



ACCESS

Benefits, drawbacks, barriers, and drivers of working with other disciplines and stakeholders

ACCESS literature review report

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Introduction

It is increasingly acknowledged that working with other academic and non-academic colleagues within and outside people's own discipline is important to provide holistic solutions and understandings to complex problems (Klein, 2017; Stokols et al., 2008). This is particularly important when addressing multifaceted threats such as climate change and environmental degradation (Klenk & Meehan, 2015; Pohl, 2005). As a result, demand for knowledge created by heterogeneous groups of individuals from a range of disciplines and sectors in addressing these problems has grown in the UK context, and research projects that operate across disciplines and stakeholder groups are increasingly promoted and financially supported by UK universities, research councils and other funding bodies (see UKRI, 2024).

Different terms for these collaborations with separate definitions have been proposed to refer to the process of knowledge creation¹, exchange² and use, including *cross-disciplinary*, *multidisciplinary*, *interdisciplinary*, *transdisciplinary*, and *post-disciplinary* working (Beaumont, 2020; Morris et al., 2022), each referring to slightly different levels of disciplinary and sectoral levels of inclusion and/or integration. Regardless of the precise term used, an appreciation of the benefits and drawbacks of undertaking knowledge creation and use in groups that include people from different disciplines and sectors is needed to understand the importance of this collaborative approach (see Beaumont, 2020; Hadfield-Hill et al., 2020). Furthermore, awareness of potential barriers and driving factors influencing the success of collaborative working environments could help promote effective, supportive, and inclusive future knowledge creation.

As part of the ACCESS project (accessnetwork.uk), providing evidence for defining and outlining benefits, drawbacks, barriers, and drivers to working with and across disciplines and stakeholders is an important part of learning from past findings related to integrating disciplines more generally, including those from environmental social science (ESS), into research projects, or policy and practice. This is with the goal of championing and coordinating social science research, to build capacity and promote and enhance the value of environmental social science in research and practice to address key environmental challenges (Gatersleben et al., 2024). As such, this review of the peer-reviewed and grey literature on working with other disciplines and stakeholders has the following purposes:

¹ Building on Nonaka and Takeuchi (1995), Popadiuk and Choo (2006, p. 310) conceptualise knowledge creation in two forms, as “exploration through the socialization and externalization of tacit knowledge, and exploitation through the combination and internalization of explicit knowledge.” In this context, *knowledge creation* refers broadly to activities, both academic and non-academic, that result in the development of new information.

² Fazey et al. (2013, p. 20) define knowledge exchange as “a process of generating, sharing, and/or using knowledge through various methods appropriate to the context, purpose, and participants involved.” In this report, knowledge exchange is seen to be undertaken by individuals or groups within or outside of academia in concert with others, whether in or outside of academia.

- To provide an overview of different definitions of concepts related to working with other disciplines and stakeholders.
- Furnish evidence from prior research regarding the benefits and/or drawbacks of working with other disciplines and stakeholders.
- Outline barriers and/or drivers to promoting greater and more effective working with other disciplines and stakeholders.

When examining benefits, drawbacks, barriers and drivers of working with different disciplines and stakeholders, a non-exhaustive list of commonly-cited themes are detailed with a set of key references, structurally based on Beaumont (2020) and Deininger et al. (2021).

This report is aimed at multiple audiences, including knowledge creators such as researchers in academic institutions, social scientists in non-academic research institutions such as government and private sector social researchers, and project leads, principal investigators, and project managers on wide-scale research projects, as well as knowledge brokers, and knowledge users.

Terms and definitions of working with different disciplines and stakeholders

When scanning the literature on working with other disciplines and stakeholders, a wide range terms emerges (Newman, 2023b). These included *cross-disciplinary*, *multidisciplinary*, *interdisciplinary*, *transdisciplinary*, and *post-disciplinary* working. Each of these refer to different levels of disciplinary and sectoral integration and/or inclusion. Despite the wide range of terms available, many of these are referred to simply as ‘interdisciplinarity’ for ease of understanding, and due to common knowledge of the term (Klein, 2017; Morris et al., 2022). However, it is important to outline differences between these various terms to ensure specificity when discussing the precise form of working with different disciplines and stakeholder groups. The definitions presented below are listed in order of increasing collaboration, interaction and integration.

