes developed to support TD learning. This blossoming of transdisciplinary learning and capacity development initiatives in higher education is encouraging. However, for researchers seeking to launch their own training initiatives, it can be daunting to make sense of what has been learnt from existing initiatives, where relevant expertise and tools are located, and who the various communities of practice are working in this space. We too have found ourselves in this position, and so endeavoured to map out and make sense of this growing area of work.

We have developed a typology of transdisciplinary research, researchers, and communities of practice engaged in capacity development of transdisciplinary scholars in sustainability science, which we present here. The typology was developed through the analysis and synthesis of information from two main sources: 1) scoping reviews of grey and academic literature, 2) interviews and workshops with experts involved in transdisciplinary learning and capacity development initiatives. While the typology is still under development, early insights indicate that transdisciplinary capacity development is taking place in some universities and research institutes across the world. These are often led within research centres and innovation hubs somewhat outside the central institutional structures. Training initiatives are generally hosted as 'add-on' learning opportunities for postgraduate scholars, and less are fully integrated into postgraduate curricula. TD research and practice seems to be more visible in the Global North (based on published literature and online presence), but other evidence indicates that strong leadership and innovation in TD research and practice is emerging in the Global South, often within a decolonial framing. In this presentation we briefly discuss these and other early results, and raise questions about what might still be missing in this area of work. We go on to consider their implications for curriculum development, collaborative training and communities of practice supporting transdisciplinary learning in a range of contexts. We also consider the implications of these findings for evaluation of transdisciplinary learning and capacity development initiatives.

RT-7.1: Using The Seven Transdisciplinary Habits of Mind (Mishra et. al, 2011) as a Toolset for Integrative Creative Practice

Time: Friday, 17/Sept/2021: 11:00am - 12:30pm

Using The Seven Transdisciplinary Habits of Mind (Mishra et. al, 2011) as a Toolset for Integrative Creative Practice

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This interactive workshop will introduce participants to the seven transdisciplinary habits of mind as outlined by Mishra et al (2011). These habits are:

Perceiving, patterning, abstracting, embodied thinking, modelling, deep play and synthesizing.

The habits of mind will be introduced by Gianna Tomasso and Glen O'Sullivan using the lens of creativity and creative practices. Gianna Tomasso is an artist and doctoral researcher focusing on theoretical and phenomenological transdisciplinarity and art and design pedagogy at Limerick School of Art and Design (LSAD), Ireland. She is also assistant lecturer in

Interdisciplinary Design. Glen O'Sullivan is a designer, critical and contextual studies lecturer and programme leader of the MA in Interdisciplinary Design Practice, also in LSAD.

A series of short presentations will situate the habits of mind from a creative perspective and will be available to all participants before the workshop. During the live workshop participants will be asked to contribute their own understandings of the habits of mind to the collective MIRO board. This will involve images, text and mapping.

The workshop welcomes participants from all disciplinary perspectives. The objective of the workshop is to tease out individually what an understanding of the habits of mind may look like in practice and to collectively produce a creative work while internalising the concepts.

As outlined in the ITD call out:

"Creating spaces and cultivating mindsets for learning and experimentation are keys to building new possibilities and putting us on a path to generation of sustainable solutions on global, regional and local scale"

Using The Seven Transdisciplinary Habits of Mind (Mishra et al., 2011) as a Toolset for Integrative Creative Practice workshop hopes to collectively create an ongoing space in which the generation of ideas from varying disciplinary perspectives is visualised and will be synthesised by the production a short moving image artwork stemming from the collective contributions of the workshop.

Mishra, P., Matthew, Koehler and D. Henriksen. "The Seven TransDisciplinary Habits of Mind : Extending the TPACK Framework Towards 21 st Century learning." (2011).

RT-7.2: Co-creating supporting structures for transdisciplinary doctoral education

Time: Friday, 17/Sept/2021: 11:00am - 12:30pm

Co-creating supporting structures for transdisciplinary doctoral education

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Universities make an important contribution to sustainable societies through research, education and innovation. Doctoral education provides the formal training of scientists to fulfill future roles in these three professional areas. Nowadays, researchers not only have to excel in science, they also need to be competent in understanding complex, uncertain and interconnected issues, handling vast amounts of data, and leading inter- and transdisciplinary teams. Doctoral students have to balance the formal academic expectations of universities with their training and education as future problem solvers and game changers. This creates challenging conditions for learning and research, potentially leading to stress, reduced well-being, and, in a worst-case scenario, termination of doctoral studies. Doctoral students may suffer from inadequate supervision, a lack of understanding and support from their research environment, feelings of isolation, and time constraints. Supervisors, who often do specialized work, are challenged to step out of their comfort zone and engage in interdisciplinary and transdisciplinary collaborations. Their tasks and responsibilities are shifting from supervising individual students to establishing and managing diverse teams and interactions. This raises the important question of how transdisciplinary career paths and supervision can be nurtured in doctoral education programs and what processes and practices can best support this?

We tackle this question from our experiences in a doctoral program piloting novel ways of working to promote collaboration both among doctoral students and with practitioners. The main aims of the Majakka doctoral program in Water and Environmental Engineering (2017-2021; Aalto University, Finland) were to develop innovative supervision processes and promote collaboration with industries. It introduced transparent and flexible ways of working where activities were co-created by six doctoral students and a team of supervisors and advisors. These practices were then scaled up to the larger Water and Development Research Group consisting of 30 researchers.

Using multiple co-creation workshops, facilitated by a service designer, we identified the needs for supporting structures at four scales: individual (cultivating mindsets and routines, well-being), research group (embracing diversity and interaction), industry (fostering collaboration and employment), and at the university level (formal and institutional support). Based on our findings, we developed a framework for establishing and strengthening supporting structures across multiple scales. It outlines key actors and activities for co-creating communities of practice that can support doctoral supervision and education of doctoral students. Our advice is to start easy but think big: first pick the low-hanging fruits (the most easily achieved by yourself and with your group) and progress towards more complex institutional changes (university level) and long-term collaboration (with industry) that take more resources and time.

We invite scholars, educators, practitioners and others involved in doctoral education to participate in a co-creation workshop to advance these ideas. The goals of the workshop are:

1. to actively engage participants in improving and extending the framework using a set of guiding questions for brainstorming and discussion (see below), and
2. to provide participants with the opportunity to learn from each other and to define concrete ways of applying what they have learned.

The proposed online workshop consists of three parts. The first part (20 min) features an introduction to the organizers and goals of the workshop, a get-to-know each other activity, and a brief introduction to our earlier work in developing the framework. The second part is the main workshop activity which will be facilitated using an online collaboration tool Miro (45 min). Workshop participants will be divided into subgroups to work on one of the following questions:

1. How can transdisciplinary career paths be developed in existing institutions and what needs to be done to support them? (gather new insights to strengthen and support the framework)

The workshop is concluded with a plenary session (25 minutes) where the subgroups can share and comment on each other's contributions and brainstorm about potential next steps to promote further collaboration (e.g. networking, development of joint papers and grant ideas).

We hope to engage participants from all four parts of our framework, including supervisors, advisors and doctoral students, research group members, practitioners from industry, and members from the university administration. Through their engagement, workshop participants will gain understanding of the different actors and their potential contribution or role in developing transdisciplinary doctoral education. Moreover, they get access to a co-created tool box - based on both literature reviews and participant brainstorming - of easy first actions to put into practice. By creating an open platform for sharing experiences from different viewpoints, contexts and cultures, we wish to encourage participants to use their imagination, brainstorm about creative new ways of working, and, ultimately, pilot new approaches in real-life.

RT-7.3: How to measure the degree of transformance in Agriculture using Living Labs approach?

Time: Friday, 17/Sept/2021: 11:00am - 12:30pm

How to measure the degree of transformance in Agriculture using Living Labs approach?

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DESIGN AND PERSPECTIVE FOR AN INTERACTIVE EVENT OR WORKSHOP:

The goal of this proposed workshop is to discuss and refine the concept towards a dynamic interaction with experts, scientists, and practitioners involved in transdisciplinary projects on different sectors and scopes of action.

The attendees will take with them a tool to evaluate projects and transformation experiments. The possibility of creating a network of actors to discuss and exchange questions, with the possibility of co-creating useful tools to be implemented in different contexts, but with the potential to be compared between each other (future benchmark or global comparison uses).

The target group is a combination of practitioners, scientist of social science (manly), researchers with experience in transdisciplinary projects in diverse sectors, prioritizing agriculture, agrifood, energy based on agriculture (biogas, energy crops), and doctoral students interested in transformation studies, development of tools for assessment innovation processes, transformation processes, sustainability, and similar topics.

The structure of the workshop or interactive space will be developed in sections, first a "diagnosis section" using an online survey or multiple answer questionary (pre-defined) to identify diverse perspectives and interests of participants, as well the basic knowledge and understanding of transformative change for the participants. A second section "on the table", will be a short presentation of the concept and its approach to measuring the degree of transforming (10 min-max.) (put the letters on the table), and using the information collected in the survey, a "brainstorming" activity using key questions, orientation examples, and real project case; the concept will be tested, challenged, refined and adjusted to make it more operational and generic, able to be used in real-life conditions, and under diverse contexts. The last section will be assigned to summarize conclusions and make a short roundtable to exchange contact information between participants.

The workshop seeks to be a co-creation semi-structured space to develop a tool for practical assessment of complex projects and transformational experiments on agriculture, but also applicable to other systems. In the end, homogeneous "language" and common understanding of transformation processes could facilitate a massive interest in this type of project and initiatives, to accelerate the societal transformation towards sustainable systems.

ATP-AgriLandLab: a concept to assess the degree of transformative change.

Agriculture is one of the main drivers of biodiversity loss. Several studies concluded that minor changes within the current framework conditions would not be enough to solve the problem, a societal transformation is needed (IPBES, 2019). Transformation means fundamental changes in structural, functional, relational, and cognitive aspects of socio-technical-ecological systems that lead to new patterns of interactions and outcomes (Patterson et al., 2017). several projects, initiatives, and innovative research strategies are being developed to transform agriculture systems, however, how to monitor (for reporting) and analyze (for learning) the transformative performance or the degree of transformative change of these initiatives is still in the development phase. The aim of this document is to present a concept to measure, analyze and monitor the degree of transformative change on Agriculture within Landscape Laboratories oriented to enhance insect biodiversity in Germany. The concept "ATP-AgriLandLab" (Analysis of Transformation Processes within Agriculture Landscape Laboratories) is based on theoretical frameworks of transformation and transdisciplinary research combined with case studies used to identify and summarize key elements of transformative change. ATP-AgriLandLab is based on the three dimensions of transformative change: changes in the way of thinking, acting, and organizing, where a set of components are linked to each dimension and are used to describe, monitor, and evaluate the performance of transformation processes. Components as technological and social innovations, social values, knowledge, social inclusion, and natural resources management are proposed to monitoring outputs and outcomes of the process of change, meanwhile, components as dynamic, flexibility, timing, transparency and communication allow to monitor the behavior of the process on-going. This concept seeks to provide a methodology to facilitate the understanding and evaluation of the complexity of transformation processes accessible to researchers, practitioners, and advisory agents, working within Landscape Laboratories in the agricultural sector.

RT-7.4: Building Transdisciplinary Capacity – How can transdisciplinary research and university-based sustainability labs support societal impact towards sustainable futures?

Time: Friday, 17/Sept/2021: 11:00am - 12:30pm

Building Transdisciplinary Capacity – How can transdisciplinary research and university-based sustainability labs support societal impact towards sustainable futures?

