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Research

Putting grant/d terms to work: from promise to practice in inter- and transdisciplinary research projects

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Abstract
Sustainability research is increasingly based on inter- and transdisciplinary research approaches (IDR and TDR). In this article, we examine how grant terms (used in grant proposals for IDR and TDR projects) are put into practice. We analyzed three research projects to study how TDR and IDR are performed and why, and what we can learn for sustainability research. From a feminist perspective and using a conceptual framework including empty signifiers, comfort words and non-performativity we explore the difficulty of performing the terms, and the risk that they remain merely grand terms, promising and useful for proposals, but not guiding everyday research practice. Based on the analysis, we present seven patterns that complicate performing the terms. We suggest that these patterns can be helpful for other researchers developing their TDR and IDR research practice.

Keywords Sustainability research · Interdisciplinarity · Transdisciplinarity · Non-performativity · Empty signifiers · Feminist theory

1 Introduction

The EU Horizon 2020 call, like other calls for sustainability research, is permeated with terms for transdisciplinary and interdisciplinary research (TDR and IDR). In the EU Horizon 2020 call we read: "to respond to these challenges, Horizon 2020 requires an increasingly transdisciplinary and multi-stakeholder approach, involving citizens and end-users, the public sector, and industry, so as to link and take advantage of unique perspectives and knowledge" [1] p7).

Central is the idea that sustainability problems are complex and wicked and therefore need perspectives not only from expert scientists but also from various other academic, civil society, private and state actors [2–4]. Lang et al. argue that sustainability research projects need to: "ensure that the essential knowledge from all relevant disciplines and actor groups related to the problem is incorporated" ([5] p6). Such research, it is argued, produces results that are both scientifically robust and relevant to society [6–8], as "co-design of the research aims, and method-driven, integrative collaboration are key for scientifically and societally impactful research" [9] p542). It is important to note that wicked problems cannot necessarily be solved, but rather resolved in various ways [3]. This calls for inclusion of multiple perspectives, increasingly widespread in sustainability research [10] and as requirements for research funding.

Terms associated with IDR and TDR such as stakeholder participation, collaboration, trans- and interdisciplinarity resonate with many researchers and research funders. They are attractive, they raise hope and convey a sense of action

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and solution-orientation. They can bring social actors together, as their openness makes them flexible and inclusive (see also the discussion on sustainability in [11]. They invite different interpretations, catering for a variety of social actors. However, to put these terms into research practice is a challenge for many research projects. In this article, we provide a deeper understanding of the mechanisms of these terms from a feminist perspective [12, 13] by zooming in on three TDR and IDR projects.

Here we refer to these TDR and IDR terms as *grant/d terms*. Grant/d terms refer on the one hand to *grant* terms, i.e., words central to research calls and featuring prominently in grant proposals, and on the other hand, to *grand* terms, i.e., ambitious words, full of promise for a "better and different kind of research (process)" (see Sect. 1.1). With this label we specifically focus attention on the tension between formulating proposals and reporting on the research on the one hand, and, on the other, putting these grant terms to work in everyday research practice: the terms are very ambitious and promising, and as such demand much from research practice.

Grant/d terms fall under the broader umbrella of "essentially contested concepts" [14]. These are terms that combine a general coherence on what they represent with dispute about what they mean in practice. They have also been called 'buzz words' ([15] on development). A buzz word is "a catchword or expression currently fashionable; a term used more to impress than to inform, esp. a technical or jargon term" (OED). But we do not consider the terms in this paper merely buzz words, as the grant/d terms that we focus on are based on serious and extensive scholarship, meant to improve research practice, and merit serious engagement.

We study the grant/d terms from a feminist perspective, using Ahmed's work on non-performativity and 'comfort words' [12, 16]. While she studies how diversity is practised in higher education institutions, we found that it is also a valuable analytical lens for sustainability research, and can help to identify the mechanisms of grant/d terms.

In line with Ahmed's findings on diversity, studies have observed a mismatch between discourses on, and the practice of, interdisciplinarity: "*the ways in which we talk about interdisciplinary research are not straightforwardly connected to the doing of it*" ([17] p1521); see also: [18]. We will discuss how, while terms such as 'participation', 'stakeholder collaboration' and 'trans- and interdisciplinarity' are able to engage and mobilise diverse groups of actors, they are difficult terms to put to practice.

Sustainability science can usefully contribute to understanding this mismatch in order to find ways to work with the problems that the mismatch creates. Here our feminist perspective is helpful: Learning to collaborate in TDR projects can be uncomfortable [19], and sometimes it is tempting to give up. But, feminist philosopher of science, Haraway, urges us to "stay with the trouble". With the trouble she means a world in the midst of ecological, political and economic disasters, and where it is urgent to move beyond individualistic and consumeristic logics and rather develop new ways of living in the world. Haraway argues that we need to find new ways of living built on responsibility and communality in order to develop capacities to live in a "messy" world. Importantly, she tells us to not lose hope, and that things can get better, if we genuinely try to address the problems. Highlighting the trouble and explicating why it is difficult to perform grant/d terms is our way of contributing through this article.

We are convinced that the involvement of different ways of knowing, multiple experiences and perspectives is essential for sustainability research. Here again, we are inspired by feminist scholars, e.g. [20, 21], who have shown how standpoints matter, how power relations (including north–south, local–global, women-men, and many intersecting categories of power) open and close possibilities for influencing decision making processes on different scales. Terms in sustainability research such as 'social learning', 'stakeholder integration' and 'stakeholder participation' can be directly related to this scholarship. We are convinced of the need for what these terms convey, but worried that the promise of these terms is often not fulfilled.

In this paper we highlight the challenges with putting grant/d terms to practice in sustainability research. We aim to contribute to a methodological discussion with the ultimate goal of improving our awareness of the often unreflected and routine but highly influential aspects of research practice. More specifically, we focus on the enabling but also stifling role that these grant/d terms play in research projects.

We have chosen to focus on sustainability research projects, such as we also are involved in ourselves, that use terms like the ones we use ourselves in our research projects. Many of these projects are—just like we often are—struggling with implementation of IDR and TDR and are learning important lessons about how to (not) handle them. Yet, these struggles and insights are seldom shared beyond the project context. As we previously argued, the challenges of everyday research practice are an overlooked area for possibility and change [13, 22].

In the analysis we concentrate on grant/d terms in three projects, from the initial phases, via the actual research to the final reporting. We ask: How are these grant/d terms performed? And why? And what lessons can we draw about the practice of grand/t terms for sustainability research? In the concluding section and as a result of the analysis, we present

our findings. Here we do not explicate some sort of ideal way to work with IDR and TDR, that would not do justice to all the complexities of and particularities of individual research projects. Instead, and in line with feminist theory—"to hold contradiction… [and] rather than resolve or avoid contradiction" [23] p150)—we highlight difficulties and tensions, and their underlying mechanisms. We do so through presenting seven patterns, which we hope can be useful input for researchers to think through how to carry out TDR and IDR research.

