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Pearce, B.J.; Dallo, Irina ; Choi, Victoria ; Freihardt, Jan ; Middel, Cédric

DOI
10.14512/gaia.31.4.6

Publication date
2022

Document Version
Final published version

Published in
GAIA - Ecological Perspectives for Science and Society

Citation (APA)
Pearce, B. J., Dallo, I., Choi, V., Freihardt, J., & Middel, C. (2022). Forks in the road: Critical design moments for identifying key processes in stakeholder interaction. *GAIA - Ecological Perspectives for Science and Society*, *31*(4), 222-230. https://doi.org/10.14512/gaia.31.4.6

Forks in the road: Critical design moments for identifying key processes in stakeholder interaction

Much of the knowledge regarding "what works" in creating stakeholder events remains tacit. This article describes the concept of critical design moments (CDMs) as a guide for designing context-sensitive and inclusive stakeholder interactions. The approach makes often implicit processes explicit. It is rooted in the experiences of coordinating and participating in a transdisciplinary winter school in a village in Switzerland.

BinBin J. Pearce, Irina Dallo, Victoria Choi, Jan Freihardt, Cédric N. H. Middel

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GAIA 31/3 (2022): 222–230

Abstract
While the importance of transdisciplinary (Td) processes as a means to address societal problems is well-established, guidance for the intentional design of stakeholder interactions to meet specific goals, under different conditions and contexts, remains less explored. We propose the concept of critical design moments (CDMs) as a lens through which to identify key processes in the design of stakeholder interactions that affect the relevance and impact of its outcomes. We demonstrate how an approach using CDMs can help to make explicit not only the goals of stakeholder interactions, but also how these goals might be met through the process design of specific activities orienting these interactions. The CDMs were identified as part of the implementation of a Td winter school for early career researchers to provide them with real-world experiences of interacting with stakeholders and local residents of a community. This work provides an approach for how Td stakeholder interactions can be designed in other Td contexts.

Keywords
critical design moments, design thinking, process design, stakeholder interaction, transdisciplinary processes

Dr. BinBin J. Pearce | Delft University of Technology | Faculty of Technology, Policy and Management | Delft | NL | b.j.pearce-1@tudelft.nl

Dr. Irina Dallo | ETH Zurich | Swiss Seismological Service | Zurich | CH *and* ETH Zurich | Transdisciplinarity Lab | Zurich | irina.dallo@sed.ethz.ch

Dr. Victoria Choi | University of Sydney | Chris O'Brien Lifehouse Cancer Hospital/ Faculty of Medicine and Health | Sydney | AU | victoria.choi@lh.org.au

Jan Freihardt, MSc, MSc | ETH Zurich | Center for Comparative and International Studies (CIS) | Zurich | CH | jan.freihardt@ir.gess.ethz.ch

Cédric N. H. Middel, MSc | VU University | Athena Institute | Amsterdam | NL | c.n.h.middel@vu.nl

https://doi.org/10.14512/gaia.31.4.6
Received December 4, 2021; revised version accepted October 28, 2022 (double-blind peer review).

Theoretical background

Using design thinking methodology as a starting point, this paper offers an approach for how to design stakeholder interactions within the context of transdisciplinary (Td) research and learning settings.[1] Recent literature related to stakeholder involvement in Td settings has been focused on categorizing the objectives and types of stakeholder interactions (e. g., Schneider and Buser 2018, Schmidt et al. 2020, Galende-Sánchez and Sorman 2021). Many previous studies have also characterized the role of stakeholders (Bryson 2004, Newton and Elliott 2016), elucidated how to identify stakeholders for Td research (Leventon et al. 2016) and described the role and levels of stakeholder involvement in Td research (Stauffacher et al. 2008). For example, Schmidt et al. (2018) have described a framework for describing and analysing stakeholder involvement in Td research. Schmidt et al. (2020) have also categorized the objectives and principles behind stakeholder involvement and the associated methods to meet these rationales. While this literature serves as a rich and important basis for considering stakeholder interactions, less has been written about how the process and activities of stakeholder interaction could be designed in order to be context-sensitive and to meet the specific needs of those involved (Noguiera et al. 2021).

Diverse means of producing scientific knowledge are needed to deal with the complexity of issues related to sustainability and sustainable development. These issues demand fostering collaboration between science and society that jointly define real-world, complex problems and produce usable knowledge (Biberhofer and Rammel 2016). Td approaches to research and learning aim to "grasp the complexity of problems, take into account the diversity of life-world and scientific perceptions of problems, link abstract and case-specific knowledge, and develop knowledge and practices that promote what is perceived to be the common good" (Pohl and Hirsch Hadorn 2007, p. 20). In the context of this paper, the Td processes in which stakeholder interactions

1 Editorial note: The article is a contribution to the field of research-based learning and transdisciplinary teaching.

are situated are considered a "collaborative mode of knowledge production that is oriented specifically towards specific societal challenges and integrates knowledge from different scientific disciplines and stakeholders" (Schneider and Buser 2018, p. 1).