Ralph Voma Tafon[1], Fred Saunders[1], Michael Gilek[1], Jen Dollin[2], Darelle van Greunen[3], Jennifer O'Brien[4], James Evans[4], Eva Friman[5], Nina Tynkkynen[6]

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Transformations to sustainability require changes in various spaces, from the local to the structural and systemic level (West et al. 2019; Scoones et al. 2019; Pereira et al. 2020). This has led to increased calls for transdisciplinary research from academics, universities, funding agencies, society, governments, and international multilateral agencies (Wiek et al. 2014). While previously, transdisciplinary sustainability research was a relatively minor pursuit, largely undertaken by researchers (albeit in collaboration with societal actors) in 'environmentally related disciplines', universities are increasingly pursuing transdisciplinarity in a more holistic way – as a core element of their institutional practice. To advance transdisciplinary sustainability work, many universities are instigating change both within the university and in terms of relations and interactions with a broad range of societal actors. This is evidenced by the rapid proliferation and institutionalization of various types of "sustainability labs" universities across the globe, placing these institutions of higher education at the forefront of innovative sustainability solutions. For example, see: Bergmann et al. (2021), Parodi et al. 2018 (real-world labs, reallabore); von Wirth (2018) (urban living labs); Pereira et al. (2020) (T-Labs, Transformative Spaces); McCrory et al. (2020) (varied types of labs). Through sustainability living labs, universities seek to contribute toward societal transformation, through interacting with and serving society and policy locally, nationally and internationally with solutions to sustainability challenges (Purcell et al 2019).

However, despite the proliferation of sustainability living labs attached to university settings and their transformational potential, and the related emerging body of literature, more consolidated evidence-based reflection is needed on what it takes to do transdisciplinary research in a landscape that is primarily organized to support disciplinary-based education and research – where the predominant norms are to understand and analyze sustainability problems in disciplinary silos and at arms' length rather than to collaborate on an equal footing with stakeholders to inform and enact science-based change in society (Turnhout 2018). Where projects have made efforts toward integrating diverse knowledge and actors to balance science, practice and society, more evidence is needed to both understand how to evaluate societal impacts (Lux et al. 2019) as well as what impacts transdisciplinary studies are having on society (Polk 2014; Newig 2018; Turnhout et al. 2020). This is mainly due to lack of flexibility and exchanges of expertise and knowledge between participants (Hansson & Polk 2018). There has also been insufficient work that is simultaneously complexity-oriented, critically reflexive and normatively committed (West et al. 2019) – work that is sensitive both to the politics of knowledge (Turnhout 2018) and to the needs of practitioners, heterogenous stakeholders and policy (Dewulf et al. 2020; Hansson & Polk 2018). Furthermore, up until now, there has been limited (if any) scientific review undertaken that bridges the scientific literature on transdisciplinary with the (aspired to) 'real-life' transdisciplinary work undertaken in university sustainability centers.

In response, this panel seeks to build knowledge capacity to support the development of impactful university setting sustainability labs and transdisciplinary research and education. Our overarching question is: How can university-based sustainability labs be developed and organized to optimize their potential to facilitate, support and develop innovative and collaborative sustainability knowledge-action that has impactful potential?

We respond to this question by exploring the following sub-questions (they should be read as framed within university sustainability lab settings):

- In what specific ways can university-based sustainability labs foster and consolidate transdisciplinary methodological learning and innovation (within the university setting)?

- What are the different focusses and pros and cons of different types of sustainability labs (Tlabs, living labs, real life labs, urban living labs)?

- What experiences (including challenges, and possibilities) are there that help support ongoing learning and reflection about what societal impact is, and could be?

- What role can sustainability labs play in providing continuity of learning and longer relations (in the context of time limited transdisciplinary research projects)?

- What are key factors or considerations that contribute to positive and equitable collaboration with societal partners? - In what ways can we make meaningful connections at larger scales, national, international?

- Are there heterodox or non-conventional ways of framing and doing transdisciplinary research that we should promote?

This contribution aligns with conference stream 2: **TD on-the-ground: making TD tangible Real-Time Contribution**

The proposed interaction targets researchers and other actors undertaking transdisciplinary research in general and working in sustainability labs in particular. The main goal is to share ideas and experiences on how sustainability labs can support the ongoing development of, and learning about transdisciplinary research practice by consolidating and reflecting on innovative

methodologies, types of collaboration, effective ways of communicating and sharing knowledges and thinking about and doing impacts.

Preliminary Format

We have assembled a roundtable of contributors who have university-based sustainability labs experience and expertise. We will draw on the sub-questions listed above to support interaction among the panelists – to share experiences and perspectives. We will also interact with the session audience to generate wider interaction around key issues for sustainable labs.

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RT-7.5: Generative conflicts? Co-creating a research agenda for the generative role of conflict and tensions for transformative impact.

Time: Friday, 17/Sept/2021: 11:00am - 12:30pm

Generative conflicts? Co-creating a research agenda for the generative role of conflict and tensions for transformative impact.

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Diverse collaborative approaches at the nexus of science and practice build upon envisioning more sustainable futures and experimenting with alternative practices in order to stimulate learning and transformative action. Likewise, the inclusion of different societal actors is put center stage for example in transdisciplinary and transformative research as well as in transition and participatory governance studies. Co-producing knowledge and strategies among diverse involved actors is regularly challenged by conflicts, contestation and tensions.

The design of co-productive, multi-actor processes is still geared towards eliminating conflict; finding consensus is the norm set for the process. This leads to the risk that vision making is then not more than a normalizing discourse (Ploger, 2004). We see the tendency to end up with minimal consensus outcomes as preferred compromise, which in turn, may prevent collaborative research with society to focus on more radical steps. Instead, we hypothesize that a process is needed, in which co-production of knowledge moves from a minimalist consensual solution of antagonistic positions towards a co-creative attitude of adversaries.

Here, we suggest to revisit the potential of conflict in transdisciplinary and transformative research. We argue that discomfort, contestation and conflict can be treated as sources of creativity, as opportunities to question deep underlying assumptions and as potential forces for creative irritation and disruption. Yet, observing and analyzing the role of conflict in co-production processes are challenging. Initiating platforms to host conflict-loaded debates remains resource intense and prone to being captured by dominant or undemocratic voices.

This workshop is planned as a vantage point into a novel research agenda about the potentially generative role of conflict in transdisciplinary and transformative research. Our idea is to address new forms of conflict arenas and process designs that enable embracing conflict as an element of transformative literacy.

RT-7.6: Building pathways between transdisciplinarity and transformations: reflections on practices and methods from the ground

Time: Friday, 17/Sept/2021: 11:00am - 12:30pm

Building pathways between transdisciplinarity and transformations: reflections on practices and methods from the ground

Carla Alvial Palavicino[1], Olivier Ejderyan[2], Bianca Vienni Baptista[3]
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The goal of this workshop is to 1) explore how TD as an approach and as a practice is framed as a method in different initiatives aimed at transformations in 2) discuss how TD as an approach can learn from other disciplines and approaches, such as organizational studies, public innovation and transitions, and vice-versa and 3) seed future collaborations between these approaches and discourses by open a space for discussion.

In recent years, "transformations" have moved from academic discussion to become part of the strategic agendas of many public and private organizations. As embodied in the Sustainable Development Goals, "transforming our world" is a call for action beyond incremental approaches, to fundamental changes in systems and institutions. Organizations such as Future Earth, EIT Climate KIC, the European Commission, and many regional governments around the world relate to the notion of transformations in their programs. Within the discourse of these organizations, transdisciplinarity and co-creation are often mentioned as a "method" to address these transformations. Drawing from the literature on transitions studies, organizational studies, institutional theory or systems theory more broadly, this understanding of transformations focuses on changes in socio-technical systems and aims to informs the decisions of public and private actors with the capacity to initiate or steer projects for systems transformations (Leach et al, 2012; Hölscher et al, 2018).

As means to consolidate itself as a community, TD positions itself as a reflexive, integrative, method-driven scientific principle, which approaches societal problems by integrating knowledge from various scientific and social bodies of knowledge. In German speaking countries, TD has been explicitly linked to transformations in debates about risks and opportunities of transformative science (Schneidewind et al 2016; Renn 2019) and problem-solving. Such an understanding has also been adopted by the Swiss academies such as the td-net or the Swiss Academic Society for Environmental Research and Ecology (SAGUF) who conceive TD as a way to bridge STEM and SSH disciplines in order to address real world problems in the field of sustainability. In this approach, transformations appear to be the outcome of problem-solving.

Given these discourses and their (implicit and explicit) interrelations, it is therefore worth exploring what "transformations" and "transdisciplinarity" mean for organizations that use these concepts as part of projects, policies and other types of interventions, as well as the spaces for cross-fertilization with other academic traditions such as transition studies.

The workshop will start with a "pitch" of ideas on TD/transformations from 2-3 discussants who engage in transformations in practice (such as EIT Climate KIC, UNDP, regional governments, others to be determined), followed by a discussion in groups of 6-8 people which will address the questions:

- How is TD perceived as a useful approach (method, theory, other) to implement transformations? Likewise, how the "transformations" discourse is perceived and implemented in transdisciplinary settings?
- How does TD's solution-orientedness relate to transformations?
- What are the actual "spaces" for conceptual and methodological cross-fertilization between these discourses?

We will invite the participants to answer these questions based on their practice-based and place-based knowledge. Discussants will provide practical examples (projects, programs, etc.) on how they link the TD and transformations discourses.

The workshop is targeting at researchers and practitioners working on transdisciplinary and "transformations" oriented projects, in the natural sciences, humanities, social sciences, policy, and practice as well as to researchers who explore and develop the link between these two discourses. The participants will be able to share experiences and their hands-on understanding of TD from transformations, get acquainted with alternative understandings of TD/transformations, and get feedback relevant to their projects and/or work.

Prior to the workshop we will circulate a short paper written by the organizers among the registered participants. The document will help to structure the discussions by examining existing TD/transformations relationships and outlining potential routes for further engagement.

As an outcome of this workshop, we envision that some participants might be interested in exploring further these questions and develop a working paper/position paper that will build and explore with more detail the TD/transformations connection(s) in practice from different perspectives.

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RT-7.7: Movement in one's own research actions

Time: Friday, 17/Sept/2021: 11:00am - 12:30pm

Movement in one's own research actions

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We propose an online workshop with the participants of the ITd Conference 2021, to explore and learn about movement in inter- and transdisciplinary research.

The workshop 'Movement in one's own research actions' lasts 90 minutes and builds on a series of workshops and first analyses of a young research team that met for the first time at the Center for Methods of Leuphana University Lüneburg.

The workshop focuses on questions about the personal understanding of one's own research, as well as on movement in research actions. As research of complex phenomena and problems shows, it often cannot be realized in established fields of knowledge and with the help of institutionalized knowledge practices. Thus, when the demands of research do not match the established structures of knowledge production and are too far apart, we are called upon to break new ground with interdisciplinary, transdisciplinary, or undisciplinary approaches to research.

Those researchers and students who do not work from a disciplinary tradition often do not have a fixed point of view. They are themselves on the move, meandering between established fields of knowledge, borrowing, and temporarily forming new places in the landscape of knowledge. They move on, when the research question demands it. This kind of research and inquiry-based learning can lead to uncertainty and runs the risk of falling into dilettantism and methodological contradictions. Such research practices raise many questions: How to situate myself when my activity is based on movement, on crossing boundaries between fields of knowledge and practices? And: how can research movements be methodologically composed in such a way that they can be shared and understood? To answer these questions, we emphasize the specific constitution of movement in research, which takes place starting from the positionality of the researcher and the turn towards the phenomenon or problem of concern. Its clarification seems to play a prominent role in strengthening the understanding and the traceability of what happens in such an open research and can contribute to epistemological and methodological consolidations. We assume that movement that is not realized along prefabricated methods has a specific epistemic quality.

The aim of the workshop is to trace one's own understanding of research, and in particular the movement in one's own researching activity. A virtual space of movement, reflection and exchange is to be created, which makes it possible to illuminate becoming a researcher and to trace one's own concept of research. The common space enables a mirror to make a cross-boundary and undisciplined research visible, audible and shareable.

• What could attendees of your online workshop or interaction take away from it? What communities do you want to reach? What is the goal of your proposed online workshop or interaction?

Our workshop is an invitation to all people who want to take a closer look at their understanding of research and the movement in their own researching activities. The workshop offers a space for pausing and becoming aware, giving participants observations and questions to take with them: What is my role as a researcher in the generation of knowledge? What is the transformative potential of my own research activities when I am, as a researcher, aware of my research movements? What movements shape research and what qualities underlie them?