1.1 'A different kind of research'

The idea that sustainability challenges, such as climate change and water scarcity, need a different kind of research that is change oriented and includes multiple voices, is by now well-established in sustainability research [5, 24]. There is no single definition of IDR and TDR, but we think it is helpful to share here how we understand these concepts, namely as "*different types of knowledge production for social change which are based not only on the integration of knowledge from different disciplines* [IDR], *but also on the inclusion of values, knowledge, know-how and expertise from non-academic sources* [TDR]" [25] p440). To conduct IDR is to do research that integrates methods, concepts, perspectives, theories etc. from one or more disciplines in order to address research questions that are broader than what a single discipline can answer. TDR further stresses the importance of integrating knowledge from non-academic actors—it is "science *with* society rather than *for* society" [26] p6).

Much has been written about these approaches, and helpful overview articles exist: [3] provides an overview of the roots and schools of TDR, and [5] synthesizes a set of principles from scholarship on both TDR and IDR. These articles describe a lack of clarity in the literature and research practice, both in what TDR and IDR projects should look like, and in what roles researchers and non-academic partners are supposed to play. Some scholars see TDR and IDR as *tools* to ensure that findings and solutions produced by researchers gain societal legitimacy and are implemented in society; for example: "*If sustainability science is to contribute practical solutions to the problems we face, cooperation among researchers, industry, and the general public is imperative. Only when society at large is inspired to act on the basis of their research and conclusions can sustainability scientists lay the foundation for construction of a sustainable society*" [27] p6). Other researchers instead focuses on TDR and IDR as a *knowledge co-production process* between researchers and non-academic partners, and see the process itself as core: *"researchers and stakeholders own, initiate, manage and carry out the research processes together […] Instead of bringing stakeholders into the scientific realm as advisors, informants and users*" [28] p111). While these two functions may not be mutually exclusive, they assume different ways of working.

Several studies highlight the challenges in collaborating and communicating in interdisciplinary teams and the challenges of putting TDR into practice [5, 29, 30]. Often researchers and societal partners have different understandings of what TDR is [31] and how to 'do' TDR [5, 7, 32]. Indeed, project participants (researchers and societal partners) regularly have different epistemological and methodological approaches. But beyond actual differences, researchers working in IDR teams also often have prejudices about methodologies, and epistemologies of researchers from other disciplines [33]. It can therefore be complicated for IDR teams to agree on the problem and research approach [34]. If left unnoticed or undiscussed these differences can substantially complicate the implementation [11]. But, scholars argue, if the researchers instead discuss these differences, (and look for similarities), new and rewarding paths forward can open up [35].

Literature points out that researchers are often assumed to 'just know' how to collaborate in IDR and TDR. But, sometimes such collaboration is new for researchers, and if it is not still the particular group to collaborate within may be new. Therefore, researchers may need to first learn how to collaborate and focus on how to productively organize the work such that the challenges of collaboration come to the center [19]. Also Lawrence et al. stress what they call "process knowledge", i.e. "consists of the methodologies and procedures needed to design and carry out TDR projects" [3] p55). The initial phase of an IDR and TDR project is very important. Here the research problems are identified and the aims and approach formulated. Already in this phase limited problem formulation and unclear problem ownership between the local stakeholders and the research team, can typically cause problems [5]. This initial phase is also, according to Horcea-Milcu et al., "generally not documented and only vaguely conceptualized" [36] p187). With this article, we hope to contribute to increased knowledge about this phase.

A study of success factors and challenges in the realisation of fourteen so called Real-World Laboratories (transformative and collaborative) for sustainability Bergmann et al. conclude that IDR and TDR requires more skills and time than traditional research projects. Interesting for our article, the authors say that the openness of the concept of Real-World Laboratories "provides spaces for experimentation and learning for sustainability transformation and allows for bridging often existing barriers between academic fields, methodological approaches or social sub-systems" [9] p561). So here,

the openness was found to be a space for learning. We will argue later on in this article that the openness of the grant/d terms that we focus on provides these spaces in some respects, but closes them down in other. We will also come back to these Real-World Laboratories to see how their specific approach could counter the risk of non-performativity of the grant/d terms.

As if IDR and TDR is not difficult enough with these internal pressures, there are also external pressures. In more traditional academic environments, IDR and TDR scholarship is not valued as much as disciplinary scholarship. Especially in promotion and tenure processes this can be a challenge. Klein and Falk-Krzesinski [37] argue that IDR and TDR need a fair and equitable evaluation framework that functions for this kind of research, in order to give merit to TDR and IDR researchers. As we will show, the evaluation of IDR and TDR worries some of the researchers we interviewed, and could impact engagement and creativity in collaboration.

The studies discussed above highlight a variety of difficulties in implementing TDR and IDR. If we consider these studies together, we see a complex landscape, with epistemological differences, practical considerations and academic cultures, that makes IDR and TDR work hard to navigate.

2 Grant/d terms—conceptual framework

We have described grant/d terms as attractive and hopeful. They are also ambiguous, used without clear definition and therefore open to different interpretations by different people at different times, and, typically without these differences clearly surfacing for those involved. In this section, we introduce our conceptual framework, consisting of empty signifiers, non-performativity and comfort words.

2.1 Empty signifiers

To analyze our grant/d terms we draw on the concept of empty signifiers. Empty signifiers are terms that can be filled with different meanings depending on who is using them, in what context and for what purpose [38, 39]. As empty signifiers, they may be constantly contested, and changed in practice [40]. As we speak, think about, and write about these signifiers, we simultaneously construct a shared reality; they become meaning-making activities, and they have material effects. They are constructed, and they construct. As such, it has been suggested that signifiers can also be 'productive', as they hold the potential for radical change based on their capacity to bring people together [41]. The openness of empty signifiers may cater for diverse viewpoints and therefore enable discussions across perspectives, leading to unity in collective concerns for the future, very much as the Real-world laboratories mentioned above.

In this study we use the concept of empty signifiers to shed light on what is said and how it is turned into practice or not. We will demonstrate that the grant/d terms we follow in this study do not have a fixed meaning and are performed very differently in and between the projects.

2.2 Non-performativity

Performativity highlights that reality is constantly 'becoming' [42] and departs from an understanding of the world as 'done ' in and through practice. Performativity forms an important lens in our study and help us see the grant/d terms 'being done and becoming'.

Logically, non-performativity is the opposite of performativity. But, not entirely, because at the same time and paradoxically, it is also an action: "*Many actions might be necessary for something not to be done or for an attempt to transform something not to lead to a transformation of something*" [16] p2). While the performed is the practice by which discourse produces the effects it names [43], the non-performed is the practice by which discourse does not produce what it names [12].

The idea of non-performativity comes from a study about the non-performativity of anti-racism and diversity in a university setting [16]. This study described how university representatives publicly speaking about anti-racist work became the evidence that the university was non-racist. But beyond the text of the policies, the terms were not translated into university anti-racist and diversity practices. Indeed, and here is the paradox, the naming decreased the pressure on performing, as the official referral to these terms silenced critical perspectives. As empty signifiers, the terms were *"emptied of force"* [16] p4).