Intradisciplinarity

A way of working that involves working in one “discipline either as an individual or a [group] from the same discipline” (Beaumont, 2020, p. 12).

Cross-disciplinarity

“A way of working that involves working in one discipline with awareness of one or more other disciplines, [including applying one disciplinary approach] in the context of issues normally belonging to another. This approach rarely involves the deep engagement with expertise from another discipline” (Beaumont, 2020, p. 12; Sierra et al., 2018).

Multidisciplinarity

A way of working that involves “a process whereby people from different disciplines work together on the same problem or question, simultaneously or in close succession, sharing their disciplinary knowledge in a way which is additive rather than integrative. That is, the disciplinary perspectives are not changed by the process, only contrasted” (Beaumont, 2020, p. 13; Klein, 1990). In reality, some projects operate in this way rather than often-stated intentions of inter- or transdisciplinary ways of working (Morris et al., 2022, p. 31).

Interdisciplinarity

A way of working that “integrates knowledge and methods from different disciplines, using a true synthesis of two or more disciplines to address a specific problem, leading to the establishment of a new level of discourse and integration of knowledge. Broadly, interdisciplinarity involves collaboration between people from different disciplines with the goal of producing new knowledge” (Beaumont, 2020, p. 13; Morris et al., 2022; Schuitema & Sintov, 2017; van Rijnsoever & Hessels, 2011).

Transdisciplinarity

A holistic way of working “which creates a unity of intellectual frameworks beyond the disciplinary perspectives, subordinating disciplines and resulting in an outcome which is not recognisable from the original parts” (Beaumont, 2020, p. 13; Klein, 1990; Stember, 1991). According to Morris et al. (2022, p. 31), there are two main definitions of transdisciplinarity in the context of research:

(1) Transdisciplinar[ity] is knowledge making where traditional expertise integrates with other forms of knowledge making, such as public engagement or collaboration with industry partners.

Transdisciplinar[ity] takes into account multiple perspectives.

(2) Transdisciplinary research takes place when the resulting research “transcends” or “transforms” disciplinary boundaries or ways of working.

Examples of this arising from sustainability science include work integrating research and activity on migration and energy independence projects in Argentina, increasing public participation and

engagement with regional sustainable development projects in Slovakia, or studying insecticide-treated bed net uptake in Tanzania (see Lang et al., 2012).

Post-disciplinarity

Where working with other disciplines and stakeholders examines “issues across traditional disciplinary boundaries. Post-disciplinarity is seen as more “transformative” than multi-disciplinary research because multi-disciplinarity is still bound by disciplinary paradigms and ways of thinking” (Fazey et al., 2018; Fitzgerald & Callard, 2015; Morris et al., 2022, p. 32). Post-disciplinary approaches to working are seen as a potential foundation to allow for more “fluid, problem driven approach[es] to organizing research teams and engaging stakeholders” (Brewer, 2013; Delbridge, 2014, p. 110), and may be particularly useful for work groups that “may be too short-lived to be institutionalized [...] or to be given lasting disciplinary labels” (Biagioli, 2009, p. 819). Post-disciplinary working is also seen as the most appropriate method of working with other disciplines and stakeholders to avoid fragmentation and enhance coherence in knowledge creation (Sayer, 2000).

Concluding remarks on terminologies

Despite the broad definitions for the terms presented above, agreeing shared definitions of some of these, including interdisciplinarity, has long been contested and continues to be so (Aboelela et al., 2007; Bruce et al., 2004; Huutoniemi et al., 2010; Klein, 1990; Siedlok & Hibbert, 2014; Weingart, 2000).

Although variations exist between these different terms, commonalities exist between them (other than for intradisciplinarity). These are: that multiple individuals must be involved, that two or more disciplines must be integrated with, added to, or engaging with one another, and that bringing together different disciplines is with the aim of creating new value, is more than the sum of its parts, and progresses knowledge further than is possible within one discipline as a result.