• Description of the preliminary structure and design for your online event

I. Presentation of concepts

II. Icebreaker/Warm-Up

III. Questions and reflection round

IV. Interactive moving research

V. Plenary discussion

VI. Conclusion and reflection of the workshop

The workshop will start with a thematic introduction and a short insight into our explorations and analyses so far. After an interactive warm-up, a first round of discussions will be initiated, in which we will exchange ideas on the topic of 'researching' based on keywords and images. A video will be played, which invites the participants into the moving part of the workshop. All participants take their time to give intuitive movements to their movements in research. Afterwards, the experiences and insights will be exchanged within the plenary discussion, and the significance of movement in transdisciplinary research will be discussed. Our methodological approach is nomadic, transdisciplinary, participatory, transformative, and reflective. It aims to engage in moving research -intellectually, verbally, and physically- for the workshop and reflections beyond.

RT-7.8: Nature, Networks and Bridging the Perception Gap between Science and Society: An Action Research Study of the Primary Attention Groups of Urban Citizens

Time: Friday, 17/Sept/2021: 11:00am - 12:30pm

Nature, Networks and Bridging the Perception Gap between Science and Society: An Action Research Study of the Primary Attention Groups of Urban Citizens

David Buckley[1], Aoife Donnelly[1], Lorraine D'Arcy[2]

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Establishing nature-based solutions projects that reconnect urban citizens with nature and facilitate social learning is highlighted as a research and innovation priority in the European Union's commitment to achieving the United Nations Sustainable Development Goals by 2030. Previous studies in the field of transitions research have concentrated on observing and involving particular social groups based on traditional community structures which are not wholly representative of the complex communicative ecology in which urban citizens socially engage. As a consequence, future analyses could benefit from utilising a unified, transdisciplinary community construct grounded on interaction frequency, with the purpose of engaging the

emergent system ability hidden within the social networks of urban citizens and improve participatory design, communication flow and amplify the impact of public problem solving.

The Primary Attention Group (PAG) is a form of community centred on an individual and exists in both geographic and virtual space, using both face-to-face and electronically mediated communications. PAGs offer a possible basis for exploring novel development opportunities with regards to establishing network initiatives that enable shifts in mindsets and behaviours, as well as facilitating a greater sense of community and project ownership in cities at the local level. As such, the aim of this research is to enable urban citizens to develop and visualise their PAG by mapping their communicative ecology through action research in order to support them to participate in positive activities that reconnect them with nature and improve their health in a self-organised manner.

What is the goal of your proposed online workshop or interaction?

Participants will learn how PAG eco-mapping could be applied to reconnect urban citizens with nature and improve social learning in communities in a self-organised manner. Attendees will also gain from a number of theoretical and practical co-benefits which include;

1. Developing new understanding and insight on a number of key themes that shape individual and community mindsets such as social vulnerability, engagement, social identity, risk strategy, psychological and emotional resilience and capacity for learning
2. Participating in a simple application of social-emotional network mapping and experience how these techniques can be used to visualise and get a better understanding of networks

What could attendees of your online workshop or interaction take away from it?

Attendees will prepare a map of their individual 'social learning village' which includes the key social relationships and communicative interactions that shape the way they think, feel and behave. Their map will support them to;

- Improve their decision making
- Understand their emotions, cope with stress, relate to others and form trusting relationships
- Stimulate, facilitate and support dialogue on key social behaviours and relationship dynamics
- Provide a road map for building a personalised support community around new habits of thinking
- Describe the role digital technology plays in mediating their social learning

What communities do you want to reach?

Marginalised women in urban communities. We are also seeking to build professional connections and collaborative partnerships with other researchers with interests in nature-based solutions, mindset theory, community development and sustainability transitions.

Description of the preliminary structure and design for your online event

Session Overview:

Participants will be guided through a series of participatory activities which support them to explore the social, technological and discursive layers of their PAG by creating a visual representation of their own informal social network using an online whiteboard. Time will be allowed to periodically discuss and reflect with other participants on their map in order to inform strategy for working with and sharing knowledge with individuals in their network.

Learning Agenda:

- *10mins -* **Welcome and introduction.**
- *25mins -* **Map creation.** Participants will be asked; **(a)** About the networks that they are connected with such as individual people, groups and clusters, institutions, discourses, nodes of influence, use of technology and their emotional connectedness within their networks **(b)** To think about a current situation or challenge that they would like to change in relation to improving their connection with nature **(c)** List all the principal actors involved in this issue.
- *25mins -* **Observation and reflection on their map.** Once the participant is satisfied with their map they will be asked to take some distance and comment on what they see. (e.g. What, if any, patterns do they notice? What, if any, significance is there in terms of how their relationships are positioned on the page? Who, if anyone, has been forgotten? How do they and others perceive them?)
- *25mins -* **Exploration of any changes they would like to make to their map.** Define action plans which relate to their day-to-day situation and agreed learning objectives (e.g. How could they develop better support by building closer connections, or creating distance within a relationship? What new actors need to be brought in and which may need to be left out? What would an ideal map look like? What would they do differently if they did the activity again in the future?)
- *5mins -* **Closing remarks and questions.**

RT-8.1: The operalization of transdisciplinary co-production: What does methodological diversity mean for knowledge transfer and replicability?

Time: Friday, 17/Sept/2021: 1:30pm - 3:00pm

The operalization of transdisciplinary co-production: What does methodological diversity mean for knowledge transfer and replicability?

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The focus of this workshop is on exploring what methodological diversity mean for knowledge transfer and replicability in transdisciplinary co-production. Transdisciplinary co-production is an approach that aims to create new cultures and practices for research collaboration to better mirror current societal complexities. The core idea is to expand who is involved in generating new knowledge and address real-world problems through collaborative processes that include a wide variety of knowledge and expertise. However, as a general approach, the idea of transdisciplinary co-production alone does not provide the sort of practical guidance that supports academic researchers and other participants or funders when they seek knowledge on how to go about it. In recent years, the number of tools, methods, and approaches offered to address complex issues through participation has burgeoned, as has the number of substantive issue areas that apply such methods. As tools reflect a diversity of research traditions, scientific disciplines, professions, and words of practice, they tend to be highly distributed in disconnected ways across the intellectual landscape. This makes it difficult to locate methods when you need them. Furthermore, many descriptions of methods and tools are largely decontextualized, leaving limited insights as to what they can help achieve, or how they can be combined with other methods or tools, in different situations or contexts. Alternatively, they report on single case studies, from which it is difficult to discern what the specific recipe used has to offer in other situations. The challenges of particularisation and generalisation are well known and discussed, in relation for instance to comparative urban research. However, the focus is usually on the replicability of findings, rather than the replicability of methods and the strengths and limits of the comparative imagination. It requires a rather different concern, with what we do as researchers, as opposed to what we have concluded.

In the book *Transdisciplinary Knowledge Co-production: A guide for sustainable cities*, we sought to inform readers of the challenges and opportunities posed by transdisciplinary co-production, with practical examples of methods in action from projects enabled under the umbrella of Mistra Urban Futures – an international centre for sustainable urban development. The book provides an array of tools and methods, illustrated by case studies from Kenya, South Africa, Sweden, and the UK. It attempts to draw on lessons learnt from field-based research and practice, offering ideas and methods which are non-prescriptive and adaptable. It sets aside any pretension that one approach can achieve everything we might need, asking instead how we can design effective local interventions in response to diverse issues, people, organizations, cultures, and environments.

The methods and cases presented in the book all sought to combine scientific knowledge with other types of knowledge, such as know-how and practical expertise from residents, businesses, community organizations, planners, administrators, and politicians, to build new and combined knowledge of relevance for urban sustainability. They however differ widely, in terms of substantive focus, institutional and physical context, timespan, and impact, and are more or less systematic, more or less context dependent, more or less abstract and concrete. While this diversity is part of the strength of the transdisciplinary co-production approach, moving beyond a patchwork quilt of methods and case studies, to bring the local learning to more general insights, proved difficult. It called for reflection on to what extent, and with what risk, analogies, demarcations and conclusions be drawn from a diversity of methods and cases, and what the diversity in existing practices means for the field of transdisciplinary research and methods at large.

In this session, we invite participants to reflect, discuss and expand on how we can better deal with the methodological diversity that is central to transdisciplinary co-production, including what it means for knowledge transfer and replicability. Based on experiences from the Mistra Urban Futures network, the session will open with a brief presentation of three central issues regarding this topic, as a starting point for the break-out room discussions:

- The consequences of diversity: To what extent, and in what way, can we compare, contrast and feed off research methods operationalised in diverse settings and formats?

- The consequences of an 'anything goes' co-production: What are the implications for including such a wide variety of methods for the development of the TD field, and what are the core or central tenants which may be needed to orient and base the work on?

- The consequences of spatial and contextual diversity: What role does space, place and context play for td-research? How could TD contribute spatially to a sustainable development?

The session will close with joint reflections of essential learnings from the parallel discussions.

RT-8.2: Co-harvesting Tools for Change: Leveraging multiplicity, systemic-design knowledge and real-world experimentation towards regeneration.

Time: Friday, 17/Sept/2021: 1:30pm - 3:00pm

Co-harvesting Tools for Change: Leveraging multiplicity, systemic-design knowledge and real-world experimentation towards regeneration.

Haley Fitzpatrick[2,3], Tobias Luthe[1,2,3]
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This dialogue session focuses on how sustainability transitions can be expanded to include greater emphasis on action-oriented and co-designed implementation of transformative innovation engagements. Recent research and practice suggest that action-oriented, second order science and real-world laboratories (RWLs) offer significant opportunities to leverage change across societal systems. By inviting transdisciplinary participants, across research and practice, this dialogue session aims to harvest examples of experiences related to real-world Tools for Change (TfC) and Systemic Design Principles (SDP) developed by the MonViso Institute (MVI), a RWL in the Italian Alps with close collaboration with ETH Zurich, AHO Oslo and Politecnico di Torino to enable new ways of transformative learning and systemic innovation in practice.

Sustainability transitions research has illustrated how science can lead structural socio-technical change, such as through reflexive governance, transition management strategies, plural policies and diverse stakeholders. Systems theory and systemic design scholarship provide pathways towards resilience by addressing complexity and "wicked" societal challenges through holistic methodologies to transcend reductionist thinking and better adapt to uncertainty. Yet, the slow and disparate translation of sustainability goals that is required across scales have shown that science and technology are only aspects of innovation

processes. Transformative innovation requires deep engagement with "soft" systems such as diverse values, norms and ways of knowing to overcome resistance and build innovation capacity. RWLs offer these critical settings to combine globally relevant scientific research, experimental and collaborative environments with strong engagements in local communities to strengthen and accelerate both new and existing initiatives.

The complexity in enabling place-based systemic innovation requires a new set of hybrid methods, since analytical and explanatory tools of science have reached their limitations when it comes to the social complexity of cooperative regeneration and implementation in the real world. We present a next generation of tools for enabling systemic innovation and mainstreaming the transition to a more sustainable society, from research towards impact. We provide scalable tools for enabling local people action through the interplay of science and design in real-world laboratories - transcending the logic boundaries of science and tapping into different types of knowledge through mutual forms of learning, cooperation and co-design.

The MonViso Institute (MVI) is a place and state of mind as an evolving open innovation ecosystem - a real-world laboratory for research, education, entrepreneurship and new living - on sustainability transitions and regenerative design for a more resilient and just society. MVI's mission is to re-think and re-design how we want to live now and in the future. Resilient, regenerative, blending local traditions, regional resources, and global openness. MVI's vision is being lived in real time: while it is evolving as an Institute - state of mind independent from place – it is as well evolving as a place, a mountain campus, where the state of mind is lived and experienced in real life. The MVI "Systemic Design Principles" (SDP) guide the experimental work on testing and applying "Tools for Change" (TfC) (towards a more sustainable, just and regenerative society) and developing illustrative "Seeds for Systemic Innovation" in real, that enable and scale social and technical transitions. These core concepts guide MVI's research, education and events, with the goals to evaluate, spread and scale their impacts to other systems. We believe that design is at a pivotal movement to confront complex challenges of global scale with place-based inclusive responses at the intersection of science, creativity, and systemic innovation. The evolving MVI is a pathway of experimentation in the real world, guided by a set of goals, such as experimenting with resilient community models, anticipating crises as triggers of shaping new opportunities, building capacity through mutual exchange on experiential seeds for systemic innovation, and incubating entrepreneurial sustainability by balancing local identity and international inspiration. The last years of developing this lab have provided valuable experiences on how place-based systemic innovation (dis)functions, and where further research to fully understand, transcend, upscale and employ derived tools is required.