Analogous to 'diversity work' in Ahmed's study, TDR and IDR can be considered 'good practice'. 'Good practice', according to [12], refers to a set of practices that enable the organization 'to look good'. Projects that claim IDR and TDR carry a sense of 'good': they promise engagement, listening to and making multiple voices heard. However, writing or talking about the importance of IDR and TDR does not, of course, equate to performing it. Indeed, "*acts of commitment can be made in situations where commitment is not given in the sense of being bound*" ([12] p114); while these 'good words' are spoken, there is no guarantee that they will be performed beyond being spoken. In TDR and IDR projects, good words are a key part of the early phase of proposal writing, to mobilise collaborators and to convince the fund givers.

2.3 Comfort words

We also use the concept of 'comfort words'. Comfort words are a specific form of empty signifiers that highlight the positive, hide the negative and are detached from power relations [16]. As empty signifiers, comfort words can be used in different situations and contexts. To explain we use Ahmed's study, in which diversity (an empty signifier) is understood as a comforting word because it is *"detached from scary issues"* ([12] p66) and thus readily accepted. While diversity is a comfort word, equal opportunities or equality are not, because they be interpreted as a critique of uneven power relations. The comfort of the term "diversity", the positivity that it is loaded with, allows for "hopeful performative" [12]. Might terms like TDR and IDR function in similar ways? Are they comfort words that promote collective (research) action for addressing sustainability crises, while at the same time discouraging a discussion on inequalities in knowledge production?

In our analysis, we use *empty signifiers*, *non-performativity* and *comfort words* to understand grant/d terms in sustainability research. Hence, we focus on: how the very act of speaking and writing about grant/d terms can hide what is not done—the non-performed—as well as what is done; and how grant/d terms speak to a broad variety of people and can mobilize groups, but are difficult to 'do' in practice.

3 Methods and materials

3.1 Case selection

For the purpose of this study we selected three projects that described themselves as inter- and transdisciplinary research projects, and had as their aim to contribute to sustainability transformations. All three focused on environmental sustainability in the Baltic Sea Region between 2010 and 2020, and shared a focus on climate change and water (water governance, Maritime Spatial Planning, and coastal ecosystems and ecosystem services). We call them Research Project A, B and C.

While the projects share these basic traits, they differ significantly in their setup. Project A included researchers from various social and natural science disciplines who worked together across disciplines in work packages. These researchers collaborated actively with a broad range of non-academic partners in the overall project work. In contrast, Project C included researchers from only two disciplines, and, while the ambition was to include non-academic partners, they were never involved in the project. Project B consisted of researchers from several disciplines, both natural and social science, and partners from outside academia, but mostly as interviewees and as part of the audience for project presentations. Project A was the largest project with the most funding, followed by B and then C. The differences between the projects with respect to IDR and TDR provided rich and diverse comparative material for our analysis.

3.2 Data collection

This study's focus is on how the researchers understood their work with the grant/d terms, and as such this is not a study in which we assess the projects' performance. We worked based on qualitative methodology, consisting of a semi-structured interview study with individual researchers, and a desk study of project documentation (call texts, proposals,

Fig. 1 Wordcloud of the grant terms, produced in Nvivo

websites, reports[1]). The interviewed researchers included post docs, researchers, project leaders and professors; information about these positions was not used in our analysis. Projects A and B had ended when this research began, while project C had newly started. Therefore, we had the opportunity to participate in project C activities, and we participated in two workshops in order to understand the project set up regarding IDR and TDR. Additionally, a focus group was held with Project C's research group at the start of the project, with the aim of learning about the goals of the project, beyond the written material. Our recordings and notes from these workshops were subsequently analysed and organized into thematic categories.

We started with a browsing exercise of call texts from Horizon 2020[2] and from the funders (not named to ensure anonymity) of the three projects. We chose Horizon 2020 with the assumption that EU calls also influence how national funders frame their calls. We included the following key words (and variations of) in our search: *inclusion, stakeholder/multi-actor engagement/approaches, interdisciplinarity, transdisciplinarity, participation, collaboration, cross-* (e.g. *cross-disciplinarity, cross-dissemination*). The result of this exercise was the identification of umbrella terms associated with IDR and TDR as variations of *stakeholder participation, collaboration and engagement*. The Horizon 2020 calls and the reoccurring terms identified in the documents were analysed in Nvivo, producing Fig. 1 below. More variations of the terms exist but we did not use them in our analysis. This identification of terms, in combination with the desktop study of project material provided the basis for the interviews undertaken in the next step.

We interviewed 28 researchers (10 from Project A, 8 from Project B and 10 from Project C) from Sweden, Australia, Canada, Poland, the Baltic States, the Netherlands, UK, Finland, Denmark and Germany. All researchers in the three projects were given the option of participating in an interview. Only two researchers did not participate: one had changed

[1] All anonymized.

[2] European Commission (2019). Gender Equality and Diversity in R&I. Available at: https://ec.europa.eu/info/sites/info/files/research_and_innovation/knowledge_publications_tools_and_data/documents/ec_rtd_factsheet-gender-equality_2019.pdf (06-05-2020) .

European Union (2015). "Gender - H2020 Online Manual". Available at: https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/gender_en.htm [04-03-2020] .

European Union (2018). "Horizon 2020 Work Programme 2018-2020 - 9. Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy." Available at: https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-food_en.pdf (04-10-2019).

European Union (2018). "Horizon 2020 Work Programme 2018-2020 - 12. Climate action, environment, resource efficiency and raw materials." Available at: https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-climate_en.pdf (04-10-2019).

European Union (2018). "Horizon 2020 Work Programme 2018-2020 - 16. Science with and for Society." Available at: https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-swfs_en.pdf (04-10-2019).

EU Science & Innovation (2016). "Understanding gender dimension for MSCA projects" Available at: https://www.youtube.com/watch?v=Hq4eWo30RfY (19-06-2020).

jobs since the project and the other repeatedly postponed the interview, such that it ultimately did not happen. Each interview took 1–2.5 h and was recorded and transcribed.

Author 1 of this article was involved as a researcher in Project A, attending two learning events, and co-authoring one article during the lifetime of Project A. This happened before Project A was included in this study. We selected project A for this comparative study, because participating in project A gave Author 1 a deeper understanding of it. At the same time we have been constantly aware that this prior engagement may have also obscured some findings that would have become clearer to a more distantiated researcher. Throughout the study we reflected on Author I position in project A and its possible impacts on the analysis, asking for example: "could this be interpreted and understood differently?".

In the interviews we asked the researchers about their experiences of working in the project. We focused the interview on how participation and collaboration were practiced in the different phases of the project, both between researchers (IDR) and non-academic partners (TDR). The interviews followed an interview guide with themes such as which disciplines were involved, why they were considered relevant for the project, how the collaboration between researchers in the project happened, and what the challenges and benefits were with the IDR approach. Further, we asked how the grant/d terms were defined in the projects, and in what ways they were implemented. We also asked questions about which non-academic actors were invited, why and how it happened, and what the researchers saw as the benefits with the TD work. For the early phase, we used research calls, proposals and project descriptions, as well as interviews. For the implementation phase we used interviews. For the reporting phase, we used interviews, final reports and project web pages. Please note that we did not include interviews with non-academic actors in the projects. This would be a good idea for future research. The challenges we have identified in our analysis are mainly drawn from the interviews with researchers.