The focus of this paper is to make an often implicit set of linked activities explicit by naming the key processes that researchers and practitioners face while designing stakeholder interactions. For those unfamiliar or just starting out in Td research, the existing literature offers a dearth of guidance for creating stakeholder interactions for research purposes that would be of a sufficient quality. Much of the knowledge regarding "what works" in design meetings, events and workshops remains tacit, built from experiences of individual researchers over time, but is rarely offered as an approach that can be learned explicitly. In this case, the link between Td research and learning is made via the shared competence needed in both contexts. As described in Pearce et al. (2018), both Td research and learning require the ability to communicate values, reflect about self and others, apply abstract concepts in a real-world setting, frame complex problems with others, be able to translate real-world issues into research questions, and imagine solutions and their consequences.

Within the setting of a Td winter school, the authors identify so-called critical design moments (CDMs) in the process of designing a community event involving stakeholder interaction from the perspective of early career researchers who are becoming acquainted with Td research methods and practices. By comparing the processes of how stakeholder interaction activities were designed by two student groups, we make a first exploratory identification of the critical elements for designing these activities that may serve as guideposts for discerning the quality of a Td process. By conceptualizing and structuring such processes, we make a contribution to the ongoing discussion of how to make explicit, and therefore advance, how stakeholder interaction activities can be most effectively designed within Td processes, particularly in a learning and teaching setting.

We base the CDM concept on two existing concepts (figure 1). The first and main point of departure is design thinking, primarily the version of the method developed by the d.school at Stanford University, originally applied to the design of products and services (Brown 2009, Kelley and Kelley 2015). The approach has been adapted as an educational methodology for cultivating creative and critical thinking (Faste et al. 1993, Seelig 2015). Most recently, it has also contributed to methodologies for inter- and Td problem solving for sustainable development (Pohl et al. 2020). Design thinking can be defined by five steps that help the designer to identify the core problem: 1. empathizing, 2. defining the problem, 3. ideating approaches to the problem, 4. prototyping possible solutions, and 5. testing solutions (Stanford d.school 2018). The originality of the approach lies in its dependence on "human-centred" thinking, or the cultivation of empathy for others, in order to identify the problem at hand and to identify the solutions that directly address the needs of those affected by the problem. Building on these steps, we identify an adapted parallel structure for the design of stakeholder interaction.

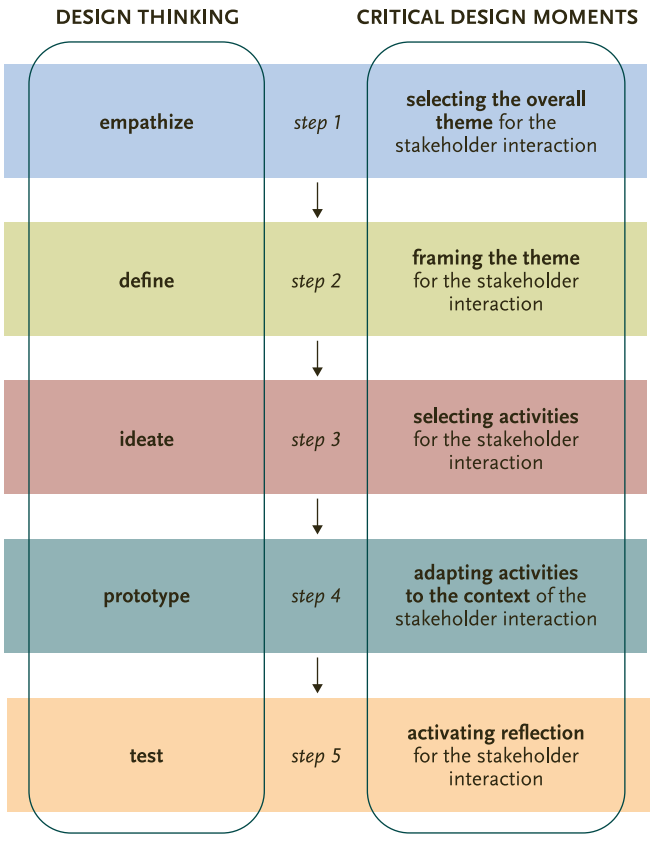

FIGURE 1: Critical design moments for designing stakeholder interaction processes.

