

Evaluating transdisciplinary research quality

Transdisciplinary research (TDR) addresses societal issues and involves non-academic partners. To meet today's societal challenges TDR is often seen as part of the solution. But TDR projects differ considerable from regular and disciplinary projects and therefore require other conceptions of quality and evaluative approaches.

Siri B. Borlaug (NIFU and OsloMet) and Silje Marie Svartefoss (NIFU and UiO)

1. What is transdisciplinarity?

Transdisciplinarity is a slippery concept with several definitions. One of the most common is that TDR is research which crosses disciplinary boundaries and involves non-academic partners. The research is context specific and often problem-driven (Klein, 2008; Pohl et al., 2011). To give an example; commissioned research is often transdisciplinary as the research addresses the need of the commissioner, the commissioner is involved in setting the agenda and defining the research question. Still, for commissioned research to be truly transdisciplinary active involvement of the non-academic partners is required throughout the research process. TDR thus differs from so-called collaborative projects in which the external partners are not obliged to participate in all stages of the research project.

Further, TDR differs from disciplinary, multi-disciplinary and interdisciplinary research as it involves work to overcome social, cognitive and organisational barriers between academic and non-academic partners (Belcher et al., 2016). In comparison, interdisciplinary research is defined as research that transcends disciplinary fields (Huutoniemi et al., 2010; Klein, 2008).

Thus, TDR challenges common conceptions of quality and evaluation approaches and practices. Given the increasing emphasis on the importance of transdisciplinarity for solving societal challenges, and hence the increased requirements for involvement of non-academic partners in research project applications and grants, it is important for policymakers and funders to be aware of that TDR requires other conceptions and approaches than disciplinary and interdisciplinary research projects.

2. Research quality in a disciplinary context

Current tendencies in research policy show a movement from quantitative and summative evaluations towards more formative evaluations of research and researchers (Sivertsen & Rushforth, 2023). In the midst of this, notions of quality have, however, remained underdeveloped. For a long time, the emphasis in research policy has been on

internationalisation and scientific impact, or 'excellence', characterised by a focus on developing and supporting research at the international frontier. Within this, research quality has generally been perceived and operationalised as scientific impact, and bibliometric indicators have been used as the main means to measure research quality. There are many reasons for this, but access to quantifiable data is certainly a major one. The emphasis on scientific impact poses however challenges for TDR as this may not be the main aim of the research.

Furthermore, in the design of peer review of research project proposals, quality notions tend to be ill-specified or very general, asking reviewers to assess the 'originality', 'rigor' or 'value'. With the increased emphasis on TDR, a broader understanding of research quality is needed for ensuing proper evaluation processes. Especially given that former discussions of research quality have often been limited to differences in conceptions of quality between fields and within areas, like the humanities (Hug et al., 2013; Lamont, 2009; Mårtensson et al., 2016), or different sites. For example, Langfeldt et al. (2020) argue that there are several co-existing notions of research quality in different sites such as knowledge communities, research organisations, funding agencies and policy, and they identify three core attributes of quality: Originality, plausibility and value. The first refers to novelty and innovativeness - key attributes for research to become a legitimate contribution to the stock of knowledge. Plausibility or reliability refer to sound methods, rigor, integrity and research ethics, and value refers to both scientific and societal value/usefulness.

While external usefulness is seen as an attribute of research quality, the authors do not really pay attention to the role of stakeholders outside science (except for the policy sphere) and their influence on research quality. In this perspective, relevance or usefulness outside of science is still a contested criterium of research quality. One consequence of

this is the classical two-dimensional rhetorical and political divide and perceived tension between 'quality and relevance'. In transdisciplinary research, however, relevance is embedded in the research process and a core criterium. We will expand on this in Section 4.