The first stage of analysis of the interviews was during transcribing, where we simultaneously took notes on recurring themes. For the second stage of analysis, we used NVivo for ordering and structuring the material into nodes, following our theoretical concepts of empty signifiers, comfort words and non-performativity. The nodes included 'challenges', 'conflictual issues', 'empty words', 'how to get people engaged', 'epistemologies', 'value of IDR', 'value of TDR' and many others. In a third stage, we printed the nodes, cut them out and used colour coding before sorting them to identify deeper themes. In the final stage we considered these deeper themes in relation to our conceptual framework of empty signifiers, comfort words and non-performativity.

3.3 The backstage of research

With this article we want to highlight the importance and potential of discussing the challenges with TD and ID sustainability research. Inspired by the work of Goffman [44], we use the concept of the 'backstage' a place where we let our guard down, more free from evaluation of one's performance. Here, we use backstage for the messy everyday research practice, including things that went wrong or were difficult, and that we often do not include in presentations and reporting of our research.

We, the authors, work in the sustainability research field ourselves and are much influenced by the idea that multiple voices, experiences and different ways of knowing are needed to address complex problems and sustainability transformations. We are presently involved in two research programs where IDR and TDR for sustainability change are central ideas. As we write this article, we struggle to improve our own IDR and TDR research practice. We have met and are meeting the same and similar challenges to those that we present and discuss in this article. We have also published on this theme before [22] and discussed a number of dilemmas, the backstage of research and what we can learn from engaging with it.

While we focus in this article on the challenge of performing grant/d terms, the purpose is not to assess or evaluate the three projects. Rather, and in line with our conceptual point of departure of performativity, we highlight patterns in everyday research routines: how researchers perform the grant/d terms, and when and why. We hope that the findings can contribute to better IDR and TDR practice.

4 Practicing the grant/d terms in the three projects

To answer the main research questions—How are these grand/t terms performed? Why? And what can we learn from the challenges to implement grand/t terms in sustainability research? -we worked through a sub-question for each project: How do grant/d terms feature in the early phase, the implementation phase and the reporting phase? Following the

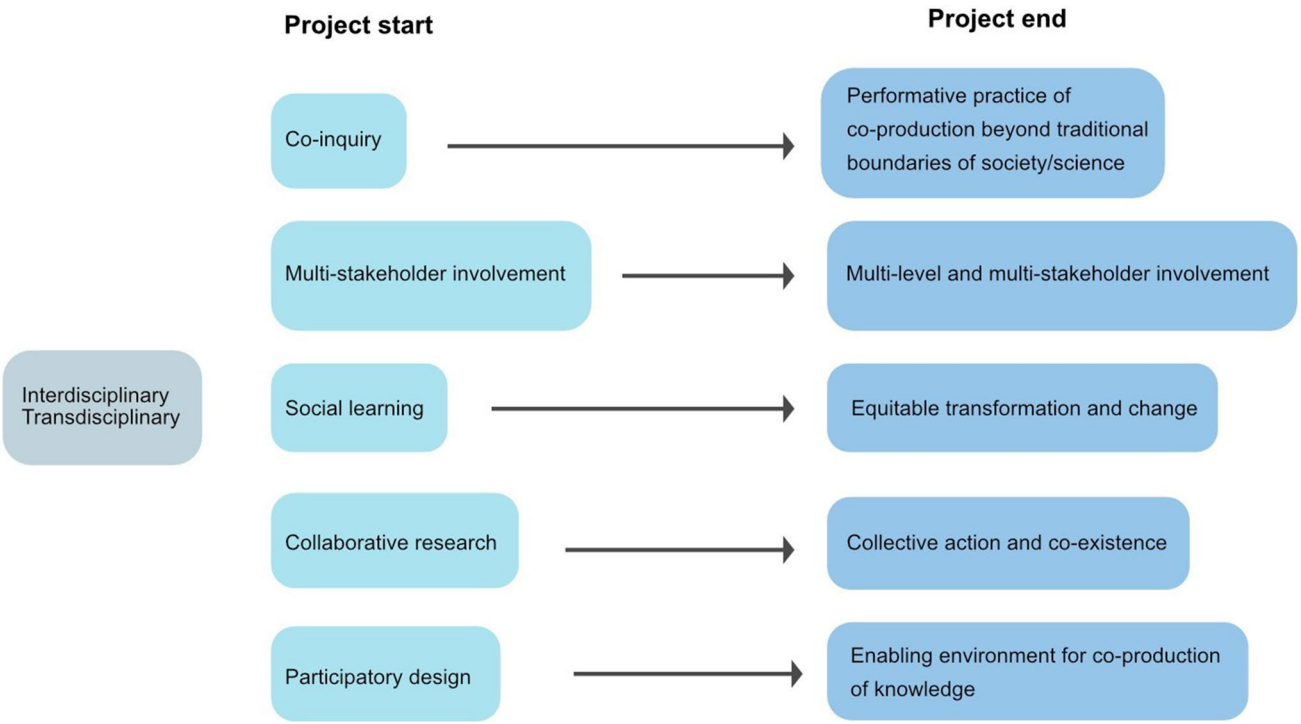

Fig. 2 IDR and TDR in Project A

terms through these phases, may give the impression as if a research project needs to be executed exactly along the lines of its initial proposal. This is not the case, we acknowledge that adaptation and change in research projects is normal practice and sometimes key to ensure that ensure that new and relevant questions are addressed, or initial questions are addressed appropriately.

4.1 Project A

Project A performed local case-studies for climate adaptation and sustainability change, with the aim of creating a dialogue between researchers and non-academic actors to influence decision making. It included ten research teams from eight countries in Europe, Australia and North America, with social and natural scientists. Most of them had worked together before, and several researchers were competent in various collaborative research approaches. The project included events, where researchers and non-academic actors met and where the guiding principles included: "co-inquiry", "social learning" and "designing an enabling environment for the co-production of knowledge". The focus on learning was strong in the project, and the aims and hopes for the learning events were ambitious. Figure 2 presents the grant/d terms used in the project (in written documents, websites and in the interviews), the first column represents the terms at the project start and the second column represents the final stages of the project. The figure thus represents the development of grant/d terms from the early phase to the reporting phase.

A first thing to notice in Fig. 2 is that the terms in the early phase and the reporting phase were not the same. We will explain what happened below.