Overall, while much research in this field examines *academic research* practices across disciplinary and/or sectoral boundaries, the scope of the latter sections of this report includes research examining collaborative working for knowledge production in a more general sense. This includes a range of findings from research conducted on working that included or consisted solely of non-academic researchers, and consisted of research, projects, or working practices that could be cross-disciplinary, multidisciplinary, interdisciplinary, transdisciplinary, or post-disciplinary. The findings are therefore presented in a more general sense, discussing collaborative working for knowledge production across disciplines and stakeholders in the context of multiple forms of working.

The following sections of the report aim to describe the benefits, disadvantages, barriers, and drivers of working with people from other disciplines within and outside of academia that should be considered regardless of which form of collaborative working one is undertaking.

Benefits of working with other disciplines and stakeholders

From the literature, a range of benefits of working with other disciplines as well as with academic and non-academic stakeholders emerged. The core structure and grouping of these themes is developed from findings from Beaumont (2020) and Deininger et al. (2021), analysed and added to from the wider research base on benefits of working with other disciplines and stakeholders. These benefits include³:

1. **Interesting:** That working with different disciplines and stakeholders can be positively challenging and intellectually stimulating (Aboelela et al., 2007; Bark et al., 2016; Beaumont, 2020; Siedlok & Hibbert, 2014).
2. **Essential:** It is seen as essential or necessary to addressing complex challenges such as climate change, especially due to the holistic nature of the work identifying and addressing a broader set of problems (Aboelela et al., 2007; Bark et al., 2016; Beaumont, 2020; Bruce et al., 2004; Lach, 2014; Morris et al., 2022; Shah, 2020).
3. **Better research:** Working with different disciplines and stakeholders can result in more accurate knowledge, better and more useful/relevant solutions and greater impact, creative and innovative thinking, greater methodological rigour, and it can provide longer-lasting and novel solutions to challenges (Bark et al., 2016; Beaumont, 2020; Bruce et al., 2004; Bruzzese et al., 2020; Howell & Cleary, 2001; Lattuca, 2001; Leahey, 2018; Morris et al., 2022; Morss et al., 2021; Siedlok & Hibbert, 2014; Smaldino & O'Connor, 2022; Stokols et al., 2005; Szostak et al., 2016; Teel et al., 2018; Weaver, 2008; Winowiecki et al., 2011).
4. **Professional development:** It can increase opportunities and professional development for individuals, whether through opening up new funding opportunities, increased publishing productivity, higher quality of publications, boosting author visibility through citations, or

³ The benefits presented here are based on the assumption that the collaborative project is well-managed, and that individuals within the project are collaborative with one another.

growing networks across disciplines (Abramo et al., 2017; Beaumont, 2020; Bruzzese et al., 2020; Leahey, 2018; Roper & Brookes, 1999; Yegros-Yegros et al., 2015).

Drawbacks of working with other disciplines and stakeholders

Although working with people in other disciplines and sectors is often viewed as a broadly positive undertaking, this method of collaboration can have drawbacks depending on the topic or context. Potential drawbacks of working with other disciplines and stakeholders include:

1. **Difficulty:** It can be a difficult thing to do, and can often be a complex, frustrating and/or confusing activity to undertake and implement, particularly at the start of a project (Beaumont, 2020; Evans & Marvin, 2006; Gibson et al., 2019; Hadfield-Hill et al., 2020; Jaeger-Erben et al., 2018, p.; Leahey, 2018; Ursić et al., 2022).
2. **Time and/or resource-intensive:** It tends to be time-consuming, requiring more commitment than traditional within-discipline working. As a result, it can reduce productivity, and be more expensive (Balmer et al., 2016; Beaumont, 2020; Croissant, 2023; Leahey, 2018; Shove & Wouters, 2005).
3. **Dilutes disciplinary research:** It can dilute (or be perceived to dilute) disciplinary research (Beaumont, 2020; Morris et al., 2022; Petts et al., 2008). It can similarly be difficult to select the appropriate disciplines, and to reconcile conflicting priorities between disciplines and achieve a consensus, or may result in generalist abilities instead of specific disciplinary expertise for individual researchers (Beaumont, 2020; Brister, 2016; Lau & Pasquini, 2008; Leahey, 2018; Schoenberger, 2001).
4. **(Potentially) career-limiting:** It can be seen to be career-limiting in existing academic frameworks and promotion structures. This is because it is not always respected, and sometimes considered to produce lower-quality knowledge and outputs, thereby potentially being risky for those pursuing a successful research career (Balmer et al., 2016; Beaumont, 2020; Bromham et al., 2016; Bruzzese et al., 2020; Khan et al., 2019; Klein, 1990; Lau & Pasquini, 2008; Leahey, 2018; Morris et al., 2022; Newman, 2023b; Petts et al., 2008). This includes the likelihood of having lower levels of funding success, especially for early-career researchers and researchers from specific disciplinary backgrounds. However, it has been