Since the academic discussion on RWLs is still relatively conceptual, this dialogue session aims to generate deeper practical awareness and weave together real-world examples of SDP and TfCs, which include student-driven research, co-design, technical innovation demonstration, explorative events, stories of failure and more. This session will 1. Present the Systemic Design Principles and TfC experiences from the last five years of MVI work. It will 2. Harvest other experiences from participants on design principles and TfC, and 3. Discuss common ground and joint understandings.

We envision this as a hybridized workshop format, where digital interaction could be supplemented with in-person engagement depending on pandemic restrictions. MIRO, a user-friendly, free and interactive visualization software will be used for participants to engage in a Systems-Oriented Design (SOD) methodology, developed by Birger Sevladson (AHO Oslo).

Participants will use the technique of "gigamapping" to visually understand, connect, and synthesize the TfC examples that they have collected from their research, practice or own experiences. A public invitation could be opened for transdisciplinary participants and distributed across different platforms to reach diverse stakeholders, policy-makers, researchers and change-makers. Co-authors Tobias Luthe and Haley Fitzpatrick will facilitate the MIRO workshop via Zoom break-out rooms.

The learning outcome of this session will be a clearer understanding of what and how SDP and TfCs can be leveraged across scales and contexts to nudge and tip local-people action towards systemic innovation.

RT-8.3: Local Space and Global Topic – Success Factors of the Grand Challenge Forum on Global Health

Time: Friday, 17/Sept/2021: 1:30pm - 3:00pm

Local Space and Global Topic – Success Factors of the Grand Challenge Forum on Global Health

Nadin Gaasch[1], Angela Osterheider[1], Audrey Podann[2], Christine Ahrend[2]

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What is our boundary-object? In this workshop we put up to discussion our transdisciplinary approach – the so-called Research Forum – for fostering knowledge exchange in Berlin. We define Research Forum as a multi-annual process of in-depth exchange between scientific and non-scientific actors following two goals: 1) to support the development of Berlin's profile as an integrated research area through transdisciplinary exchange formats and, 2) to contribute to the further development of methodological issues in transdisciplinarity. The Research Forum we present focusses on the topic global health with the special aim to identify future issues in this field that cover the potential of Berlin's research landscape as well as the needs of society to tackle this grand societal challenge. Based on this thematic focus, we call this Research Forum Grand Challenge Forum Global Health.

What is the context? The Research Forum is one of multiple measures for fostering knowledge exchange between science and society at the Berlin University Alliance (BUA). The BUA is a new association of Freie Universität Berlin, Humboldt-Universität zu Berlin, Technische Universität Berlin, and Charité – Universitätsmedizin Berlin funded as part of the Excellence Strategy of the Federal Government and States since November 2019. It`s "long-term goal is nothing less than to turn Berlin into an integrated research environment […] convinced that the potential in Berlin for a far-reaching collaborative culture is unique in Germany" (Executive Summary). Indeed, we perceive the BUA as an excellent experimental space to bring together knowledge from different research institutions as well as from the society in Berlin. However, the BUA is not yet sufficiently structurally anchored: this makes it difficult to implement such a transdisciplinary process. In addition, we cope with typical concerns in science about the added value of transdisciplinarity but also with practical manageability of such a Berlin-wide process

What is our goal of the workshop? As we are now in the conceptual phase, we would like to create a learning space for the participants and ourselves and get feedback on how to cope with current (and conceivable) hurdles of implementation and how to improve the concept of the Grand Challenge Forum Global Health. We will structure the discussion along selected success factors presented lately by Bergmann et al. (2021). We cherish the success criteria compiled in this paper as important landmarks in developing and reflecting on a new TDR process, although the authors refer to real laboratories. We neither intend to present the paper nor to put up the criteria for discussion. We rather use the criteria as a lynchpin for our workshop. To focus the workshop discussion, we have singled out three success factors (SF) that we suspect to have implementation difficulties. These are (c. f. Bergmann et al, 2021):

- Find the right balance between scientific and societal goals (SF 1)
- Create lasting impact and transferability (SF 7)
- Consider dependency on external factors (SF 11)

In preparation of the workshop, we will work out these three success factors precisely according to our current needs in the project and identify very specific questions for exchange. We will appreciate the assessment of the TDR peers on strengths and weaknesses of our project to be able to adjust the procedure that is scheduled to start in autumn 2021. In addition, we would like to have specific feedback from the attendees on which aspects would be particularly interesting for a Design Report to publish in GAIA.

Thus, we contribute to the following key questions of the conference: What tangible transdisciplinary processes and practices are taking place on-the-ground? How can we use these examples to improve existing transdisciplinary practices and to facilitate inclusive and equitable research?

What is the community we want to reach and what could attendees take away from? We like to get feedback from experts that have experience in transdisciplinary research processes and offer a place of exchange. In this context, we are interested in theoretic, methodological as well as practical knowledge. However, conference participants who would like to deepen their experience in setting up a transdisciplinary process very welcome to give their first impression about the concept and ask critical questions. We want the participants to exchange views and experiences on success factors to jointly develop solutions on how to turn supposed hurdles into paths of success. The key aim is to learn from each other and, at best, to take home new ideas for own TD processes. Furthermore, attendees get to know more about the BUA – a new experimental place for transdisciplinary knowledge integration.

What will the workshop look like? The workshop has to goals: first, the participants should have the possibility to exchange ideas and learn from each other; secondly, we – the workshop team – want to have as constructive feedback as possible from the community. To create a space for an open exchange, we start with a brief warm-up. Before we introduce our concept, we reflect on the institutional context. The core of the workshop are three breakout groups – each of the groups will be facilitated by our team to focus on one of the success factors mentioned above. We refrain from the modus that the participants rotate between the groups (e.g., as in a World Café) to provide sufficient time to work as intensively as possible on the questions. However, for getting insight into the work of the breakout groups, each facilitator will shortly present the jointly developed solutions. We close with a feedback poll and an invitation to stay informed for next steps in the Grand Challenge Forum on Global Health. For realizing the workshop procedure outlined below, we assume a maximum number of 25 participants:

- Welcome to the workshop & Warm-up *(plenum/ online poll)*
- Presentation of the concept *(plenum/ slides)*
- Interactive feedback and discussion on the concept *(plenum resp. single work/ online poll resp. whiteboard)*
- Facilitated discussions focussing on three different success factors *(breakout groups/ max. 8 attendees per group/ structured recording via online whiteboard)*
- Presentation and discussion of the main aspects of the breakout groups and advice from attendees on critically discussed issues *(plenum/ structured recording via online whiteboard)*
- Feedback poll on the workshop and the planned Design Report *(single work/ online poll)*
- Short Conclusion and Goodbye

Reference: Bergmann, M., Schäpke, N., Marg, O. et al. Transdisciplinary sustainability research in real-world labs: success factors and methods for change. Sustain Sci 16, 541–564 (2021).

RT-8.4: Failure is an option: Creating space to talk about failure in transdisciplinary sustainability research

Time: Friday, 17/Sept/2021: 1:30pm - 3:00pm

Failure is an option: Creating space to talk about failure in transdisciplinary sustainability research

Rebecca Laycock Pedersen[1], My Sellberg[2]

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After being picked as President Biden's special presidential envoy for climate in 2020, John Kerry said of climate change: 'Failure is not an option.' This is representative of a common view within the sustainability community: faced with the challenge of sustainability, the stakes are too high to fail. However the reality is that, even though we may not see it as an option, transdisciplinary sustainability projects fail regularly. The aim of this workshop is to create space to think and talk about failure in transdisciplinary sustainability scholarship in all its various forms in order to destigmatise and learn from it.

There are many reasons why failures are not spoken about more openly. A lack of publications could be because of author, reviewer or editor beliefs that positive examples are more useful to learn from (e.g., the emphasis on successful initiatives in Seeds of the Good Anthropocene (Bennett et al., 2016)). It could also be because authors choose to write about success for promotional purposes or as a result of positive feelings associated with success. Even under circumstances when researchers

want to study failed initiatives, they may struggle to find such initiatives given that stakeholders may not want to revisit their failures.

While there is considerable value in learning from and amplifying success, we suggest there are two main risks associated with glossing over failure. First, failure is well-recognised as having pedagogical potential. If we do not interrogate failures, we miss opportunities to learn from them. Secondly, failures are inevitable. Everyone fails sometimes, and often it is not the fault of the individual or even a group of individuals. However, if failure is stigmatised, and attribution of responsibility and blame are commonplace, a risk-adverse culture is created. This is a problem, because the scale of transformations needed to shift us to a more sustainable future require us to take risks and experiment with new ways of living, working, and relating.

We therefore posit that failures (e.g., during fieldwork, inter-/transdisciplinary collaboration, and funding applications; writer's block) need to be spoken about more openly in transdisciplinary sustainability scholarship. This proposed workshop will create space for thinking and talking about failure in through short presentations (for framing and sharing resources), individual reflection activities, paired discussion, and reflections from participants in a large group format. These discussions will be aided by the virtual collaboration software, Miro.

The session structure will be as follows:

Presentation: Inspiration for the workshop (15 mins)

We will begin with a presentation explaining that it is important to talk about failure in order to destigmatise it. The presentation will cover themes from the literature like queering failure, failure as process or outcome, failure and time, and failure and emotion. The presentation will conclude by outlining the structure for the rest of the session, and issuing statements encouraging participants to be reflective and explaining how confidentiality will be handled in the session (e.g., there will be opportunities to share, but there will be no expectation to, especially if sharing could put participants at risk (e.g., mental, physical, financial, professional)). We will conclude the presentation by offering several vignettes of transdisciplinary failures experienced by the facilitators to kick-start the individual reflection activity.

Individual reflection activity (10 mins)

The intent of this activity will be for participants to reflect on their own experiences of failure in transdisciplinary sustainability research. The activity will be guided by the following prompts:

- Think of an example of how you failed in your TD research

- How was your failure received? By yourself? By others?

- What emotions did you feel? Did you make space for them? Did others?

- Did you learn from it? Was it possible to share your learning(s) or embed it/them into organisational practices/infrastructure? If so, how? And why or why not?

- (How) did it influence your future TD research (if any/at all)?

We will ask the participants to keep the answer to the first prompt private (writing it on paper in front of them), and to share their answers to the latter four bullet points on the Miro board (as far as participants are comfortable to do so).

Paired discussion (15 mins)

Following the individual reflection, participants will be placed into pairs for one-on-one discussions. We will invite them to get to know one another and to share what they wrote for the individual activity. Participants will be welcome to share the 'failure' that they wrote about, however this will be optional. They will then be asked to respond to the following prompts:

- Was there anything that came up that surprised you?

- How did it feel to think/write about your failure like this?

At the end, pairs will be asked to discuss if there is something they would like to share with the large group. Up to 5 pairs will be asked to nominate themselves to share what they talked about, allowing for reflective and high quality sharing rather than many brief contributions.

Break (10 mins)

Large group share (20 min)

We will invite each of the self-nominated pairs to share what they discussed with the larger group.

Presentation: Hopeful resources (5 mins)

After the large group share, we will signpost helpful resources and concepts related to failure. These will include Holdsworth's (2020) manifesto for failure in research funding, humble geographies, resources for bringing failure into teaching research methodology, failure in sustainability education, and systems thinking perspectives on failure.

Next steps (15 mins)

The session will conclude with individual reflections on Miro responding to the following prompts (10 minutes):

- What do we need to do to destigmatise failure in TD research?

- What will you take away from this workshop?

- Will you do anything differently because of this workshop? If so, what?

- How would you like us (the session organisers) to follow up on this workshop? (if at all)

In the last 5 minutes, we will summarise the main themes from this final Miro activity and identify possible follow-up actions for facilitators and/or participants.