Central terms used in the early phase (terms in light blue) were co-inquiry, multi-stakeholder involvement, social learning and collaborative research. Many of the researchers had worked based on these terms before, and they were easy for them to initially gather around. However, in the implementation phase, tensions emerged as the researchers had different ideas of how to implement them. They disagreed specifically on ways of working with the stakeholders (TDR). While one group was interested in engaging stakeholders for feedback and discussions on research findings, the other group saw TDR as co-creating knowledge together with the stakeholders. They did not discuss this disagreement, but it had consequences for the IDR in the project, as the teams started working increasingly separately from each other and keeping to their own approach. This finding mirrors those of [34, 35], who show that researchers working in IDR can encounter difficulties when they discuss their understandings of theories and methods, and that these difficulties can

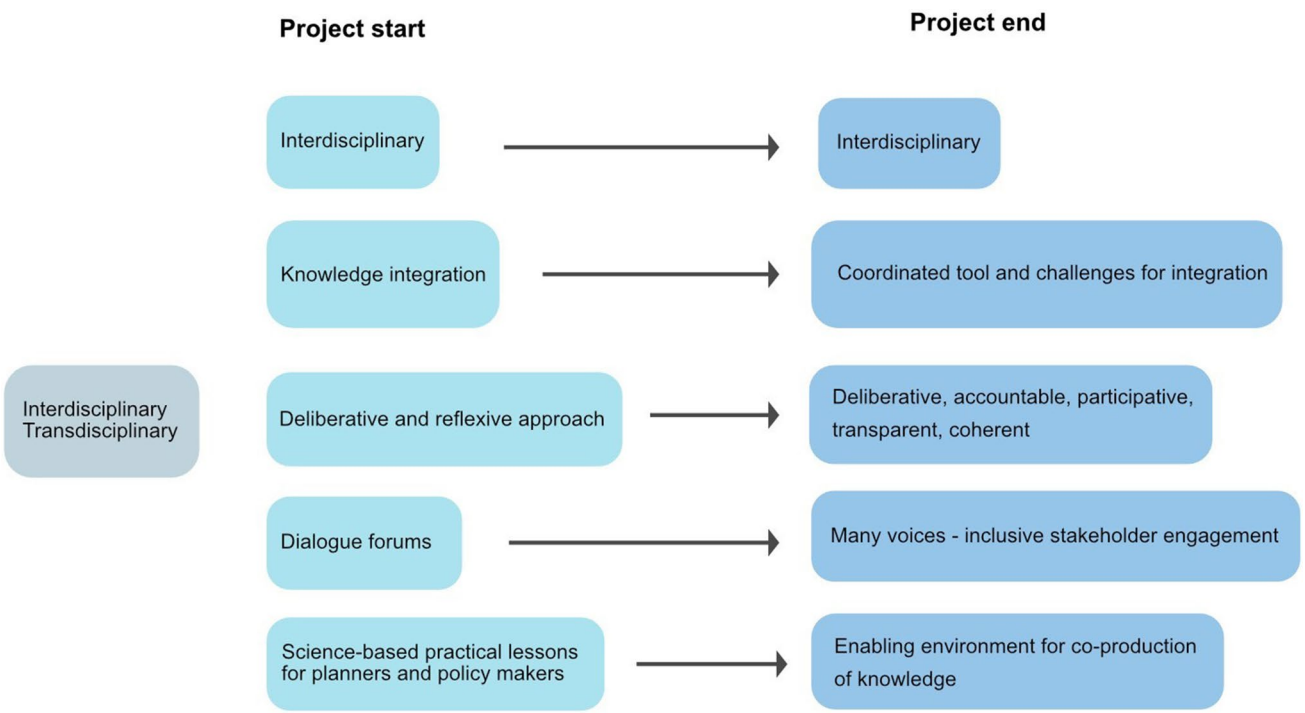

Fig. 3 ID- and TDR in Project B

lead to researchers returning to their disciplinary silos. This clarifies that even when the project focuses on such discussions about how to manage the collaborative work, proposed as a key element for successful projects by [3], it does not guarantee successful collaboration.

A Project A researcher explained the challenges in doing TDR: *"We are all experts on collaborative processes, and how to do that. And we all want to claim our expertise so we all want to do that in this project as well."* In terms of working with IDR, they described how the IDR project was a challenge for researchers trying to carve out their own research identity, *"…if we all end up doing the same…that means some of us are actually not needed. You cannot be doing exactly the same and publish papers about it and claim you're original".* Scholars have pointed to a lack of process knowledge and collaborative skills as an important reason for the faltering of IDR and TDR projects [3]. But, drawing from the example of Project A, even when such skills are present, it again does not guarantee successful project management.

Several Project A researchers also stated that academic structures limit possibilities for collaboration: *"…in the project there were obviously some quite senior academics who all have their view of things, of how things work and how it should all go and I think that translates to some difficulties in communication between groups and that's not because they don't have good intentions but it's just realities of working cross-culturally, across time zones, different countries…".*

The researchers told us that the new terms in the final project (dark blue in Fig. 2) developed from their engagement with the original terms. One example is that collective action became co-existence: at the start of the project the researchers had assumed that their multiple perspectives would merge into one common idea for action (collective action), but through the everyday project work it had become clear their different perspectives would not merge into one, but instead would be used next to each other (co-existence). It is beyond the scope of this article to establish what happened to these new emerging terms, whether they brought a deepening of TDR and IDR practice or if they will constitute new comfort words.

4.2 Project B

The aim of Project B was to improve, develop and implement environmental planning through a mixed-methods approach, with literature reviews, stakeholder dialogues and interviews. Natural and social scientists collaborated in this project, all with experience in IDR and some with experience and/or competence in TDR. In so-called dialogue forums, planners, decision-makers and scientists met to validate the research, get input and do outreach. This project focused heavily on deliverables that were intended to increase the long-term impact of the project: online training modules, a