A second point of departure for CDMs is Klein et al.'s (1989) critical decision method for eliciting knowledge from the field of macrocognition in psychology. Klein et al.'s approach shows how effective decision-making is undertaken by experts in real-world, high-pressure and high-stakes situations. They do so by identifying "critical decisions" which are essential to the quality of the outcomes of decision-making processes. This approach assumes that expertise is derived from "explicit and objective knowledge", "tacit knowledge" and "perceptual knowledge". Yet, Klein et al. (1989) make the argument that only the first type of knowledge is discussed in the training of expertise and more emphasis should be given to tacit and perceptual learning. Their critical decision method is an approach for identifying the tacit and perceptual types of knowledge in decision-making processes. They found that there are tacit and perceptual moments in decision-making that are more influential to the outcome than others. They also found that these implicit processes can be made more understandable and become incorporated into training, once they are made explicit.

The conceptualisation of CDMs in this paper, then, is an adaptation of these two existing concepts – design thinking and the critical decision method – applied to the design of stakeholder interaction. CDMs share an assumption with the critical decision method that making explicit implicit moments of deci- >

sion-making (in this case, for designing stakeholder interaction) can be done so by naming specific moments of decision-making that are particularly important to the quality of the outcome. CDMs combines this overarching assumption with the five steps used in design thinking as a means of identifying a starting set of important processes in the design of stakeholder interactions (figure 1). Indeed, the term "critical design moments" is derived from the critical decision method as well.

An idea in CDMs which differs from the design thinking methodology is that a distinction is made between the identification of *intended goals* of stakeholder interaction and *emergent goals* as the basis of design. We propose that a concept such as CDMs can contribute to advance the *process design* in Td settings by naming them. The discussion of the design of stakeholder interaction is complementary to the ongoing and rich work on the *analysis* of stakeholder settings. By making the process explicit, we are better able to accrue knowledge of how to best design stakeholder interaction and build on previous experiences, as well as experiences of other stakeholder settings that researchers may not be personally associated with. Without an explicit discussion about the process, important knowledge is likely to be kept tacit and stay unsystematized. This risks the loss of valuable time and resources invested in creating effective processes when Td researchers or practitioners (especially early career people who do not yet have a store of personal experience to lean on) inadvertently reinvent the wheel at the start of new projects. CDMs are an attempt to define the key moments of a design process, enabling researchers to critically reflect on their decisions and their implications on the stakeholder activities, and also allows diverse experiences to be compared.

The case study

The Transdisciplinarity Lab Winter School (TdLab WS) *Science meets Practice* was organized every year between 2011 and 2020 (Stauffacher et al. 2012). The aim of this WS was to give early career researchers exposure and training in how to design and run stakeholder interactions in a real-world setting. While the program itself was not focused on research outcomes, its goal was to provide participants with insights about understanding, selecting and applying Td concepts and tools in their own research projects and other contexts. The program was therefore focused on providing a real-world setting in which the WS participants could be included in an ongoing, local decision-making process. In recent years, it took place in Wislikofen, a Swiss community of 360 residents near Zurich. The coordinators and students stayed at a former monastery-turned seminar hotel in Wislikofen, supporting an immersive experience within the local environment. TdLab, the coordinator of the WS, is a research and teaching group within the Department of Environmental Systems Science at the Swiss Federal Institute of Technology Zurich. The unit focuses on fostering and studying interactions between science and society and also develops and teaches courses for students and young scientists in understanding and conducting Td processes. The focus of the TdLab WS was on interaction processes between an educational program and the real-world context in which this program was implemented. Thereby, it was envisioned as a space for interaction within the community on issues that require deeper discussions and dialogue than is normally possible.

Over the course of eight days, students initially learned about a selection of Td research concepts and tools (in particular, from the *td-net*/TdLab toolbox[2]), including concepts of joint problem framing, design thinking and specific skills training for designing stakeholder interactions. The students were also introduced to the historical, cultural and political context of Wislikofen by various informal activities with the local stakeholders, including the mayor, members of the community council ("Gemeinderat") and 15 residents who were approached by the mayor and community secretary based on the diversity of their perspectives and backgrounds. Wislikofen was a part of a regional political process for integrating the administration of eleven municipalities to increase the economic and administrative efficiency of the region (a process termed "community amalgamation"; cf. Soguels 2006, Steiner and Kaiser 2017). At the end of the TdLab WS, students designed and organized a real-world stakeholder interaction event on the topic of community amalgamation (program overview in figure 2). The goal of this event was to address the current challenges of the region relating to the implementation of the community amalgamation process. The role of the students from day one was to listen to the local stakeholders and learn about their needs in the days leading up to the community event to inform the planning and design process. The community event was made up of four activities designed by four groups (figure 3, p. 226). The authors focus on the design of two out of four of these activities, which were newly developed as part of the TdLab WS: *Confession Box* and *Draw Your Community*.

The *Confession Box* activity provided an anonymous idea exchange where 17 residents of Wislikofen and surrounding communities answered two questions by placing their answers into a box. The first question, answered before participants engaged in other activities, was: "What empowers you the most to voice your concerns in your community?" The second question, answered after participating in other activities, was: "How can you empower other people to voice their concerns in the new Gemeinde Zurzach?" At the closing of the event, a sample of answers was read out to the group. All answers were put up on a wall to read and to stimulate further reflection and discussion.