RT-8.5: Adopted, aspired, ascribed, resisted: dealing with researcher roles in transdisciplinary processes

Time: Friday, 17/Sept/2021: 1:30pm - 3:00pm

Adopted, aspired, ascribed, resisted: dealing with researcher roles in transdisciplinary processes

Callum J Gunn, Teun Zuiderent-Jerak, Barbara J Regeer

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Goal:

In this session, we will explore how transdisciplinary knowledge development processes, guided by visions of transformation, translate into an engaged research practice in which researchers navigate different positions and roles. This panel will bring together insights from different scholarly traditions that deal with the key issue of intervention and positionality at science-society 'interfaces' as we seek to enrich these understandings in the context of transdisciplinary processes. We hope that this panel's outputs can feed into further collaboration in the form of written contributions.

Background:

A central tenet of transdisciplinarity is an explicit orientation around the transformation of the worlds it engages with. An interest in transformation implies a specific focus on engagement and intervention within transdisciplinary processes, which opens up questions as to the positionality of researchers (and other actors) both engaged in and steering the mechanisms of these processes. This panel thus aims to explore how the tensions between studying and engaging in transdisciplinary processes are dealt with.

The question of positionality brings transdisciplinary research (TDR) in close quarters with other (scholarly) traditions where debates are active regarding the role of engagement and intervention as part of the knowledge production process. For instance, Scholz & Steiner (2015) distinguish TDR from professional consultancy via the presence of specific research questions related to the transdisciplinary process and its facilitation. They use the example of participatory observation as a task to be undertaken by scientific researchers in TDR processes. Observation and its intimate relations with participation are also a point of debate in science and technology studies (STS), concentrating on how far 'engagement' with a studied collective can be taken by scholars interested in maximizing learning, including in normative terms (Zuiderent-Jerak, 2015; Downey and Zuiderent-Jerak, 2017).

How these questions of positionality are dealt with is surely important across these different modes of scholarship. In transdisciplinary approaches, knowledge development is often theorised within communities of practice. A community of practice is characterised by the mutual engagement between actors sharing an explicitly articulated common concern or vision that coordinates their interaction to deepen understanding and expertise regarding the shared interest. In transdisciplinary processes, researchers tend to be conceived of as 'change agents' or 'intermediaries', in which they both facilitate and take an active role in co-creating and distributing knowledge in the community. Researchers are participants within the interactive integration processes considered key to transdisciplinary knowledge development (Pohl et al., 2021). Recent work in the transdisciplinary field has focused on developing these ideal-type role typologies by linking them to overarching ideals of transition and transformation (Wittmayer et al., 2017), and how different (competing) roles emerge and unfold in practice (Pohl et al., 2010; Bulten et al., 2021).

What is less clear is how these role conceptions, guided by visions of transformation, translate into an engaged research practice that balances interference/intervention with other competencies and roles related to the knowledge development and learning process. Central to this is handling the inherent - though variably implicit and pervasive - individual and collective normativities within transdisciplinary processes. Bringing together insights from different areas of scholarship that deal with these issues, this panel seeks to build on coherent typologies of researcher roles and competencies through exploring the tools, devices, and resources that enable transdisciplinary processes relevant to all actors involved.

Questions revolve around how the 'transformativity' of TDR processes can be characterised. Transformativity might be understood as a research mentality that coordinates, for instance, where and how data is collected, by which actors, through what mediums, for what interests, under what conventions and regulations guided by certain kinds of ethics, resulting in certain kinds of performances.

Questions include, but are not limited to:

- How do transdisciplinary researchers manage their positions of steering and participating in transformative learning processes? What kind of tools, devices and resources enable this?
- How do interactive integration processes evolve in transdisciplinary research?
- What role do researchers play in the development of integration processes?

- What kind of expertises as well as non-expertises are both required for and developed through transdisciplinary processes?
- What kind of competencies and are needed for developing these (non-)expertises?

- How do researchers navigate the roles and capabilities of other actors within transformative learning processes?

- How might the 'transformativitiy' of transdisciplinary processes generate different forms of exclusion?

Session chairs:

Dr. Teun Zuiderent-Jerak/Dr. Barbara Regeer (Vrije Universiteit Amsterdam, VU)

Callum Gunn MSc (Vrije Universiteit Amsterdam, VU)

Confirmed Session Panellists:

Dr. Sabine Hoffmann (Swiss Federal Institute of Aquatic Science and Technology, Eawag)

Dr. Julia Wittmayer (Erasmus University Rotterdam, DRIFT)

Dr. Morten Sager (University of Gothenburg)

References

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Pohl, C. et al. (2021) 'Conceptualising transdisciplinary integration as a multidimensional interactive process', Environmental Science and Policy. Elsevier Ltd, 118(January), pp. 18–26. doi: 10.1016/j.envsci.2020.12.005.

Scholz, R. W. and Steiner, G. (2015) 'The real type and ideal type of transdisciplinary processes: part II—what constraints and obstacles do we meet in practice?', Sustainability Science. Springer Japan, 10(4), pp. 653–671. doi: 10.1007/s11625-015-0327-3.

Wittmayer, J. M. et al. (2017) 'Actor roles in transition: Insights from sociological perspectives', Environmental Innovation and Societal Transitions, 24, pp. 45–56. doi: https://doi.org/10.1016/j.eist.2016.10.003.

Zuiderent-Jerak, T. (2015) 'Situated intervention : sociological experiments in health care'. Cambridge, Massachusetts: The MIT Press (Inside technology).

Draft Session outline/design

Timeframe (minutes)

00-05; Dr. Teun-Zuiderent Jerak

Introduction to the session

05-25; Panellists

Introductory pitches (5 minutes) to set the scene from different perspectives on researcher roles & competencies

25-50; Session chairs + panellists

Facilitated panel discussion

50-80; Panellists + audience

Interactive discussion

80-90; Session chairs

Summary and looking ahead

RT-8.6: Louder Together: Accelerating multi-discipline dialogues for development.

Time: Friday, 17/Sept/2021: 1:30pm - 3:00pm

Louder Together: Accelerating multi-discipline dialogues for development.

Mona Ibrahim[1], Elsiddig Elmukashfi[1,4], Alhadi Osman[3], Mohamed Elsheikh[2,4]

[1]University of Oxford, United Kingdom; [2]Brighton and Sussex Medical School, United Kingdom; [3]KIT Royal Tropical Institute, Netherlands; [4]University of Khartoum, Sudan; mona.ibrahim@spi.ox.ac.uk

This abstract highlights the need for multidiscipline policy structures, especially in low- and middle- income countries. It emphasises a case study from Sudan from a project titled "Lights, Laws and Livelihoods".

Sudan is facing an electricity crisis. Two out of every five people have no access to electricity and those who do experience daily shortages — leaving parents without power to cook dinner and students without light to study past sundown. The existing carbon-driven electrical grid is an outdated vestige of the imperial period, with continuing detrimental impacts on the environment, and it is crumbling under the weight of increased demand from Sudan's growing population. After losing its oil-rich South the country is now seeking for alternatives; alternatives that can secure its energy needs and yet meet Sudan's action plan in combatting climate change.

These challenges are not unique to Sudan, nor are they unique to the electricity sector. Tens of developing countries are in a similar position where limited funding is thinly invested to a wide range of development goals - to the degree of inefficiency.

Through this abstract, a new appoach to electrification is proposed. It recommends inclusive trans-disicipline dialogues on electrification that realises the extent of the impacts of electricity on health, education, labour, livelihoods and the environment. This approach may revolutionize program evaluation and show the true cost-effectiveness of electricity programmes. Established evidence may service to link impacts across sectors and encourage co-financing across different sectors. Academia plays a huge role in establishing those linkages and uniting sectors on common goals.

RT-8.7: How to assess societal impact of research: Approaches and experiences from different transdisciplinary and participatory research fields

Time: Friday, 17/Sept/2021: 1:30pm - 3:00pm

How to assess societal impact of research: Approaches and experiences from different transdisciplinary and participatory research fields

Josefa Kny[1], Rachel Claus[2], Janet Harris[3], Martina Schäfer[1], Brian Belcher[2]

[1]Technische Universität Berlin, Germany; [2]Royal Roads University, Canada; [3]University of Sheffield, UK; kny@ztg.tu-berlin.de

At the backdrop of a growing interest in tracking and assessing societal effects of transdisciplinary research in the scientific and political arena, a recent OECD policy paper notes that we should take advantage of the "considerable opportunities for mutual learning across different sectors" (OECD 2020: 40). In the workshop, we want to take up this desideratum. In the proposed online workshop, we aim to bring together scholars from transdisciplinary research areas of sustainability sciences, research-for-development and health research to elaborate on the strengths and weaknesses of their respective approaches of monitoring and assessing societal impact of research from a conceptual and empirical stance.

Based on a preliminary literature review conducted by means of a backward snowball approach (starting from a set of relevant papers retrieved published in pertinent journals from the research areas concerned), we identified several tentative commonalities and questions to frame the workshop discussion:

Firstly, we reaffirm the lack of conceptual clarity concerning key terms of impact assessment while comparing different research areas, as discussed by Belcher and Palenberg (2018) in the international development context and by Harris et al. (2018) for participatory health research. Thus, key questions are: To what extent are the same conceptual and terminological underpinnings understood and applied differently in various research communities? How could a common understanding support the development of context sensitive methods for tracking impact?

Secondly, the central challenges of traceability and (causal) attribution are discussed in all research fields considered against the background of the complexity of transdisciplinary endeavours and societal effects (Beckett 2018, Douthwaite et al. 2017, Lux et al. 2019). While the concept of 'impact pathways', that is "the sequence or hierarchy of changes and events that map out how things will change" (Vogel 2012: 44), is to some extent used in all discourses (Biggs et al. 2014, Fritz et al. 2019, Temple et al. 2018), it so far remains an open question to what extent the challenges and respective methodological advances might match or differ according to their field contexts.

Finally, across all of the disciplines in our workshop, visualization of the links between activities, results and effects is used to facilitate joint reflection and to create a visual boundary object, which can serve as a starting point for monitoring concepts (Breuer et al. 2016, Deutsch et al. 2021). This leads to the question: How can visualization and narratives be used to increase understanding of impact pathways?

Addressing these questions could be a useful basis to learn from one another and, eventually, combine methodological elements. Therefore, in the workshop we want to address the following questions in an open discussion format:

1. What are the main concepts and terms used in relation to assessing societal effects in the respective research area and how are they defined?
2. What are the key challenges in methodologies to trace and assess societal contributions of research?
3. What is the role of visual and narrative change models in facilitating discussion about societal effects, and how are they used?

We invite scholars from the different research fields to contribute brief responses to these questions form their own experience. The discussion will be structured by asking participants to complete a short template before the workshop, if they like (see below). The filled out templates will be accessible online. In the workshop session, we will present a first synthesis of the handed in contributions as a starting point for discussion. We then will deepen the comparison of the existing approaches and identify conceptual and methodological similarities and differences in small groups (breakout rooms). Based on the identified strengths and gaps of different approaches, documented in a Miro board template, we will jointly discuss whether and how to synthesize methodological elements to advance their overall application in transdisciplinary research projects and strengthen comparability in the last part of the workshop. We will conclude with a collection of open questions and suggestions for joint meta research activities on the topic in a Miro board.

For attendees, this workshop offers an introduction into approaches of describing societal effects of transdisciplinary research in different research areas, an interactive reflection about their similarities and differences as well as first ideas on opportunities and how to combine them constructively to achieve rigorous and manageable concepts and methods in the future. We welcome scholars from the research fields of sustainability, development and health as well as other researchers interested in methodological advances of the assessment of societal effects to join the workshop.

We are looking forward to your contributions to the discussion! If you are interested in contributing, please fill out the template of questions provided below and send it to Josefa Kny (kny@ztg.tu-berlin.de) until **August 13th, 2021**. The filled out template should not exceed two pages.