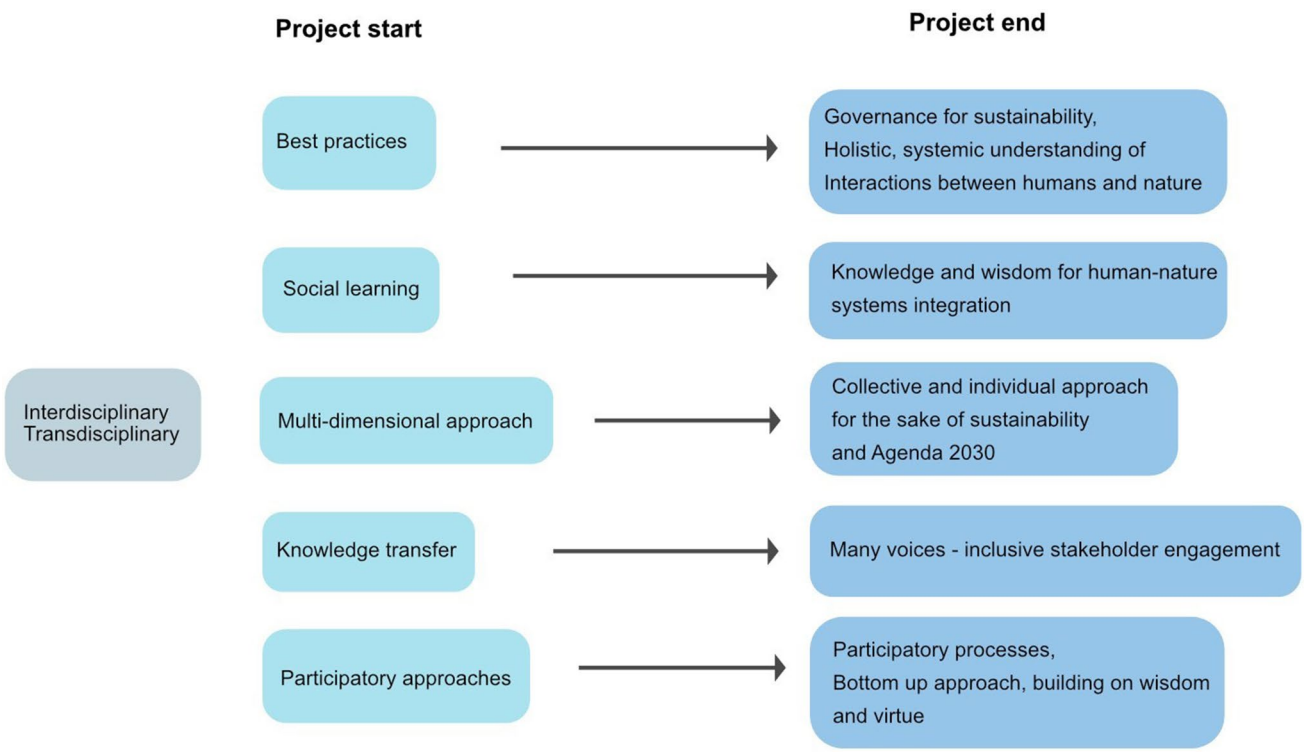

Fig. 4 IDR and TDR in Project C

practitioner handbook, and a conceptual framework on social environmental sustainability. Figure 3 shows the terms used (in written documents, websites and in the interviews), at the beginning of the project (light blue) and at the end (dark blue).

A Project B researcher described how TDR and IDR terms were mostly present in the proposal writing stage, and then faded away in the implementation phase. Normally, the researcher said, projects are composed of work packages, performed by separate research groups: *"There are groups normally from one institution contributing their part. And that's how it works when executed…It is hard to work together when you do not have to work together…. Like when it's actually fine that you work alone…"*. In this case, the IDR ambitions from the proposal were difficult to put into practice as subgroups kept mostly to themselves. One researcher described difficulties in implementation of the project because *"…there was a lot of conceptual confusion because there are people coming from different disciplines."* These two quotes highlight how interdisciplinary work requires researchers to stay with the hard work of IDR [19], but how it may be tempting to instead work alone or in academically homogenous groups.

The researchers in Project B described how the struggles with the TDR and IDR led to a deepened understanding and engagement with the terms. One of the interviewees told us that the project leadership time and again pushed these terms, and put them centre stage. The interviewee found this frustrating during the project duration, but also rewarding in the end. In the final report of Project B, it is stated that planning needs to be coordinated, transparent, coherent, as well as participative, inclusive, deliberative and accountable. The film that was produced as a final product stressed the importance of stakeholder engagement in planning, as it is a complex process where many voices are needed. This suggests to us that there has been learning along the project cycle. Initially, the terms might have been rather empty, but through the researchers' engagement with them, and their "staying with the trouble", an appreciation for this way of working returns, which is formulated and reinforced in the final report.

4.3 Project C

Project C was a two-year long project that aimed to bring together knowledge from two disciplines to improve the IDR understanding of a particular sustainability dilemma and to provide knowledge for policymakers to use in their decision making. The project was to *"bridge a research gap between [discipline one] and [discipline two] knowledge through an*

innovative and participatory approach". It was framed as an IDR and TDR project with the aim of identifying knowledge gaps between the two disciplines involved (see Fig. 4).

To our knowledge, none of the researchers in the project had prior experience in TDR approaches. Co-creation and social learning as approaches were—if interpreted in the broad sense of meeting and speaking with each other—happening. The main activity was a literature review of 3000 scientific papers from the two disciplines involved. The result of this review was put into a database tool, targeting policy makers and made available to the general public. At the second workshop, the database was to be presented to, and tested with, stakeholders. Author 1 participated in two Project C workshops. The invitation for the second one read: *"You will participate in a trans-disciplinary process of social learning and co-creation among experts, stakeholders and decision-makers in pursuit of a common and holistic understanding".* Unfortunately, the research team had not managed to secure stakeholders to the workshop, and as a solution the researchers present engaged in a role play taking different stakeholding positions. Figure 4 below show the grant/d terms in the project (in written documents, websites and in the interviews), where the first column displays the terms at the start and the second column the final stages of the project. The figure visualizes the development of grant/d terms during the project cycle.

While the main deliverables were traditionally academic—a literature review and a database for policy makers – in the final report the following terms featured prominently: "participatory processes", "interactive participation", "trans-disciplinary knowledge and wisdom", "virtuous individual and collective decision-making processes"…*" for the sake of sustainable development and the goals of Agenda 2030"* (from final report). (Fig. 4, in dark blue).

Our analysis shows that Project C had many problems in fulfilling the grant/d terms. There was a lack of knowledge and experience in the team, confusion about what the terms meant, and difficulties in getting stakeholders involved. As one Project C researcher reflected: "*Maybe the ambition levels were high at the beginning, and then…kind of the reality came into the picture…that is how I see it".* Despite this, the terms continued to be used on paper. Yet, they were reformulated in the final phase. For example, "best practices" became "holistic, systemic understanding of interactions between humans and nature", and "participatory approaches" became "bottom up approach, building on wisdom and virtue".

4.4 Summarizing the role of the terms in the three projects

Looking at the early phase, the projects seem quite similar: all use grant/d terms and promise IDR and TDR. But, in the implementation phase, the terms feature differently in the three projects. In Project A, many of the grant/d terms were implemented in the learning events through collaboration with non-academic actors. Collaboration between researchers was more challenging because of different epistemologies and methodologies and because there were many experienced TDR researchers involved with competing perspectives on how to do collaboration. In Project B, the researchers told us that they collaborated well across the disciplines, and worked through challenges of sharing methods, but the non-academic actors mostly featured as interviewees and audience for the findings. The Project C interaction with non-academic actors was minimal. Still, the same and new grant/d terms were used to report the project to the funders.

All three projects struggled in implementing the terms and the researchers shared useful reflections from their research practice in the interviews with us. Unfortunately, the final reports of the three projects did not discuss the challenges.

5 Projects A, B and C through a performativity perspective

In this section, we structure the analysis based on the early, implementation and reporting phases of the projects because the patterns are specific to the phases and can be observed across the projects.