The *Draw Your Community* activity aimed at exploring how residents define their "social networks". Participants received a piece of paper with a house and three zones representing their

2 The methods in the toolbox have been collected from Td researchers who are a part of the *td-net* network and affiliated with the TdLab. The toolbox is available both via *https://naturalsciences.ch/co-producing-knowledge-explained/methods/td-net_toolbox*, as well as *https://tdlab.usys.ethz.ch/toolbox.html*.

village of residence, the new Gemeinde Zurzach and the area outside of this new Gemeinde, respectively. They were then asked to draw their social networks "before" and "after" amalgamation, that is, family, friends, hobbies, work environment, and living place. Afterwards, the participants presented their pictures to the others, highlighting important elements and key changes between present and future states.

Methodology

Four participants of the TdLab WS – three PhD candidates and one Postdoc student – as well as the coordinator of the TdLab WS jointly developed the CDM concept in an iterative process after the end of the TdLab WS.

First, the four participants collected their experiences regarding the design process retrospectively. The design of the interactions was based on tools offered in the *td-net*/TdLab toolbox. Initially, the CDM concept was identified as a possibility for framing the experiences of designing stakeholder interactions. This was based on the impressions and experiences of everyone involved and because the program of the TdLab WS was inspired by the design thinking methodology. Second, participants' experiences of the design process of the stakeholder interaction activities were collected and recorded in detail. Third, an analysis was performed to decide whether the CDM concept remained a relevant concept for framing the participants' experiences. To this end, the four participants formed two pairs; each pair had been responsible for designing one of the activities during the WS. The pairs collected and shared their experiences of the design process and outputs of their activities. Then, along with the coordinator, each pair compared their design experiences with each other. This iteration occurred multiple times, until all agreed that all relevant details from each experience were captured. Finally, these experiences were compared to the concept of CDMs and resulted in the further interpretation of the implications of these outcomes.

FIGURE 2: Transdisciplinarity Lab Winter School (TdLab WS) 2020: program overview aligned with critical design moments and related activities amongst participants and with the community.

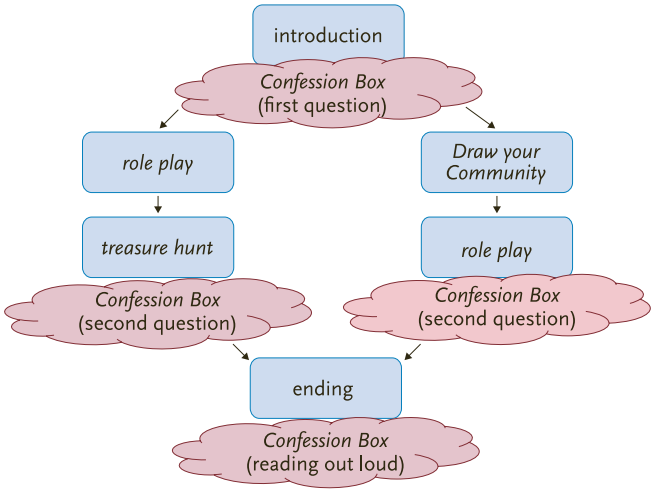

FIGURE 3: Overview of the final community workshop event with the activities organized by students. (The activities *role play* and *treasure hunt* are not discussed in this paper).

Illustrating the concept of critical design moments

Through the iterative process described in the previous section, we derived five CDMs, one per design thinking step (see figure 1 and figure 2). These are: 1. selecting the overall theme, 2. framing the theme, 3. selecting the activities, 4. adapting activities, and 5. activating reflection. In the following sections, we describe these CDMs and provide an in-depth view from the designed stakeholder activities *Confession Box* and *Draw Your Community* introduced in the case study. The design process is characterized by *intended goals* (set before the beginning of the WS) and by *emergent goals* (emerging during the course of the WS).

Selecting the overall theme

The overall theme "community amalgamation" was chosen four months before the start of the TdLab WS in a joint problem framing process (Pearce and Ejderyan 2019) between the coordinators and community representatives. This topic provided the thematic basis and was introduced to students as the starting point of their activities. Therefore, this step was divided into the actions taken both by the coordinators of the TdLab WS and the students themselves. Underpinning both sets of actions is the intention to "empathize" with the perspective of those living and working within Wislikofen.

From the coordinators' perspective, jointly identifying the topic was to ensure that the theme was timely and relevant for the local residents, while offering sufficient complexity as a learning space for participants of the WS. From the students' perspective, the empathizing step comes in after the start of the WS during the first day, when they literally walk with residents of the village to experience the place as they do, coming into dialogue with the mayor of the village and community council, as well as having lunch with the community.