3. Evaluation in a disciplinary context

Current approaches to evaluation of research projects tend to further contribute to a strengthening of the divide between quality and relevance. Project proposals are usually reviewed by a panel of academic peers and studies of panel dynamics have found that grant peer review seems to disfavour inter- and transdisciplinary proposals (Ayoubi et al., 2021; Langfeldt, 2006). Moreover, traditional evaluation procedures like midterm review of a large project or centres, and after the project is concluded, are usually not well suited for transdisciplinary research. For instance, societal impact evaluations focus on the relevance of research after the ending of the project, creating an artificial separation between research and the impact phase and do not do justice to the nature of the research process (Franssen 2022), which in itself is a transdisciplinary effort.

Furthermore, evaluations may also play a significant role in setting direction for what type of outcome of the projects that is valued (Borlaug, 2016). An emphasis on scientific publications as a valued outcome may thus represent a hindrance for developing genuinely transdisciplinary projects.

In short, the increased emphasis on transdisciplinary research and its importance for sustainable research and role in solving societal challenges, call for a broader operationalisation of research quality beyond the scientific conceptions, and an inclusion of relevance throughout the different evaluative phases of the research process.

4. Transdisciplinarity and quality

Four key principles are seen as essential elements of TDR quality (Belcher et al., 2016, p. 8): relevance, credibility, legitimacy and effectiveness. Each principle has a set of criteria. i.e. conditions that need to be met in order to achieve a principle.

- *Relevance* is "...the importance, significance, and usefulness of the research project's objectiveness, process and findings to the problem context and to society". TDR quality

involves addressing societally relevant problems and produce useful knowledge and includes all phases of the research process from problem formulation through the applicability of the research.

- *Credibility* refers to the robustness of the research findings and the adequacy of data and methods. The inclusion of external actors helps to achieve relevance and legitimacy but also heightens requirements related to credibility such as transparency, reflection and reflexivity.
- *Legitimacy* is whether the research process is perceived as fair and ethical by the end users. On the one hand, this includes that researchers reflect and account for their own positions and interest, and on the other hand to make the process transparent to stakeholders external to the research. A delineation of the inclusion and engagement of societal actors along the whole process is therefore important for the legitimacy of the research.
- *Effectiveness* is here understood as research that contributes to a positive change, may it be social, economic and/or environmental. This principle is a bit tricky, it can be indicated or assessed at the proposal stage and during the research process but assessing effectiveness *ex post* still remains a challenge. Learning and societal capacity building are central goals of TDR and therefore may effectiveness relate to changes in knowledge, attitudes, skills and/or practices, not only products and the like.

Notably, these principles differ considerably from the ones seen as constituting research quality in disciplinary research projects. In TDR the relevance aspect is up front, and although credibility and legitimacy are reminiscent of what Langfeldt et al. (2020) labelled plausibility, these aspects of quality are more emphasised in TDR than when evaluating disciplinary research.

The lack of generally accepted quality standards for TDR is one of the reasons why the proliferation of TDR has progressed moderately, some argue (Jahn & Keil, 2015). There is as such a need for building up a practice of *quality assurance* and evaluation of TDR.

5. Transdisciplinarity and evaluation

There are several approaches and frameworks for how to evaluate TDR research, and many of them

are rather field or context specific. For the purpose of this policy brief, we highlight principles that evaluations of TDR should incorporate, and outline how some frameworks for evaluation specifically suggest that TDR quality should be evaluated.

Principles that evaluations of TDR should incorporate

The literature points to four general principles. First, TDR evaluations need to adapt to account for the fact that TDR includes external actors with different perceptions and expectations about the results of TDR. As a general rule, stakeholders should be included in the evaluations of TDR projects (Belcher, Ramirez, et al., 2019; Brennan & Rondón-Sulbarán, 2019; Klein, 2006, 2008; Mitchell et al., 2015; Wickson & Carew, 2014). This also includes representatives of non-human stakeholders (Franssen, 2022).