suggested that this research landscape is changing, with increasing acknowledgement and appreciation of the value of impactful research and collaborative working (Sun et al., 2021).

5. **Challenging to publish:** It can be difficult to publish findings in academic journals that often target specific disciplines (Bammer, 2016; Beaumont, 2020; Lattuca, 2001; Laudel, 2006; Petts et al., 2008; Teel et al., 2018). In addition, it can be challenging to find suitable reviewers with the appropriate set of knowledge and skills to review projects and outputs (Bromham et al., 2016; Hein et al., 2018). There is currently mixed evidence regarding impact of undertaking research with other disciplines and stakeholders on citation counts (Yegros-Yegros et al., 2015).
6. **Measuring contribution:** Finally, it may be difficult to clearly know in advance or demonstrate specific group member contributions to projects. This may be due to conflicting methods of evaluating success, lack of shared evaluation criteria, and differing potential timelines of impact between disciplinary and stakeholder groups. Poorly defining roles within teams before beginning can also result in disengagement later on in the project (Beaumont, 2020; Gibson et al., 2019; Newman, 2023b).

Barriers to enhanced working with other disciplines and stakeholders

Though similar in some ways to drawbacks of working with people from different disciplines and sectors, a range of somewhat different barriers to enhanced collaboration are presented in literature on the topic. Some barriers may be seen as causes, while others may be viewed as effects resulting from these causes that hinder collaborative working for knowledge production:

1. **Inadequate communication:** This includes differences in use of jargon and lack of a common vocabulary that may lead to confusion, misunderstanding, and/or disengagement. Speech communities, consisting of different dialects, metaphors and articulation often defined by disciplinary identity, can isolate those from other disciplinary or sectoral environments if individuals or groups are unaware or do not explain meanings clearly (Austin et al., 2008; Beaumont, 2020; Bracken & Oughton, 2006; Brasier et al., 2020; Clayton et al., 2016; Freshwater et al., 2006; Gibson et al., 2019; Kumar et al., 2019; Lattuca, 2001; Lau & Pasquini, 2008).