The selection of the theme of stakeholder interactions is directed by intended goals of the various stakeholders involved in the process. For the students, the goal was to learn about and to gain experience practicing Td concepts and methods. For the coordinators, the goal was to make this possible and to encourage and facilitate the dialogue between science and society. For the citizens of Wislikofen, the goal was to get an outsiders' perspective on a complex community process and to connect with the students.

Framing the theme

Given that the overall theme "community amalgamation" was very broad, each of the four TdLab WS groups decided to focus on a particular aspect of the theme for their particular stakeholder activity. This was necessary in order to make the theme more graspable and actional within the limited scope of the WS. The focus was framed based on their impressions from interacting with local stakeholders, on emergent goals and on serendipity factors (Foster and Ford 2003, Bulten et al. 2021). The three different categories of serendipity factors that were of relevance to the WS are: 1. *human differences* such as language skills, personal interests, or pre-existing relationships, 2. *context differences* like the group composition during the TdLab WS or the interaction with the coordinators, and 3. *dynamic differences* like the conversation partners during informal meetings with external stakeholders or the depth of interaction with the stakeholders.

Framing the theme was influenced by emergent goals, in addition to the intended goals. The concept of emergence has been associated with the unexpected *outcomes* of co-production for sustainability (Norström et al. 2020, Chambers et al. 2021), but not explicitly connected to goals. We define emergent goals as goals which are not foreseen at the start of a co-production process and, thus, become clear only in retrospect after the process. In the context of the WS, interactions between students and stakeholders *during* the course of the WS led to new goals in addition to the initial intended goals. This became apparent in reflection discussions in which all students were involved. This iterative process is the reason why framing the theme is needed after the selection of the overall theme was completed. For the TdLab WS, these emergent goals were:

- ***Diversify the modes of participation.*** The students observed that the residents tended to be most forthcoming in their responses in informal and smaller group settings. Hence, they drew the assumption that a comfortable setting and communication method could make it easier for participants to share their perspectives authentically.
- ***Foster empathy between stakeholders.*** During the community event, the students observed that the representation of certain groups (e.g., women) was low, and it became a goal to explore these missing voices, for which Td processes can be an effective approach.
- ***Facilitate the ongoing decision-making process.*** It became clear that residents were concerned about a potential disruption brought about by the amalgamation. Students therefore

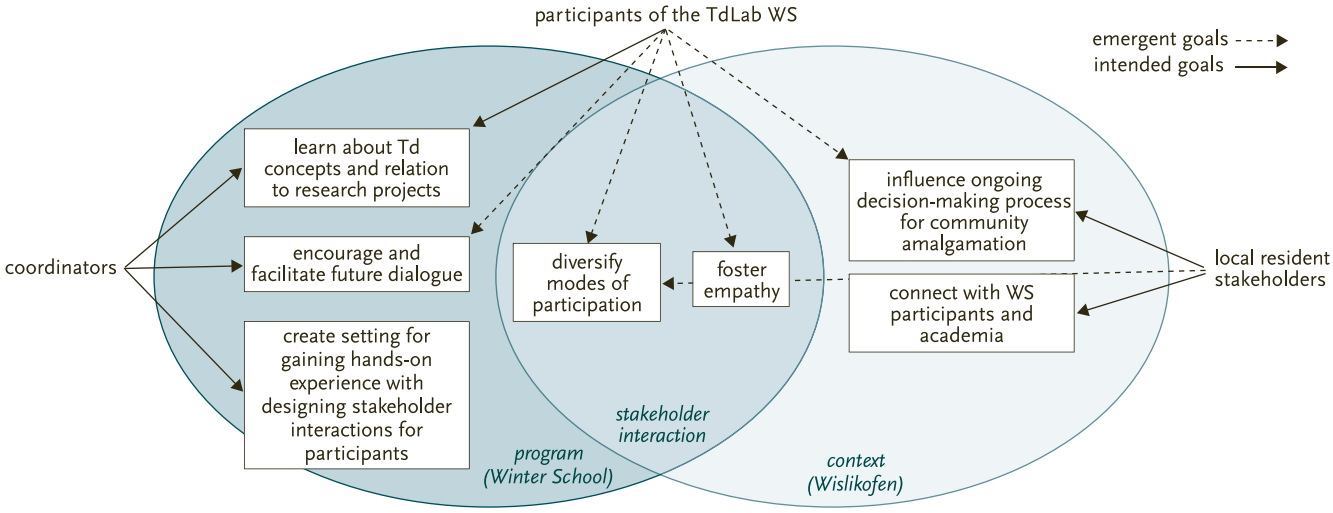

FIGURE 4: Overview of the intended and emergent goals related to the context and activities of the Transdisciplinarity Lab Winter School (TdLab WS).

became focused on supporting actions that would positively influence ongoing decision-making processes within the community.