5.1 What work do grant/d terms do in the early phase? And/or how are they performed?

As demonstrated above, grant/d terms featured prominently in the early phase of the projects—in the applications and the early texts about the project on websites, in brochures and early project meetings. They operated as an empty signifier, more specifically as comfort words [16]. In all projects the comfort words enthused and mobilized participants from different disciplines and backgrounds, enabling a first stage of collaboration. IDR and TDR were not discussed in the initial phases of any of the projects, according to our interviewees. We argue that this meant they could remain harmless and attractive, and continue functioning as comfort words. That the researchers involved did not all have the same basic epistemology and methodology was no problem at this stage. The grant/d terms used in the three projects were

all open enough to cater for this diversity, and the participants endowed them with their own understanding. Several Project C researchers had initial doubts about how to engage stakeholders in the project. As no stakeholders actually participated in the events, this never became an issue, but some regretted it never happened.

In Project B, TDR was understood in different ways; one researcher said: *"our task in … the project was not, so to say, produce stakeholder participation … And that's a big difference. So, what we did, we interviewed stakeholders … And we presented our results for those who participated in that study."* Another Project B researcher disagreed and raised questions about what stakeholder participation really entails, how the project could have involved stakeholders earlier, and how it would have been better to focus on knowledge co-production rather than interviews and inviting the researchers to present their results. This researcher regretted that they did not work like this from the start. As [45] point out, the early phase provides opportunities to unpack problems, and find a balance in the problem framing between the researchers and the non-academic actors in the project.

In neither Project A nor B there was discussion about what TDR and IDR meant in practice. From the interviews it became clear that in this early stage, several researchers viewed IDR and TDR as a solution rather than a (challenging) approach that would demand specific skills, considerable time and resources. Several researchers stressed the idea that IDR and the inclusion of different stakeholders were essential to address complex socio-ecological crises and contribute to sustainability transformations. A researcher in Project A put it this way: *"Well, I mean, in theory… in order to navigate realities, we need to be able to draw upon multiple perspectives."* Likewise, a researcher from project B: *"… because of the nature of the problems… we need all these kinds of solutions, try to solve that from all the angles".* This quote illustrates how rather than a task, approach or challenge for the research project, the diversity of IDR and TDR work was framed as the solution to complex sustainability problems. Indeed, in the interviews researchers expressed a trust that the project teams would be able to deal with any challenges coming from the diversity of perspectives.

Comfort words may close down discussions on multiple, possibly contrasting, perspectives [16]. In our study, the comfort words made it possible to ignore differences that could lead to tensions. Initially, collaboration was spoken about in a hopeful way, as an essential component for the project team and the non-academic stakeholders. A researcher from Project A said: *"It is easier to start with a project, everyone is pleasant to each other, wanting to learn, excited to have a chance to do something".* Likewise, a Project B researcher stated: *"In the first meeting, there was this drive or eagerness, like OK now we work together, and there was sort of a master plan. But then everyone goes home and then everyone does their thing."* These two voices represent a larger pattern in our material showing an initial strong sense of collectiveness, enthusiasm and trust in the process and project.

Alongside—or because of, as we suggest,—the voiced enthusiasm for the project and the grant/d terms, they remained undefined, opaque and difficult to grasp for several participants, and some expressed criticism towards this fuzziness of the grant/d terms. The clearest example is from Project C. The project leader stressed the need for stakeholder participation but one interviewee stated that he disagreed with this from the start but did not express his concerns, partly because it seemed a requirement from the funder:*" It's something where the [funder's name] already showed that for them it is extremely important to have stakeholder involvement. I can only speak for myself rather than for other scientists in the group but some of us don't value it that high. … but what I can say from me is that I didn't put that much effort or energy as I should have done, I guess".* A Project B researcher also expressed his scepticism towards IDR: "*Oh, yeah now often it is suggested or even required to have it interdisciplinary. It's like a buzzword…So on the one hand everybody asks for it because it is modern. But it is very difficult to make it fit this structure* [a project]." These quotes clarify how the IDR and TDR was not well anchored in the researcher team, which can also form an obstacle to their implementation.

5.2 What work do the grant/d terms do in the implementation phase of the projects? And/or how are they performed?

While the mobilizing capacity of the grant/d terms was strong in the early phase of the projects, once the project was up and running, it became clear that the participants held diverging understandings of the terms. Consequently, the terms lost their mobilizing and enthusing power. As a researcher in Project A stated: *"So, starting out, I remember lots of laughing, but later… It's similar in a lot of projects…somewhere around the middle it was quite tense. The different disciplines and academic traditions…. It is not always possible to be interdisciplinary…".*

In this phase, tensions became apparent. For example, the researchers in Project A turned out to hold different ideas about the purpose of the learning events, and about TDR in general: is it about co-creating knowledge, or rather getting feedback on researcher knowledge? The planning of these learning sessions caused tensions, as one researcher said: *"I found it constraining that there were always many people, many opinions about the leadership and what we should do with*

these events, it wasn't just a question of getting on with it, always lots of consultation and conversation…". These differences in ideas decreased researchers' willingness to collaborate on the project, as these differences felt difficult to overcome.

During the project neither project leaders nor participants took this issue up. Interestingly then, core ideas about reflexivity and collaboration and learning—central ideas for the researchers' modes of working—were not used for the collaboration in the research team itself: *"The rules of the game did not necessarily apply within the sort of immediate peer community, which I think is fascinating. And I've seen that quite openly in these projects that claim collaboration and participation, but when it comes to the sort of people who are experts in it, they are not particularly good at doing it at home".* So while process knowledge was available, the researchers did not sufficiently use it to improve the working of the IDR, and collective learning and reflection was lacking. [19] call for a reflexive learning approach within the researcher team – learning together as you go—in order to develop the necessary skills for implementation of IDR. Such an approach should focus exactly on the discomfort that comes with collaborative work. In our study, we see that the project teams withdrew from the discomfort of disagreement, rather than addressing it.

In this phase, several researchers grew skeptical towards the grant/d terms: the empty signifiers were no longer comfort words. During this implementation phase, the grant/d terms moved to the background. Interviewees from all three projects described how they returned to their own academic homes in this phase and collaborated mostly with their closest colleagues. In the interviews the researchers said that lack of time was a major reason for not collaborating across disciplines. Completing the work became the focus for many. Moreover, they perceived IDR as risky for their academic career. For example, a Project C researcher explained: *"You take the risk to publish in some other journal that is not really your field."* He continued by saying that other scientists in your field might criticize or question you and that it might negatively affect your career. His experience highlights the need for new ways way of evaluating scholarship that recognizes IDR and TDR work [39].

5.3 What work do the terms do in the final reporting of the projects?

The role of the grant/d terms in the implementation phase varied between the projects. All had trouble performing these terms or did not implement them at all. Still, the grant/d terms returned at the end of the projects and featured prominently in all three project reports. In this phase non-performativity—the practice by which discourse does not produce what it names [12] – manifests itself. The grant/d terms are expressed but not necessarily practiced. Or, their expression becomes the only way that they are performed: in Project C, the terms "bottom-up approach", and "building on wisdom and virtue" are examples. In Project B, "dialogue forums" was later described as "inclusive stakeholder engagement". This could be seen as a way of even more strongly showing that the project engages with the terms, hiding the challenges that the projects faced.