2. **Inconducive work culture:** This can take the shape of poor understanding of ‘the other’, inappropriate (mis)valuation of methodologies, lack of respect for other disciplines and differing disciplinary traditions, exacerbated by unequal in-group power relations and inadequate communication. Differences in disciplinary status, such as that seen in the UK where natural science often receives greater recognition than social sciences among science and policy groups is one such example that can inhibit effective collaboration (Beaumont, 2020; Bennett et al., 2017; Brister, 2016; Campbell, 2005; Croissant, 2023; Frickel et al., 2016; Gardner, 2013; Gibson et al., 2019; Jacobs & Frickel, 2009; Klein, 2008; Lach, 2014; Lattuca, 2001; McCoy & Gardner, 2012; Milman et al., 2017; National Academy of Sciences et al., 2005; O’Cathain et al., 2008; Pedersen, 2016; Siedlok & Hibbert, 2014).
3. **Lack of time and facilitation:** As noted, collaborative working can be more time and resource consuming. Lack of time and facilitation, short project timespans, inconsistent and/or short-term employment circumstances and excessive bureaucracy created by working across departments and organisations that is not conducive to being inclusive to all groups, disciplinary approaches or methodologies can hinder attempts to work with different disciplines and stakeholder groups (Arpin et al., 2023; Beaumont, 2020, p. 21; Brasier et al., 2020; Doering et al., 2022; Elixhauser et al., 2024; Hein et al., 2018; König & Gorman, 2017; Newman, 2023b).
4. **Narrow disciplinary training and mindset:** Traditionally, narrow disciplinary training is common among research training programmes, and can hinder ability to understand and engage with other disciplines and stakeholder groups (Austin et al., 2008; Beaumont, 2020; Clayton et al., 2016; Lattuca, 2001). Alongside lack of training, fundamental differences in disciplinary traditions, and epistemological differences, that result in challenges to integrate differing methodologies in an appropriate way can also impede further collaborative working (Edwards et al., 2011; Elixhauser et al., 2024; Hein et al., 2018; Jacobs & Frickel, 2009; Pedersen, 2016; Schoenberger, 2001; Siedlok & Hibbert, 2014).
5. **Institutional barriers:** Funding constraints and comparative difficulty for these kinds of research projects to get funding compared to single-disciplinary projects have also been cited as potential risks of undertaking this kind of work (Beaumont, 2020; Bromham et al., 2016; Hein et al., 2018; Klein, 2000; Newman, 2023b; Siedlok & Hibbert, 2014; Weingart, 2010).
6. **Collaborative working not being worth pursuing:** The perception that working with different disciplines or stakeholders can be an impediment to career progression is still prevalent in some quarters. In addition, a lack of career incentives to undertake it will reduce willingness to do so (Beaumont, 2020; Gibson et al., 2019; Lattuca, 2001; Schuitema & Sintov, 2017; Siedlok & Hibbert, 2014). This is not the case across all disciplines and may interact with institutional barriers such as funding constraints.

7. **Valuation of ‘success’:** Current ways in which ‘success’ is evaluated in knowledge creation arenas, such as academia, are at times not commensurate with research goals, or broader goals of having impact. This has historically been seen in performance reviews, and expectations when applying to new roles that value certain types of success. These include prioritising the number of peer-reviewed publications and citation counts of candidates over other successes, such as policy impact, public engagement and/or education outcomes (Bark et al., 2016; Beaumont, 2020; Brennan & Rondón-Sulbarán, 2019; Newman, 2023b, 2023a).
8. **Distance:** Physical distance between workers, including distance created in the division of researchers by discipline for bureaucratic reasons in universities can create disciplinary siloing and hinder collaboration (Boden & Borrego, 2011; Gazzaniga, 1998; Hadfield-Hill et al., 2020; Newman, 2023b; Rekers & Hansen, 2015; Tripp & Shortlidge, 2019; Vienni Baptista et al., 2019). This can hinder original inclusion of potential team members in projects across disciplinary and stakeholder boundaries and inhibit effective communication between team members during a project of this type.

Drivers of enhanced working with other disciplines and stakeholders

Finally, drivers of enhanced working with other disciplines and stakeholders are presented. To some extent, many of the drivers presented seek to overcome the barriers outlined above. Despite its potential value, there has not been a large amount of primary research into factors that may enhance collaborative working practices (Newman, 2023b). Based on the academic and grey literature, the drivers of enhanced working with other disciplines and stakeholders presented have been clustered into the following groupings:

1. **Collaborative attitudes** are fundamental to promoting project success. The ways in which this may happen includes ensuring enhanced communication and resonance, improving understanding of ‘the other’, promoting greater respect and humility between disciplines, removing hierarchical structures and maintaining group equality, providing effective leadership, and establishing trust between group members (Beaumont, 2020; Cassidy et al., 2023; Clayton et al., 2016; Elixhauser et al., 2024; Gibson et al., 2019; Hüttermann & Boerner, 2011; Lyall et al., 2013; Newman, 2023a; Sankaran et al., 2021; Schnegg, 2021; Tripp & Shortlidge, 2019).
2. **Reflexivity** to one’s own disciplinary background is vital to allow those working with other disciplines and stakeholders to leave disciplinary “comfort zones.” Being open in this way to

other disciplinary approaches and stakeholder ways of working is important due to the sometimes stark differences that exist between groups (Castán Broto et al., 2009; Elixhauser et al., 2024, p. 3; Hadfield-Hill et al., 2020).