- ***Encourage future dialogue between science and society.*** Spending time with the local community leaders and residents helped the students realize that they had a role in facilitating future dialogue within the community. It enabled the residents to use certain methods and activities, introduced by WS participants, in other community events, meetings and processes in the future.

In figure 4, we summarize the intended goals prior to the start of the WS and the emergent goals of students that became clear after the process. We focus on the emergent goals of students for this paper because the activities that they designed are at the focus of this paper and we had explicit discussions with students about how these goals have changed. While there may have been emergent goals for local residents, we did not follow up on this point explicitly and therefore cannot be sure. However, anecdotally, we received the impression that the residents valued the stakeholder interactions as an informal and low-stakes environment for expressing different views within the communities that allowed voices, normally not represented, to be heard. Therefore, creating a sense of inclusion of less represented groups in the community could have been an emergent goal, although this is not shown in figure 4. In addition, some local residents also communicated that they will take up the activities that we have designed in their own events and meetings in the future, meaning that the learning about and application of Td tools and methods became an emergent goal for the local residents, as well as for the students. As for the coordinators, because this was not the first time that such a program was carried out, previous emergent goals had already been incorporated as the intended goals of the WS.

Selecting the activities

The students learned about different ways to engage people, to encourage them to express their concerns and needs and to create a common sense of a problem. The choice of a suitable method depends on the goals one wants to reach and the available resources. The examples of the two groups highlight how a focus on differing goals can lead to different choices of the method of the activities. For the *Confession Box* activity, the students chose to use a "confession box" as communication tool because they were inspired by the physical setting of a monastery where the WS took place and by the idea of a "confessional". This choice was in line with the emergent goal of *diversifying modes of participation*. They wanted to provide a comfortable setting for the participants to reflect on how they could motivate others to participate and, through anonymity, provide a platform for participants to express themselves free of judgment.

For the *Draw Your Community* activity, the students used a drawing exercise to visualize complex social phenomena which was inspired by a rich picture exercise conducted by the coordinators during the TdLab WS. As thoughts and feelings about social connections are often difficult to express in words, they sought a method easily accessible for all participants. Their choice was influenced by two goals for the event itself: first, they wanted to *diversify the modes of participation,* by allowing all participants to express themselves in a comfortable way. Second, they wanted to *foster empathy* with each other's perspectives, which was supported by having the participants present their perspectives to each other.

Adapting activities to the context

Methods and tools that are employed in the design of stakeholder interaction activities should be adapted to the context in which they are implemented. It is important that the context, the institutional environment and existing mindsets are con- >

sidered to increase the possibility that the activity meets the relevant goals and needs of the situation. For the *Confession Box* activity, the students realized that ensuring the participation of different groups in the community was a key challenge for the amalgamation process. This reflected the core problem of inadequate communication and understanding of each other's perspectives between the stakeholders. Therefore, they felt that proper linguistic choice in the activity was a crucial element in achieving the emergent goals of diversifying modes of participation and fostering empathy. It was important that the participants understood the questions and that this activated both individual and group reflection.

Activating reflection

The aim of the students was not only to organize an entertaining event for the participants and to trial new methods, but also to facilitate future dialogue and to activate further reflection. Their primary concerns were how to ensure that the participants' insights were mirrored back to them during the event, and how these insights could be translated into discussion topics beyond the actual event. For the *Confession Box* activity, this CDM was influenced by the design thinking process and the emergent goal to *encourage and facilitate future dialogue in the community*. Originally, they wanted to read out only a sample of the answers. However, this did not reflect the initial intent of the activity. The idea was to break down barriers and to give equal opportunity to the community to be heard without judgment. Therefore, they decided that pinning all comments up was the best option.

Discussion

From the perspective of the TdLab WS organizers and students designing the stakeholder activities and facilitating the community event, we can conclude that both intended and emergent goals have been met. In figure 5, we relate what the outcomes of the process have been, in relation to the intended and emergent goals presented in figure 4.

Regarding the *intended* goals, the students were able to both understand and expand their repertoire of Td concepts and methods. Related to the emergent goals, students were also given the opportunity to apply these concepts in a real-world context that allowed them to develop empathy for diverse perspectives, as well as to diversify modes of participation. Also related to an emergent goal, students were able to contribute to real-world processes of local decision-making by summarizing and reflecting on their observations in a report written for the community council of Wislikofen. Regarding intended goals for local residents and stakeholders, their participation allowed them to the opportunity to directly voice their opinions about the ongoing community amalgamation process. They were also able to encounter an academic group and get to know students as individuals that enriched their experience of coming into contact with people who are different from those they communicate with on a daily basis. Regarding the intended goals of influencing ongoing processes of community amalgamation from the local residents' perspective, it is noteworthy that two local newspapers published articles about the TdLab WS, which illustrates how the interactions between the students and the community stimulated public discourse around the amalgamation process. Moreover, a group of six WS student participants created a brochure for the community to share insights from the stakeholder activities, which met great interest by local council members. The intended goal of the coordinators of having students understand and apply Td methods and tools in a real-world context was realised in the students' ability to design a stakeholder interaction event which lead to a fruitful discussion and outcomes. The intended goal of fostering future dialogue within the community was met through the uptake of these processes and was realised through the emergent goals of local residents.