TEMPLATE OF QUESTIONS

- **Name of your approach to assess societal impact:**
- **Approach description** (Please summarize your approach and its application context/options in a few sentences or bullet points.)**:**
- **Concepts used in the approach** (Please insert definitions for key concepts and components.)**:**
- **Key challenges** (Please write down what you are struggling with concerning the application of your approach.)**:**
- **Visualization and narratives** (Please add short information on whether and how you use visualization, narratives or other boundary objects in your approach.)**:**
- **Strengths and weaknesses** (From your own perspective: What would you consider as strengths and weakness of your approach?)**:**
- **Learn more** (If possible, please insert a link to a website, paper etc. where details of your approach and its application can be found.)**:**

RT-9.1: Building transdisciplinary science-policy capacities and opportunities in Latin America and the Caribbean through an Inter-American fellowship program

Time: Friday, 17/Sept/2021: 3:30pm - 5:00pm

Building transdisciplinary science-policy capacities and opportunities in Latin America and the Caribbean through an Inter-American fellowship program

Ana Watson Jimenez[1], Kimberly Portmess[1], Marcella Ohira[1], Marga Gual Soler[2]

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Intertwined health, environmental and economic global crisis requires orchestrated international efforts vis-à-vis trustworthy science advice and diplomacy. Transdisciplinary (TD) plays a key role in timely and effectively addressing these complex problems, but how can emerging countries build capacity for TD work on the ground and in transboundary networks? Typically, most traditional academic programs do not prepare scientists with the soft skills necessary to engage with transdisciplinary research and global governance practices. The goal of this panel is to advance in understanding the impact and contributions of the Inter-American Institute for Global Change Research (IAI) Science, Technology and Policy (STeP) Fellowship Program in the Americas in mobilizing scientific expertise from multiple fields to support global environmental governance.

STeP is an innovative program in Latin America and the Caribbean (LAC), seeking to place local scientists (Fellows) in public or private host organizations to research, inform and advise decision-makers on global environmental change and sustainable development issues. Additionally, IAI provides strategic professional development training for Fellows and their host institutions to become leaders and active agents of systemic change using science to support sustainable and inclusive development in their countries.

To foster science diplomacy and regional collaboration the IAI has partnered with AAAS Science & Technology Policy Fellows in the US and Mitacs Canada Science-Policy Fellowship program. Since 2020, 20 fellows from the US, Canada, Argentina, and Mexico have united in the STeP science diplomacy training program on themes of regional priorities and science diplomacy. This session will feature 5 fellows, who are doctoral candidates or post-doctoral researchers, describing their experience on team projects encompassing the areas: a) Science, security, and diplomacy in the changing Arctic, b) clean energy, c) circular economy, d) sustainable agriculture and the food-water-energy nexus, and e) sharing data at the global health-global change nexus.

The program aims to build human and institutional capacity for science-informed policy, create an international network of peers, cultivate effective science advice and communication skills, provide emerging academics with first-hand knowledge of policy-making processes, and mobilize scientific expertise to support evidence-based solutions. During the session, lead administrators will explore the challenges and opportunities of the program in addressing transdisciplinary skill gaps and creating opportunities to bridge academia with the world of policy.

What could attendees of your online workshop or interaction take away from it?:

Attendees will engage in the discussion of emerging lessons on how joint transboundary science-policy fellowship program in North America and South America helps to: build capacity for science-informed policy; create a TD network of peers, cultivate effective science advice and communication, provide emerging academics with knowledge of policy-making processes at different scales, and foster mobilization of scientific expertise to support evidence-based solutions.

Further, the audience will gain an appreciation for the skills needed for effective science-policy communication and relationship building across expertise and levels. Session participants will learn how fellowships create a channel for communication between scientists and policymakers ranging from municipal and national to regional and international levels.

Lastly, lead administrators will share information and experiences about the establishment of an Inter-American Network of Science-Policy Fellows to facilitate inclusive and equitable research. The Network helps not only with the long-term sustainability of the program, but also contributes to South-South and North-South transdiciplinary collaborations through professionals or "bridging agents" who understand both the world of science and the world of policymaking. More importantly, how these two worlds can work effectively together to tackle society's most pressing global challenges.

Potential Audience and Structure:

The session will provide a platform for sharing lessons learned. The potential audience for this panel includes scientists from different disciplines, early career scholars and students, decision-makers as well as practitioners. The panel includes:

1. Introduction of the importance of professional development in science diplomacy, communication, and leadership in transdisciplinary contexts. (10 min.)
2. Presentation of the lead administrator addressing the lessons learned from the implementation of the IAI-STeP fellowship program in Latin America and the Caribbean (10 min.)
3. 5 fellows (one per project area) will display an interactive presentation of their results and challenges (40 min).
4. 15 minutes discussion in sub-groups per area.
5. 15 minutes plenary discussion and networking.

RT-9.2: Navigating power in transdisciplinary research: From reflection to resistance

Time: Friday, 17/Sept/2021: 3:30pm - 5:00pm

Navigating power in transdisciplinary research: From reflection to resistance

Livia Fritz[1], Olivier Ejderyan[2], Franziska Meinherz[1]

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Abstract

The goal of this workshop is to develop together with researchers and practitioners concepts and tools in order to identify and deal with power dynamics in transdisciplinary (TD) research projects.

Power is a key concern both implicitly and explicitly in transdisciplinarity at different levels. Notions of empowerment of actors are central to the TD endeavour of addressing real world problems. Regarding process design, principles of TD research stress the need for shared control of knowledge production and allude to the ideal of interactions on "equal footing", hence implicitly to balanced power relations. Furthermore, TD approaches have been developed with the expectation that the inclusion of practitioners and their expertise in research processes allows to co-produce societally relevant knowledge and leverage the transformative power of research. The role of power dynamics and imbalances in TD practices has increasingly been acknowledged and the need for unfolding the entanglements of power and politics throughout such research processes has been recognised. An increasing number of scholars find that power relations among researchers, between researchers and practitioners, and among practitioners shape collaborative research.

However, there has been very little direct engagement with different conceptualisations of power in TD research. Recent work has addressed this lack of engagement by identifying diverse ways in which power can shape TD processes, including potentially desired forms such as empowerment ('power to') or collective learning ('power with') as well as potentially undesired ones such as domination and control ('power over') (Fritz & Meinherz 2020a). Based on such conceptualisations, different manifestations of power at various stages of TD processes have been explored and approaches to identify them have been proposed (Fritz and Meinherz 2020b).

When it comes to addressing power issues in TD, researchers' reflexivity appears to be central (Fritz and Meinherz, 2020b; Pearce & Ejderyan 2020; Rosendahl et al. 2014). Reflecting on the researcher's positionality (especially when they initiated or are coordinating TD collaborations) as influential on the conduct of a TD project can indeed help them to adapt their behaviour, research methods, moderation technique or even project scope in order to address power. Yet, so far little research has systematically collected the various ways in which TD researchers and practitioners directly address power issues in their collaborations.

This workshop, thus, invites both researchers and practitioners involved in TD research to jointly reflect on the diverse ways in which power manifests and to share their ways of (deliberatively or unconsciously/implicitly) navigating power in TD practice.

What could attendees of your online workshop or interaction take away from it?

- Workshop participants get familiar with basic concepts and theoretical notions on power that can support them in making power dynamics visible in their projects;
- Workshop participants will learn from others how they navigate power in TD practice; on this basis a knowledge base on how TD practitioners navigate power will be jointly built;
- Reflexive stance towards their own practice;

What communities do you want to reach?

- Practitioners of transdisciplinary methods and approaches, i.e. scholars and actors from practice and policy;
- We invite both researchers and practitioners involved in transdisciplinary research to contribute their reflections on experiences with and ways of navigating power dynamics in transdisciplinary research projects.

Description of the preliminary structure and design for your online event

The workshop design will rely on a combination of inputs from the organisers, individual and collective reflections in which workshop participants will collect their experiences with power dynamics and ways of handling them. Overall the event well be structured along the two main questions:

(1) How and in which situations does power manifest in TD research?

(2) How is power handled throughout research processes?

Key elements of the workshop:

- Getting to know each other & short impulse talk by workshop conveners, clarifying key theoretical notions guiding the workshop. (15 min.)
- Structured reflection and sharing of experiences with power in smaller groups using breakout rooms; the key concepts introduced in the first part facilitate the participants' reflection; each group documents their experiences/examples with virtual post-its on a pre-structured board on "miro" (or any other similar platform). For one of the power situations they recall they will also be asked to think about the ways in which they handled it (or explain why they did not manage to handle it). (35 min.)
- Bringing together the ways in which workshop participants have so far navigated power in their TD practice: this final reflection will be guided by the question of how to deal with and productively tackle power dynamics. Tools, strategies, and approaches shared by workshop participants will be documented on virtual post-its to outline elements of a typology of ways to handle power in TD. (35 min.)
- Closing (5 min.)

Number of participants: 15-18

References:

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RT-9.3: Discerning purpose within complexity: coordination and development strategies for a transdisciplinary, problem-based, thematic studio course for undergraduates

Time: Friday, 17/Sept/2021: 3:30pm - 5:00pm

Discerning purpose within complexity: coordination and development strategies for a transdisciplinary, problem-based, thematic studio course for undergraduates

Stephanie Nicole Lewis, Anne-Lise Velez, Najla Miranda Mouchrek

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Workshop learning objective:

By the end of this workshop, participants will be able to (1) explain and adapt the provided transdisciplinary course development framework to the needs of their institutions and (2) explain a group-developed concept for a transdisciplinary course idea.

Framing for the workshop:

Collaborative teaching of transdisciplinary topics is counterintuitive to the siloed and highly structured nature of instruction within discipline-specific university courses. Navigating spaces dedicated to specialized disciplinary intellectual spaces is often taught in higher education but hiring managers and talent recruiters have indicated they want to see new hires with transferrable, competency-based skills outside of their selected disciplines. A transdisciplinary classroom space provides a minimal risk, high reward environment for developing transferrable skills like teamwork, multimodal communication, ethical decision making, critical thinking, and inclusion. This type of learning environment can further benefit from a collective of instructors from different disciplines who can bring together various perspectives and show students where the boundaries between disciplines are blurred while modeling collaborative behavior for students.

Origin of framework:

The Virginia Tech Honors-Urban Affairs & Planning SuperStudio is a transdisciplinary topic-based studio in which five concurrent three-credit courses and a co-requisite one-credit context framing course are collaboratively taught by a team of content-expert faculty. Current SuperStudio faculty members have expertise in computational biology, public administration, engineering, and learning technologies. Students enrolled in the course are from diverse disciplines, and explore societal challenges through learning collaboration, problem framing and solving, and decision-making processes. Development of this course was heavily influenced by research suggesting desirable skill sets for recent graduates pursuing entry-level positions, and pedagogical theory on problem-based learning.

The studio course is structured like a community of practice, where learners are introduced to important concepts specific to the topic section in which they are enrolled, interact with students in each of the other sections through joint conversations between pairs of sections, and form multidisciplinary teams to understand, evaluate, and propose solutions for a specific problem associated with a complex, global issue. To date, students have explored various aspects of the Green New Deal, which includes considering several international versions of the policy. Within the United States, the Green New Deal was a legislative proposal calling for political actions that would improve environmental outcomes at the global level, improve equity and inclusion practices within the US, and push for updates to failing aspects of our national infrastructure. Students have engaged with topics like healthcare equity, sustainable infrastructure, environmental policy needs, shifts in employment opportunities and training, and adjustments to higher education that foster sustainable decision making. The course is designed for third-year and fourth/fifth-year students and works exceptionally well as a capstone experience for some of the university's public affairs degrees.

Students who have completed the course report learning outcomes that exceed those proposed by the instructors. The course was structured as a learning tool for problem framing, integration of discipline-independent concepts like ethics, equity, and innovation, and synthesis of stakeholder and systemic priorities impacted by the complexity of the identified problems. Within the scope of each topic section, students are asked to contextualize the key concepts for their primary topic (e.g., policy, employment, data analytics), articulate the impacts and influences of their topic on the shared theme (e.g., the Green New Deal), complete a collaborative research project, develop a deliverable that demonstrates gained knowledge from the research process, and communicate their product to a general audience in written, visual, and oral formats. The faculty-guided project development process includes requirements for student groups to identify their preferred problem areas, propose deliverables, and identify an audience. Beyond these outcomes, students anecdotally report an appreciation for the role of diverse thoughts about and approaches for accomplishing a goal, and improved understanding of the conceptual limitations they inadvertently placed on problems they feel motivated to solve as professionals entering the workforce.