3. **Appropriate time and space allowance** can ensure sustainable success by building relationships between group members. This may take the form of long-term collaboration, factoring in appropriate time to create shared languages, relational bonds between group members, and to discuss misunderstandings, points of contention or debate in respectful and inclusive ways (Beaumont, 2020; Cassidy et al., 2023; Clayton et al., 2016; Elixhauser et al., 2024; Hadfield-Hill et al., 2020; Steger et al., 2021).
4. **Active facilitation**, including tailored strategies that account for varied needs of group members, can ensure that all team members are respected and included appropriately (Cassidy et al., 2023; Cvitanovic et al., 2020; Elixhauser et al., 2024; Gibson et al., 2019; Newman, 2023a; Sankaran et al., 2021; Wilson et al., 2021).
5. **Revised academic training** that includes education in different disciplines and methodologies is an often-cited solution to address problems related to poor understandings of other disciplinary approaches or stakeholder ways of working, and potential lack of respect for others (Beaumont, 2020; Clayton et al., 2016; Hein et al., 2018; Wilson et al., 2021).
6. **New approaches to funding** can protect and promote projects including a range of disciplinary and stakeholder entities. These approaches include offering longer-lasting funding for projects, flexibility from funding bodies to changing work directions or schedules, allowing funding for riskier or more radical projects, leading by example with active management and collaborative practice with projects, and providing new ways of evaluating success from funded projects (Beaumont, 2020; Gibson et al., 2019; Lyall et al., 2013; Pelling et al., 2023).
7. **Appropriate conceptual and epistemological** models can allow heterogeneous disciplines to work with one another and give them the ability to successfully negotiate shared goals despite between-group differences (Bark et al., 2016; Choi & Pak, 2007; Elixhauser et al., 2024; Klein, 2023; Mäki, 2016; Weaver, 2008).
8. **Institutional structures that promote collaboration** across disciplines and/or sectors, provide stability, and allow for co-location or simple accessibility of centres or groups that engage multiple disciplines and/or sectors (Carayol & Thi, 2005; Gibson et al., 2019; McLeish & Strang, 2014; Rekers & Hansen, 2015; Sankaran et al., 2021; Vienni Baptista et al., 2019; Weaver, 2008).

Conclusion

This report has outlined and defined the differing types of working with other disciplinary and/or stakeholder groups that have been identified in the literature. Despite this range of different terms, they are often reduced or generalised to the term “interdisciplinary” when described in research and policy documents (Morris et al., 2022). A key recommendation arising from our analysis of the literature is that it is important to be aware of differences in practice and approach when discussing and describing the type of collaborative work undertaken (such as interdisciplinarity vs transdisciplinarity). Different ways of working are associated with different levels of integration of different disciplinary and stakeholder knowledge. Generalisation or inappropriate use of terms for collaborative working can have knock-on effects on intended project outcomes with regard to levels of disciplinary integration, ways of working and inclusion of different stakeholder groups.

Based on academic and grey literature, this report has sought to highlight the range of benefits, drawbacks, barriers, and drivers of different types of collaborative working. This is with the aim of providing those wishing to undertake this kind of work with a set of considerations before starting projects, and for those undertaking them with potential methods of enhancing existing collaborations. Here, we highlight a set of individual-level, interpersonal and systemic factors that can support and hinder collaborative working. Some factors may be more within a group or person’s control, such as ensuring personal openness to other disciplines, and respecting others. However, others are influenced at a more systemic level, and require change for instance among funding agencies, government entities or in society more broadly.

The research funding landscape is changing, as is evidenced by recent changes to the Research Excellence Framework (REF). A greater focus on research impact to address real-world social challenges is increasingly important in academia, and among research funders. The wicked nature of many problems facing society today, including environmental problems, cannot be addressed by single disciplines or perspectives. Promoting more research and practice across disciplinary and sectoral boundaries is more important than ever. Awareness of potential benefits, drawbacks, barriers, and drivers of different ways of collaborative working is vital in ensuring that, regardless of the specific term used to describe the activity, it is done as effectively and equitably as possible.

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