Related to the *emergent* goals, the local residents expressed that the activities that the students designed during the community event may serve as a template for events that the residents themselves will organize in the future. Being a part of the TdLab WS, therefore, provided them with the experience of seeing how Td methods could be used for diversifying modes of participation and sparking engagement. One local resident attended presentations and activities throughout the WS, even beyond the stakeholder interaction event taking place during one evening, due to an interest in adapting Td methods and tools for other planned community events. Therefore, it seems that the goal of encouraging and facilitating future dialogue for the community was accomplished.

Also related to the *emergent* goals, the students were able to diversify the modes of participation, since each of the designed activities employed a variety of ways of expression, including not only verbal expression and discussion, but also drawing and anonymous voting. We are less certain if the activities were able to foster empathy amongst stakeholders. During the activities, the students had the impression that the participants were able to switch their perspective and to express themselves as they wanted. It is, however, unclear if the activities led to a broader exchange of perspectives after the event and whether it could actually influence the decision-making process, since we did not evaluate these aspects. A means of capturing internal change and transformation to evaluate the effect of such events would be helpful for future endeavours.

From the perspective of the four authors who were participants of the TdLab WS, retrospectively reflecting on the design processes of the stakeholder interaction event helped to bring key decisions to the forefront. Thereby, they gained a more structured approach to designing such processes, which will be useful for the design of future stakeholder interactions. Importantly, we believe that we can apply the CDM concept not only in other Td learning contexts, but likewise transfer it to Td research settings which involve stakeholder interactions.

In sum, our approach in synthesizing design thinking and the critical decision method allowed us to reach intended and

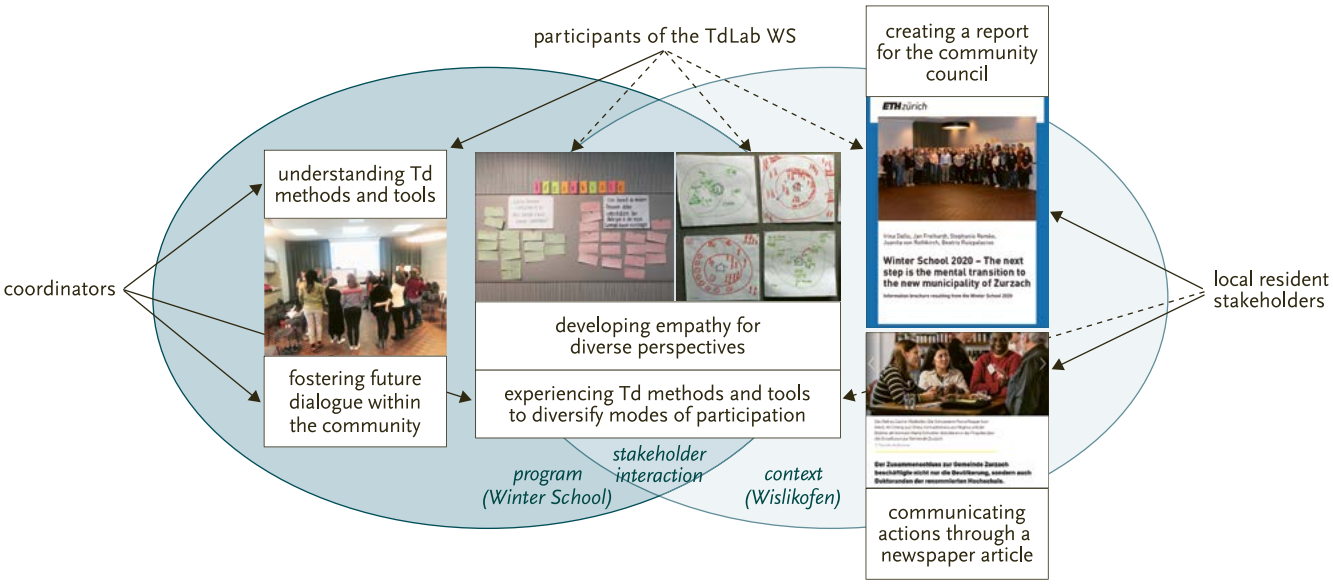

FIGURE 5: Overview of the TdLab WS outcomes (intended and emergent goals) (pictures from left to right): 1. students during a class session in which students had to demonstrate the how a Td approach can be applied, 2. outputs of the stakeholder interaction event in which perspectives were exchanged both anonymously *(Confession Box)* and through a drawing exercise *(Draw Your Community)*, 3. (top) cover of the report written (in German) for the community council on the perspectives collected on community amalgamation, 4. picture used by the *Aargauer Zeitung* in a report on the stakeholder event[a].