Non-performativity can block the recognition that grant/d terms are difficult to realise. As [12] argues, the naming becomes a way (or the only way) of practicing these terms. Several researchers acknowledged the problem of not discussing the failures and challenges in implementing grant/d terms. A Project B interviewee said: "*Failure can create knowledge…. We always try to be successful in a way that we complete the promised outcomes. Science is created if you also fail and you investigate why…".* Following this reflection, and based on our quest to highlight the challenges, we see a risk that if we do not, non-performativity will persist rather than the failures being a learning opportunity to do better next time.

In Project A, researchers disagreed about the form and aim of the learning events, but also about the synthesis work. What was it that the project had contributed with and was it really a joint understanding of results and recommendations for action? Only the researchers with similar epistemological grounds collaborated on academic papers. The final report states that the project *"created a space for performative practice of co-production of knowledge. This process went beyond traditional processes of learning and rather supported co-learning across the science-society interface, respecting and building on the diversity of participants."* Still, according to our interviews, differences amongst the researchers were not brought to the table for discussion, missing out on the opportunity to reflect and learn.

6 Discussion

In this paper we draw attention to the difficulties in working with the promising terms of TDR and IDR, by focusing on how these terms travel from research presentation to research practice. We examined how grant/d terms shaped the research in three research projects. As grant/d terms they are ambitious, and non-performativity is a risk. There is an asymmetry between what the projects say they want to do and what the interviewed researchers described that they

were are able to implement in practice. One reason for this might lie in the difficulty of implementing empty signifiers. They are difficult to pin down as they may be filled with different meanings depending on context, on purpose and on who uses the word [42]. We specifically highlighted comfort words that have the capacity to hide power relations or divergent expectations and thoughts [16].

The grant/d terms are filled with positive meaning, and their mobilising capacity is useful in the early phase of projects. However, projects can also get stuck in this mobilising and inspiring phase: the initial participatory and collaborative events may become the end goal, rather than a tool for change [46].

It is at the transition from early phase to implementation where the first non-performing trouble starts. The grant/d terms invite non-performance, or at least make performing difficult. Indeed, while none of the projects in our study in a strict sense 'performed' (according to the definition referred to in the introduction by [25] p440) all the grant/d terms, Project A and B persistently engaged with the terms. Only in Project C, were IDR and TDR truly non-performed, with the terms mostly appearing in the early phase and in the final report.

If these methodological struggles with grant/d terms are hidden and not talked about, they risk loosing their meaning. Moreover, we miss out on a possibility for learning if we hide our failures and mistakes. We argue that it is critical to have a learning perspective throughout the research process, in order to fulfil the aims of TDR and IDR (see also [19]). Indeed, empty signifiers can hold potential for change, but for this to be possible we need to be more reflexive about our research practice [41], and, stay with the trouble [13]. There is no short cut for making IDR and TDR work; rather, more time needs to be invested in the collaboration between and among researchers and non-academic actors.

In our interviews, the researchers generously shared thoughts, challenges and problems when working with IDR and TDR approaches. We think much could be gained if researchers, as part of a research project, discussed things that do not work out as planned. Sharing the backstage, holds a key to better practice, in which we can learn how to collaborate as we go about in our research projects. These skills are often mistakenly assumed to be in place already [19]. In both IDR and TDR lack of experience and lack of skills for working with non-academic actors may generate challenges for putting the grant/d terms in practice. But also in highly competent teams problems may arise. In Project A, the high level competence created disagreement about which methods were better suited for the project. In such cases, staying with the challenges (the trouble or discomfort) may open up for better practices. Our study supports the finding that the early phases of projects are particularly important for establishing ways of working leading to better practices [37, 45]. And in addition, and along the lines of Lockwood Harris, to apply a feminist perspective helps "to hold contradiction… rather than resolve or avoid contradiction" ([23] p150), something that could be beneficial for all the phases of a project.

How can we know what is the work of empty signifiers, and what is lack of experience and skills from the researcher's part to carry these projects out? This is very hard to disentangle, but drawing from our selection of different projects, with researchers with extensive knowledge and those with none or very little, we argue that keeping an eye on the mechanisms of these grant/d terms can help avoid non-performativity.

7 Conclusion

As [3] have shown, there are "a myriad challenge faced by transdisciplinary research" (box 3 page 49). Our study zoomed in and listened to the experiences of 28 researchers in three IDR and TDR projects in order to: 1) find patterns that they saw as complicating IDR and TDR in sustainability research projects; and 2) highlight these patterns, so that we and other researchers may be better prepared to deal with them.

We identify seven patterns across the three projects complicating implementation of grant/d terms and we show these patterns in Fig. 5. In the beginning of the projects the terms work as terms to meet around for the researchers (1, 2 below). At this stage, the terms become comfort words, discouraging the researchers to voice concern, and in the implementation phase, tensions arise and researchers return to their disciplinary silos to a larger extent and the terms are abandoned (3,4,5,6 below). At the last stage (7), the grant/d terms comes back, again as terms to meet around when wrapping up the project. At this stage, there is a great risk of non-performativity as in naming the terms again obscures the challenges with performing the terms.

Grant/d terms do peculiar work: they enable but also limit. More time and resources need to go into thinking how to implement the grant/d terms at the initial stages of a project, and as working with the terms is processual, this requires that the team reflects about the practice regularly. Projects and their participants have different capacities to deal with this. We believe this capacity can be strengthened by discussing our backstage. The competitive academic environment

Fig. 5 Seven patters

may not encourage it, but putting the spotlight on our research struggles can help develop IDR and TDR in sustainability research. We need to develop our ability to "stay with the trouble".

8 Future research

In this study we have not considered the role of funding agencies in reproducing the grant/d terms. These agencies formulate call texts in order to clarify the kinds of projects that they welcome, and researchers formulate their proposals (to some degree) to match the call. A relevant question for future research is: How do the calls with the grant/d terms structure the project proposals, implementations and reports? This was not an assessment study, and it would be worth investigating how non-performativity or superficial performance of the terms impacts the results of research projects like these, and in the long run also sustainability transformations.

In this study we did not interview the non-academic participants in the three projects. Their perspectives on the practice of grant/d terms would be very valuable.

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Author contributions SP conducted the interviews and focus groups and reviewed and analysed the written material. SP analysed and coded the material. SP initiated the theoretical framing. SP wrote the main text and SP and SJ reviewed and developed the text in collaboration and wrote up the discussion and conclusion together.

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Data availability The data that support the findings of this study are available from Swedish University of Agricultural Sciences (SLU), but restrictions apply to the availability of these data, which are not publicly available. The data are, however, available from the authors upon reasonable request and with the permission of SLU.

Declarations

Ethics approval and consent to participate As per standard practices in research ethics, interview data cannot be shared openly to protect study participant privacy. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. We have complied with all relevant ethical regulations and guidelines for study procedures as provided by the Swedish Research Council. We have obtained informed consent from all participants and no sensitive data was collected. This research followed Swedish Act (2003:460) stating that a study that does not risk the collection of sensitive personal data, does not need ethical review. According to this act, if sensitive data is accidentally collected, research can still continue, if an application is made.

Competing interests The authors declare no competing interests.

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