Workshop structure:

In this workshop, participants will engage in a thought exercise for brainstorming and developing a transdisciplinary studio course that includes best practices in active learning pedagogy. The session will start with an overview of the SuperStudio course structure and summary of the teaching team's ideation process. The presentation portion will include a framework for course development and establishing instructor partnerships with each other and with institutions presented as a boundary object. The workshop hosts will explain the hallmarks of the course structure and team dynamic that translated to positive learning outcomes for the enrolled students. Participants will then be divided into groups where they can get to know the disciplinary expertise of their workshop team and reach a consensus on a global issue that would allow them to meaningfully engage students in a complex problem space. The Green New Deal can be used as a starting point, but participants will be encouraged to assess other large-scale initiatives. The groups will discuss how their disciplinary interests tie together under the selected shared theme and strategize course topics and activities that foster higher order thinking and development of novel ideas for class projects based on the boundary objects presented. This process will include discussion of their individual best practices and how these approaches can be adjusted to meet the learning needs of the collective. By the end of the group work session, participants will have structured ideas for how to approach developing transdisciplinary studio-based courses, or a first draft of a course plan that could be implemented at their institutions.

Workshop audience:

The structure and goal of this workshop would be beneficial to instructors and faculty interested in approaches to developing transdisciplinary courses, or ways to reap the benefits to instructors and learners of team teaching. Individual instructors and instructor teams would benefit from this work session. Additionally, university administrators can benefit from engaging in conversations with instructors about needs for implementing courses of this nature and strategies for embedding transdisciplinary courses into disciplinary curricula.

RT-9.4: Co-creating guidelines for transdisciplinary learning & teaching publishing

Time: Friday, 17/Sept/2021: 3:30pm - 5:00pm

Co-creating guidelines for transdisciplinary learning & teaching publishing

BinBin J. Pearce[1], Michael Stauffacher[1], Matthias Barth[2]
[1]ETH Zurich, Switzerland; [2]Leuphana University, Germany; bin.pearce@usys.ethz.ch

Goal of your proposed online workshop or interaction?

The goal of the workshop is to develop a set of jointly drafted guidelines for transdisciplinary learning and teaching case studies for scholars and practitioners. As case study we understand here as descriptions and analysis of individual courses, a curriculum, extracurricular teaching events and/or a degree program for td learning and teaching. In the process of this co-creation process, the following questions will be addressed:

- Existing needs -What needs are not being met in the sharing and reporting of TD teaching and learning experiences?

- Content - What is the minimum set of information we need to make teaching and learning case studies meaningful?

- Format - What might be the most accessible format(s) and outlet(s) for such (case) studies?

This process was initiated in April 2021 as a workshop that was a part of the annual meeting of Gaia – Ecological Perspectives for Science and Society journal. This workshop was inspired by the observation most td researchers are as well active in teaching and learning but do hardly get the chance exchanging such experiences. One of the reasons being, that fitting formats and outlets are lacking that would make this sharing feasible and attractive. This past workshop provided an initial set of guidelines elicited from more than 20 people who were present. The organizers of the first workshop will present the second iteration of these guidelines in the proposed workshop with the aim of receiving additional feedback from a different audience and to broaden its relevance to both scholars and practitioners. We especially invite members of different networks like td-net, td alliance, td academy, science of team science, etc. joining as we want as well exploring options for co-ordinating our initiative with initiatives ongoing and/or planned by other.

What could attendees of your online workshop or interaction take away from it?

The output of this workshop will be a jointly developed set of guidelines for transdisciplinary teaching and learning. These guidelines will be shared widely and contribute to a future vision of publishing transdisciplinary learning and teaching case studies that addresses the following needs:

- **The need for theoretical/methodological guidance** that is matched to context –

While there is not a dearth of information about teaching methodology and concepts. What may be difficult, however, especially as one beginning a new course or want to develop a new offering, is knowing which approaches are best for the particular learning goals, institutional circumstances, funding, time, educational policies that one is a tied to. And, guidance for how one might prioritize these different considerations and how these considerations might change the way methodologies could then be implemented and, eventually, assessed, especially assessed for the societal impact of TD learning and teaching.

- **The need to share tacit knowledge** - Much about teaching is the craft of teaching.

These are things built up with experience and increased sensitivity to how people learn. These things, by definition are difficult to write about - but there is a lot to learn from those who have already built up many years of this understanding in a teaching/learning context. How could this learning be made possible through publications?

What communities do you want to reach?

The session targets primarily those who have experience with teaching and learning in transdisciplinary settings, in particular, those teachers who have an interest in sharing these experiences with other teachers. In addition, curriculum developers or scholars who have an interest in transdisciplinary learning are also particularly welcome. As said, we especially invite existing networks that have ongoing activities and/or plans that go into a similar direction. All other scholars, practitioners and students are also all welcome to contribute to developing these guidelines. The workshop will not require any prerequisite work to be completed, nor will it depend on pre-crafted contributions. There will be no limit on the number of participants.

Description of the preliminary structure and design for your online event

For those who have pre-registered to the workshop with sufficient time, participants will be provided with the three questions listed above and a link to the draft of the guidelines. This group will be asked to comment on it prior to the workshop. For those who join last minute, they may read through the guidelines during the session as well, and are welcome to give more detailed feedback after the workshop in the shared document or via email. Organizers will collect, cluster and organize both answers to the questions, as well the feedback on the draft guidelines to be the material for the introductory input.

The workshop (90') will be structured as follows:

- Brief introduction to the problem and guiding questions by the organizers (10').
- Discussion of the guidelines and remaining issues by participants (break-out rooms, working with google docs, unfacilitated but participants provided with instructions on a shared document, 45').
- Sharing insights (plenary, 30').
- Wrap-up by organizers (5').

The results of the discussions in the break-out rooms will be recorded in written form in Google Docs and shared after the session.

RT-9.6: Learning and experimentation in daily life practices due to the COVID-19 pandemic – a citizen science workshop discussing results from the "Logbook of Change"

Time: Friday, 17/Sept/2021: 3:30pm - 5:00pm

Documenting learning and experimentation in daily life due to the COVID-19 pandemic through social citizen science – lessons for transdisciplinarity?

Bettina König[1,2], Benjamin Nölting[1], Carolin Baedecker[3], Julia Rösch[4], Antonietta DiGiulio[5]

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Transition scholars have discussed in the last months whether the COVID-19 pandemic might be a window of opportunity for deep sustainability transitions by changing unsustainable routines and practices (e.g. Schot 2020, Cambridge Sustainability 2021). Yet to test this assumption, empirical insights into ongoing and potentially prevailing processes of change are needed (Nölting et al., in review). Yet, learning in transitions generally faces difficulties from limited conceptualisation (Van Mierlo and Beers 2020) and thus generating empirical evidence. The authors present at this conference an example how to methodogically capture individual learning from daily life during COVID-19 (König and Nölting, pre-crafted presentation at this conference). Despite the fact that in this example, interdisciplinary elements will only be likely to come after initial data collection, we want to link our experiences to the participatory component in TD, which we consider as one entry point to discuss ways on engaging knowledge holders, producing and sharing knowledge as an area for mutual learning between CS and TD (Pettibone et al. 2018).

This workshop is based on our own pre-pandemic TD experiences. Physical distances are typically a challenge to organise broad participation of stakeholders relevant to wicked problems studied through TD approaches. Given that analysing ongoing change processes in pandemic times needed to be distanced, we focus in this workshop on the participatory component of TD research. Are the pandemic conditions a window of opportunity or challenge for participatory methods in TD and CS research?

This explorative workshop addresses three levels of learning: 1) empirically capture individual learning from change processes in daily life (data collection), 2) learning from the analysis of different change experiences (data analysis and sharing results) and 3) learning from exchanging our citizens' science learnings to discuss TD researcher's learnings with regard to their own physically distanced participatory research experiences. E.g., how does the digital environment affect social integration and learning is an unclear effect on knowledge co-generation processes and the quality of their outcomes.

Taking the citizen science project 'Logbook of change' and its experiences with stakeholder engagement both for data collection, for involving citizen scientists in an advisory board (Bettina König, Benjamin Nölting) as well as for discussing results with stakeholders in two workshops as an input example (Carolin Baedecker, Julia Rösch) and general potential for mutual learning between TD and CS (Antonietta DiGiulio), this conference workshop aims to support to capture, exchange and discuss insights and individual learnings from the TD community at the interface between td, social science citizen science in digital forms. Thereby, the organisers hope to support community learning on physically distanced forms of participatory research methods in TD or other engaged research forms that can support their work under conditions of physical distancing and beyond.

We are open to invite other examples of distanced research methods and learning – please contact the organisers.

RT-9.7: Reflecting back on the Urban Forum – Practice meets Academia

Time: Friday, 17/Sept/2021: 3:30pm - 5:00pm

Reflecting back on the Urban Forum – Practice meets Academia

Sonia Curnier[1], Andrea Kahn[1], Lisa Babette Diedrich[1], Per-Johan Dahl[2]

[1]Swedish University of Agricultural Sciences, Sweden; [2]Lund University, Sweden; sonia.curnier@slu.se

In 2019, two Swedish research platforms initiated a transdisciplinary event format to foster exchange between practitioners and scholars from the spatial design disciplines (architecture, landscape architecture and urban design). This session presents and reflects on that format; it aims to *disclose* what a designerly "mind-set" offers for knowledge integration and holistic thinking; *share* lessons-learned from a proven constructive dialogue tool; and *explore* potential developments and other exchange formats. Design, when recognized as a synthetic and synergetic knowledge-producing practice, offers working methods for facilitation between different actor groups widely applicable to transdisciplinary projects. Audience members will learn the process details contributing to the success of the Urban Forum and join discussion on similar transdisciplinary encounter formats using critical tools from the creative design fields.

The Urban Forum – Practice meets Academia

The "Urban Forum - Practice meets Academia", is a collaboration between Urban Arena, at Lund University, and SLU Urban Futures, at the Swedish University of Agricultural Sciences, Over the past three years, the Forum has been refined and adapted to fit various settings, from international conferences (such as ITD19) to digital Covid-time seminars.

The Urban Forum – evolutionary timeline:

Seed // The idea originated at the *Beyond ism Conference* (2016) as "Practice on Stage"

Seedling // First formal Urban Forum – Lund Sustainability Week 2019 (15 floor talks) –*Sustainability thinking*

Second Urban Forum – ITD 2019 Göteborg (8 floor talks) –*Transdisciplinarity*

Graft // Urban Forum goes Digital (2021)
#1 online - *Responsibility of Design/Rethinking design processes* (7 screen talks)

#2 online - *Responsibility of Design/Across Scales* (6 screen talks)

Future // Urban Forum goes Digital #2 (Fall 2021) & Lund Sustainability Week (2022).

A transdisciplinary encounter

The Forum convenes actors from practice and academia to increase their interaction. It strives on one side, to build awareness among design practitioners of their role in a wider collective endeavor to build new knowledge, exceeding the confines of a competitive vision of practice; and on another, to expand the horizons of design researchers to consider how they might transform ideas into reality and make practical use of research. In challenging the received Theory/Practice dichotomy, the Forum strives to

- Develop reflective practice and practical theory ("Practice" = learning by doing)

- Expose how practice can deliver questions meriting further research and inquiry

- Encourage practitioners to view themselves as practice-based researchers

- Gain understanding of where knowledge is needed in the urban arena

Designing a safe space

Over the years, the Urban Forum format has been carefully designed and refined to cultivate an inclusive, mutually respectful space for dialogue. In this "safe space" practitioners and thinkers share work-in-progress, burning questions, critical concerns, inspiring findings, and crazy new ideas. Success depends on structuring a secure setting for intellectual and creative risk taking, in physical, and as the pandemic struck, digital format. Several aspects have proven crucial for fruitful outcomes, among these thematic clarity, simple presentation requirements, strict timeframes, limited participant numbers, and synthesizing moderation.