Second, TDR should be evaluated in relation to the various stakeholders it was intended to be useful for (Belcher, Ramirez, et al., 2019; de Oliveira et al., 2019; Hansson & Polk, 2018; Holzer et al., 2018; Kaufmann & Kasztler, 2009; Roux et al., 2010). As an example, Kaufmann and Kasztler (2009) argue that it is not possible to define the quality of research output by only considering the output in itself. It needs to be defined in relation to the reception within different communities, both scientific and non-scientific.

Third, evaluations should take into account that the context of TDR vary, that is; there are differences in institutional conditions and type of partner/actor (Belcher et al., 2016; Belcher, Ramirez, et al., 2019; Belcher et al., 2020; Di Iacovo et al., 2016; Hansson & Polk, 2018). This challenges the applicability of generic evaluation frameworks and calls for field and context-specific approaches.

Fourth, even though many argue that impact of TDR should also be a part of a TDR evaluation (Belcher et al., 2016; Belcher, Ramirez, et al., 2019; Belcher et al., 2020; Hansson & Polk, 2018; Janinovic et al., 2020; Roux et al., 2010), it is very challenging to do this in practice. To evaluate impact, a substantial amount of time must have passed from the project ended and the evaluation begins (Roux et al., 2010). Additionally, it is often quite challenging for external actors to connect a change in practice to a specific piece of knowledge, a change in practices is

typically influenced by several sources (Belcher et al., 2020).

Frameworks for evaluation of TDR and quality

There are few studies which provide frameworks for how evaluations can be conducted.

In general, there is an emphasis on the initial phase of a TDR project. A common issue is the underlining of the need to define the ends and outcomes of the project early in order to structure different perceptions and expectations of the involved stakeholders (Belcher, Ramirez, et al., 2019; Brennan & Rondón-Sulbarán, 2019; Mitchell et al., 2015; Wickson & Carew, 2014). As engagement of all stakeholders is key to TDR quality, it is important that stakeholder engagement is a part of the assessment of TDR projects, both in the proposal phase and afterwards (Franssen, 2022).

One promising approach to evaluation builds on the Theory of Change (ToC) which specifies how change is expected to occur in a given context (Belcher, Claus, Davel, & Ramirez, 2019; Belcher et al., 2020). A ToC entails formulating testable hypotheses that outline how and why change is expected to occur as a result of the TDR project. These should relate to the project's long-term goals and may involve changes in knowledge, attitudes, skills, relationships and behaviour. A ToC can be used for both planning and monitoring in addition to evaluation (Belcher, Claus, Davel, Jones, et al., 2019). The approach primarily understands TDR quality as researchers' ability to optimise the research design and output to increase the potential for outcomes and impact. Hence, the lack of outcomes or impact of TDR does not imply low quality.

This policy brief highlights that TDR requires other conceptions of quality than those often used in guidelines of agencies funding research. Furthermore, TDR requires emphasis on the initial phases of a research project, and the evaluation of other outcomes than scientific impact. This implies that TDR may need to set aside more resources for evaluation, and that evaluation may play a significant role for the outcome of the projects.

<p>Policy implications</p> <ul style="list-style-type: none">• Funding of TDR needs other quality conceptions and evaluation approaches than disciplinary and even interdisciplinary research.

- There are four key principles for TDR quality: Relevance, credibility, legitimacy and efficiency. Although important aspect of also disciplinary research, the involvement of non-academic partners requires heightened consciousness on these aspects.
- It is important to invest considerable work and resources in the early phase of a TDR project, that is in the research design and the implementation of the projects, in order to achieve wanted outcome.
- When evaluating TDR, one needs to i) take into account that project participants have different perceptions and expectations about the results of the project, ii) evaluate the project in relation to the various stakeholders it is intended to be useful for, iii) take into account that context, fields and areas of the project vary, and iv) impact is inherent in TDR.
- A framework for evaluating TDR is Theory of Change (ToC). This emphasises the importance of continuously evaluating change in relation to a broad set of outcomes like knowledge, attitudes, skills, relationships and behaviours.

Further reading

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