a *www.aargauerzeitung.ch/aargau/zurzibiet/wieso-sich-eth-doktoranden-aus-nigeria-china-und-mexiko-fur-die-megafusion-zurzach-interessieren-ld.1186464*

emergent goals. Further, the approach afforded us flexibility to consciously take into account contextual factors such as serendipity factors (Foster and Ford 2003). Moreover, combining these two concepts allowed us to step back to consider the whole system (Pohl et al. 2020) in order to confirm that the design decisions were in line with the broader aims. Therefore, our suggested CDM approach may allow designers to critically reflect on their decisions during design processes and, consequently, to identify critical moments during those processes. Thereby, the CDMs are unique to each project and some CDMs might have precedence over others; but the reflection approach is the same. We are aware that our developed CDM approach is limited to a single Td learning project and that the results were collected retrospectively, potentially introducing recall biases. However, the approach is based on two established concepts and thus could be transferred to other Td projects. We thus encourage other researchers and practitioners to apply the CDM concept to their Td projects and to develop it further.

Conclusion

Designing stakeholder interactions is more than selecting activities from a toolbox. Rather, it is about deliberately choosing one or several methods and adapting them to a specific context, in order to reach the intended and emergent goals of Td processes. Our five CDMs of selecting the theme, framing the theme, selecting activities fitted to the theme, adapting activities to the context and activating reflection, indicate critical moments during a design process for stakeholder interactions. The explicit identification of these CDMs aims at helping Td researchers, practitioners, and students to reflect on the purpose and goals of stakeholder interactions and to pay sufficient attention to the means and environment in which these interactions take place. Our approach seeks to make explicit how facilitators of Td processes can make intentional decisions to design context-appropriate stakeholder interaction processes. Rather than prescribing specific ways and tools that should be used for effective stakeholder interactions, the approach that this paper takes is to suggest a series of steps, called CDMs, that researchers can use to design stakeholder interactions specific to the contexts in which they are working. By making explicit how stakeholder interactions are designed with these steps, the intended and emergent goals of Td processes can be clarified. This has the potential to improve determining the extent to which stakeholder interactions were able to contribute to reaching these goals.

Acknowledgement: The authors would like to thank *Michael Stauffacher, Patricia Fry, Christian Pohl* and *Pius Krütli*. We would also like to express our gratitude to the residents of Wislikofen and surrounding communities, in particular, *Andi Meier* and *Heiri Rohner*. Finally, we would like to thank three anonymous reviewers for their helpful comments.
Funding: The writing of this paper was not funded by any research project. The open access fees were provided by the TdLab at ETH Zurich.
Competing interests: The authors declare no competing interests.
Author contribution: B. P. takes responsibility as primary and corresponding author. All other authors were involved in the initial research design, data collection and analysis, manuscript draft and final approval.

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BinBin J. Pearce

PhD industrial ecology. From 2020 to 2022 senior researcher at the Transdisciplinarity Lab of the Department of Environmental Systems Science (USYS TdLab) at ETH Zurich, CH. Since 2022 assistant professor for policy analysis and design at Delft University of Technology, Delft, NL. Research interests: collaborative decision-making for policy design, joint problem framing, integrated systems and design thinking.

Irina Dallo

PhD science. Currently, post-doctoral researcher at the Swiss Seismological Service (SED) of the Department of Earth Sciences at ETH Zurich, CH. Research interests: theory and practice of transdisciplinary research, real-world problem solving, exploring the communication of real-time hazard information to different target audiences.

Victoria Choi

PhD science. Currently, post-doctoral research fellow at the Chris O'Brien Lifehouse Cancer Hospital, and clinical lecturer in the Faculty of Medicine and Health at the University of Sydney, AU. Research interests: theory and practice of transdisciplinary research, real-world problem solving, translational research in integrative oncology and supportive care.

Jan Freihardt

Studies in environmental engineering (MSc) and science, technology and policy (MSc). Currently PhD candidate in political science at ETH Zurich, CH. Co-founder of Wissenschaf(f)t Zukünfte e.V. Research interests: environmental migration, disaster risk management, science-society interactions.

Cédric N. H. Middel

Studies in biomedical sciences (BA) and Management, Policy, and Entrepreneurship in Health and Life Sciences (Masters). Currently PhD candidate at the Athena Institute, part of the VU University Faculty of Science, Amsterdam, NL. Research interests: transdisciplinary perspective on the use of healthy foodstore interventions as tools for driving systems innovation.