The role of design

These encounters revealed a new generation of design practitioners and thinkers, who view their practice in a larger scope and purpose than simple isolated, problem-solving activity. This session will be an opportunity to give them a voice to reflect on the ability of design practice/thinking to address – in a holistic, synthetic way – the spatial challenges of contemporary urban societies.

- Projecting Urban futures / sustainable, safe, healthy, democratic, inclusive living environments

- Facing global challenges with local resources

- Activism and action – design as a mean to change things

- Changing habits - design as raising awareness

- Rethinking design processes – changing practices and policies

- Design as an activity, a process and a result

- Designers as facilitators / co-creation (being used to navigating between very different stakeholder groups)

Session Design

Overview

The 3-part session will start with a short presentation of the Urban Forum format by its two founders, Prof. Dr. Lisa Diedrich (SLU) and Assoc. Prof. Per-Johan Dahl (LU) followed by a roundtable discussion with invited participants from past Urban Fora moderated by Sonia Curnier and Andrea Kahn.

Part 1 Origins, aim and history of the format (20 min)

Urban Forum founders retrace the origins and intentions of the format, elaborating on the switch from pre-pandemic physical/local format, to a digital and international one, benefits and challenges.

Part 2 Reflecting on the format and the role of design (25 min)

This second part starts with respondent presentations (micro-interviews with participants from past Urban Fora) – about their experience with the format), as basis for discussion on how design practice and practice-oriented research in design can collaboratively contribute new knowledge for confronting wicked urban challenges. Respondents (listed below) share their views on the exchange format and examine potential developments to create a community of design activists concerned with the future of cities.

Part 3 Knowledge exchange (40 min)

Knowledge exchange with audience on forum formats, with the aim of finding out what is unique to our format, and what is common. Respondents and audience share their views on the values of the exchange format and examine potential developments to create a community of design activists concerned with the future of cities.

Respondents

Petra Jenning – Fojab – SE / Lund 2019 / Practice / (confirmed)

Tomà Berlanda / Sunniva Viking – a.space studio – ZA / Digital #1 2021 / Practice Academia / (confirmed)

Nils Björling – Chalmers University – SE / Digital #1 2021/ Academia / (confirmed)

Session timeline (90 minutes)

Introduction (5 min) – session purpose, structure and desired outcome

Part 1 (20min) – Origins, aim and history of the format
(Live or pre-recorded)
Lisa Babette Diedrich - Per-Johan Dahl

Part 2 (25 min) – Intro Roundtable - Respondent round
(3-4 pre-set question to each - 4 min X 3 respondents)
Andrea Kahn

Part 3 (40 min) – Moderated discussion (audience + founders + respondents)

Sonia Curnier

RT-9.8: Enabling conditions for inter- and trans-disciplinary integration: Commonalities and differences across geographical regions

Time: Friday, 17/Sept/2021: 3:30pm - 5:00pm

Enabling conditions for inter- and trans-disciplinary integration: Commonalities and differences across geographical regions

Sabine Hoffmann[1,2], Lisa Deutsch[1,3], Jan Streit[1,3], Benjamin Hofmann[1], Julie Thompson Klein[2,4], Christian Pohl[2], Kristine Glauber[5], Christine Ogilvie Hendren[6], Pips Veazey[7], Kristine Lund[8], Carmenza Robledo[2]

[1]Eawag, Swiss Federal Institute of Aquatic Science and Technology, Switzerland; [2]TdLab, Department of Environmental Systems Science, ETH Zurich, Switzerland; [3]Institute for Environmental Decisions, ETH Zurich, Switzerland; [4]Department of English, Wayne State University, USA; [5]Clinical & Translational Science Institute, Duke University, USA; [6]Research Institute for Environment, Energy and Economics, Appalachian State University, USA; [7]University of Alaska Fairbanks, USA; [8]ICAR Research lab, CNRS, Ecole Normale Supérieure de Lyon, France; sabine.hoffmann@eawag.ch

Although integration is often considered critical to success or failure of inter- and trans-disciplinary (ITD) research projects or programs (Defila et al., 2006, O'Rourke et al., 2016), widespread consensus on what integration actually means is lacking (O'Rourke et al., 2019, Pohl et al., 2021). We treat integration as a process of combining a wide range of perspectives not only from different disciplines (interdisciplinary integration), but also from research, policy, and practice (transdisciplinary integration) in order to advance fundamental understanding of complex societal problems, and to formulate 'socially robust' solutions (Hoffmann et al., 2017a). We likewise refer to integration as the result or output that emerges from this process (O'Rourke et al., 2016). Following O'Rourke et al. (2019) and Pohl et al. (2021), integration occurs at different phases of an ideal-typical ITD research process and yields different types of integration in different contexts depending among others on the specific purpose, scale and scope of ITD projects or programs (Klein, 2008). Finally, we distinguish knowledge elaboration from knowledge regulation (Lund, 2019).

We argue that integration does not happen automatically, but needs to be proactively led to ensure research projects or programs live up their ITD ambition (Hoffmann et al., 2017b, Deutsch et al., 2021). We also posit that leading integration does not take place in a vacuum (Brundiers et al., 2013), but requires conditions enabling integration. This contribution explores what kind of enabling conditions project or program leaders and researchers need–and create–to leverage integration. It draws lessons from a variety of cases across various geographical regions, specifically Latin America, US/Canada, Africa and Europe, in addition to insights across different professional communities engaged in ITD research, including Science of Team Science (SciTS), Action Research (AR), Integration and Implementation Science (I2S), and Association for Interdisciplinary Studies (AIS).

By drawing lessons across these communities, this contribution will provide key insights to the conference streams of "Integrative TD" and "Institutionalizing and funding TD" and address two main questions: (a) What kind of conditions do project or program leaders and researchers need–and create–to enable ITD integration in different regions? and (b) How do these conditions impact, both positively and negatively, integration in these regions and how? The contribution will build on three previous workshops at the ITD 2019 [1], SciTS 2020 [2] and SciTS 2021 [3]. The results will inform the working group on "Integration Experts and Expertise" to be established under the auspice of the newly founded ITD Alliance aimed at advancing ITD research and education.

The conveners note that a number of assumptions are embedded in the workshop design, including, for example, that workshop attendees have a clear idea of what "integration" means. We acknowledge that these assumptions could itself fill a workshop if interrogated thoroughly. It is our intent to avoid definitional derailment. We will therefore encourage participants to follow their individual understandings and focus our efforts to derive enabling or hindering conditions from participants' shared experiences.

Envisioned Goals

- Create a space for project or program leaders, researchers, and funders from different communities and regions to share their experiences;
- Identify conditions enabling or hindering integration by drawing on a variety of cases;
- Discuss positive and/or negative impacts of such conditions on integration.

Expected Outcomes

We expect all participants will be engaged or interested in exploring enabling or hindering conditions for integration, while having diverse motivations for participating. For example, participants may have different levels and kinds of expertise and experience, leading or funding ITD research from novices to experts. Others may have different roles regarding integration, from project or program leaders, researchers, and funders to advisors. Our workshop design will account for this diversity, described further below, while allowing participants to gain the following outcomes:

- Exchanging and networking across regions and communities;
- Documenting commonalities and differences across regions and communities.

Intended target audiences

The target audiences include project or program leaders, researchers, and funders from different scientific communities (e.g. ITD, SciTS, AR, i2S, AIS) and geographical regions (e.g. Latin America, US/Canada, Africa, and Europe) committed to leveraging integration. To reach the intended audience and accommodate various times zones, the workshop will occur in off-peak conference hours, preferably i.e. between 6-9 pm Swiss time, in English, French, and Spanish. Maximum number of participants: 40.

Structure and Design

The contribution will include both pre-crafted elements as well as a real-time workshop:

Pre-crafted elements

- Video calling for establishing academic careers for integration experts (Hoffmann et al., subm.)
- Survey collecting experiences on conditions enabling or hindering integration

Real-time 90-minute workshop

We envision employing a 'think-pair-share' method to share experiences on conditions enabling/hindering integration across different communities and regions:

- 10 min: Introduction (welcome, framing and setting the stage, presenting survey results)
- 5 min: Individual reflections based on two guiding questions (the basis for subsequent think-pair-share exercises); Guiding Question 1: Think of a project or program in terms of ITD integration. What kind of conditions were crucial for integration within the project or program? Guiding Question 2: How did these conditions impact positively or negatively integration?
- 15 min: Breakout rooms in quads from the same region (e.g. Latin America, US/Canada, Africa, Europe) to share results of individual reflections and other anecdotal experiences;
- 25 min: Organization of quads into larger groups of 8 participants from different regions. Groups will share commonalities and differences identified in quads and derive lessons from them;
- 30 min: Report back from groups (3 min each) in plenary session to share key points of commonalities and differences, and identify conditions enabling or hindering integration.
- 5 min: Wrap up (conclusions, next steps).

Outputs

The conveners will summarize results in a workshop brief for leaders, researchers, and funders of ITD research and/or publish them in a scientific journal.

[1] "Is there a new profession of integration experts on the rise?" (ITD 2019, Gothenburg, Sweden)

[2] "Global efforts in developing and promoting a new profession of integration experts and expertise in inter- and transdisciplinary collaborative research" (SciTS 2020, Durham, NC, USA)

[3] "Cross-academic community reflection on expertise in the emerging profession of Integration Expert and Interdisciplinary Executive Scientist." (SciTS 2021, Arlington, VA, USA)

[1] "Is there a new profession of integration experts on the rise?" (ITD 2019)

[2] "Global efforts in developing and promoting a new profession of integration experts and expertise in ITD collaborative research" (SciTS 2020)

[3] "Cross-academic community reflection on expertise in the emerging profession of Integration Expert and Interdisciplinary Executive Scientist." (SciTS 2021)

Enabling conditions for inter- and trans-disciplinary integration: Commonalities and differences across geographical regions

Sabine Hoffmann[1,2], Lisa Deutsch[1,3], Jan Streit[1,3], Benjamin Hofmann[1], Julie Thompson Klein[2,4], Christian Pohl[2], Kristine Glauber[5], Christine Ogilvie Hendren[6], Pips Veazey[7], Kristine Lund[8], Carmenza Robledo[2]

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Although integration is often considered critical to success or failure of inter- and trans-disciplinary (ITD) research projects or programs (Defila et al., 2006; O'Rourke et al., 2016), widespread consensus on what integration actually means is lacking (O'Rourke et al., 2019; Pohl et al., 2021). We argue that integration does not happen automatically, but needs to be proactively led to ensure research projects or programs live up to their ITD ambition (Hoffmann et al., 2017; Deutsch et al., 2021). We also posit that leading integration does not take place in a vacuum (Brundiers et al., 2013), but requires conditions enabling integration. This survey will collect experiences and expectations from the participants of the ITD 2021 conference with regard to conditions enabling or hindering inter- and trans-disciplinary integration. Key insights from the survey will serve as an input for the real-time workshop on conditions enabling or hindering integration (additional submission) and as a basis for structuring the workshop discussions.

Envisioned Goals (both survey and workshop)

- Create a space for project or program leaders, researchers, and funders from different communities and regions to share their experiences;
- Identify conditions enabling or hindering integration by drawing on a variety of cases;

- Discuss positive and/or negative impacts of such conditions on integration.

Specific Goals (survey)

- Identify different understandings of ITD integration among ITD 2021 conference participants
- Collect different experiences on enabling/hindering conditions for integration among ITD 2021 conference participants

Expected Outcomes (both survey and workshop)

- Increasing understanding of conditions enabling or hindering integration across different regions and communities;
- Exchanging and networking across regions and communities;
- Documenting commonalities and differences across regions and communities.

Intended target audiences

Participants in the ITD 2021 conference.

Structure and Design

The survey will be designed to be answered in max 10' and structured around three topics:

- Characterisation of respondants (region, age, gender, number of years worked in ITD research projects or programs)
- Understanding of integration in ITD projects or programs
- Experiences with enabling/hindering conditions for integration in ITD projects or programs

Outputs

The conveners will present the results from the survey during the workshop with the same name (additional submission). The results will inform the working group on "Integration Experts and Expertise" to be established under the auspice of the newly founded ITD Alliance aimed at advancing ITD research and education.