Editorial: A case for honest and purposeful interdisciplinary dialogue in research: insights from social and natural scientists' experiences

Interdisciplinary research [1] has become a buzzword in recent years. A quick search on the Web of Science platform for scholarly works mentioning inter-, trans- or multidisciplinarity [2] shows a sustained increase in the number of results in the last 24 years: it soared from 3.952 in 2000 to 63.482 in 2023. Although this exercise is far from being a meticulous research endeavour, it signals the increasing attention this kind of research has received in the last couple of decades. This makes perfect sense if we consider that many research grants have been focussing on applied research aiming at dealing with real-world problems [3]. Those problems are usually complex, thus requiring knowledge and skills that stem from more than one academic discipline (Newman, 2024; Ubanska *et al.*, 2019; Pedersen, 2016; Ledford, 2015; Rylance, 2015; Barković, 2010). A second argument in favour of interdisciplinary research is that working on the frontier of disciplines fosters innovation and "outside-the-box thinking" (Newman, 2024, p. 135; Rylance, 2015). Nevertheless, there are still many obstacles (discussed below) that make interdisciplinary research more costly for researchers willing to embark on this endeavour. Those are worth our attention if we, as an epistemic community, are willing to make interdisciplinary research the new standard.

In this editorial, we undoubtedly support that idea and discuss some of the challenges arising from this type of research in management studies. Nonetheless, since we address interdisciplinarity, scholars in other fields might find interest and inspiration in our discussion as well. The argumentation is based on team-related challenges that we have faced so far in our experience with interdisciplinary research in the context of the NRW Forschungskolleg "One Health and Urban Transformation," an interdisciplinary programme of the University of Bonn. This programme gathers scholars from different knowledge areas, converging into joint subjects and geographical areas (see Perez Arredondo, 2022). In the case of the authors: urban and peri-urban agriculture in the São Paulo Metropolitan Area. As social and natural scientists, we jointly investigated how access to public policies influences

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the health status of urban and peri-urban farmers through agricultural practices and diets – an inherently interdisciplinary research question. In the coming lines, we discuss the challenges that we have experienced using terminology, evidence and theory developed by previous research and draft some suggestions on how to deal with them.

The One Health approach and interdisciplinarity. Building on the ecosystems approach to health (e.g. Rapport *et al.*, 1999), the One Health approach relies on conceptual frameworks that integrate environmental, human and animal health in order to tackle public health challenges. It also advocates for integrative or systems-thinking, in opposition to linear thinking, in order to encompass the complexity that public health issues usually have (Zinsstag, Schelling, Wyss, & Mahamat, 2005; Zinsstag, Schelling, Waltner-Toews, & Tanner, 2011). There is no need to say that combining knowledge from different disciplines is necessary if one intends to embrace such a systemic framework. Nonetheless, it is often easier said than done.

The challenges of doing interdisciplinary research. In their critical literature review, Aboelela and colleagues most often found mentions of team factors, such as trust, leadership and communication, as success factors for interdisciplinary work (61,9% of the 42 analysed papers), ahead of environmental and institutional factors, such as an explicit institutional commitment to interdisciplinarity and sufficient resources (54,8%), and individual characteristics of team members, such as commitment, flexibility and being agreeable to work with (19,0%) (Aboelela *et al.*, 2007, p. 336).

Team-related obstacles are also the most remarkable ones we have faced throughout our daily work for the last three years doing research together. *The first* and perhaps more obvious factor regards communication: ***language***. Each field of knowledge has its own dialect. The existence of technical vocabulary is, of course, useful. It facilitates faster communication between people who speak that dialect. However, it is usually unintelligible to non-speakers. Hence, discussing research with fellow researchers coming from other fields does require extra effort that can be worthy. With time, team members learn from each other and develop a common vocabulary, composed of technical terms from the different disciplines.

In addition to the aforementioned *disciplinary* languages, research involving more than one ethnic group, culture, country, etc. also welcomes other kinds of multilingualism. Being able to communicate in more than one language, dialect or regional accent – whether it's the native language of other team members or the language spoken where the research is taking place – is often a welcome skill. It has the potential to increase the trustworthiness of the research, immerse the researcher in the participants' realities, enable communication with a wider range of people, foster cross-cultural understanding, aid in the decolonisation of research and/or establish a more nuanced perspective on the research topic and participants [4].

A second obstacle hindering interdisciplinary dialogue concerns a deeper level of communication: ***diverging epistemological paradigms***. Simply put, a paradigm is "a set of basic beliefs" that constitutes one's worldview (Guba & Lincoln, 1994): What is the nature and form of reality? Is there a "real world" to be apprehended through research? What is the relationship between the person who knows and the knowledge itself, the researcher and their (object of) inquiry?

Traditions stemming from the natural sciences usually adopt post-positivist or objectivist paradigms. In broad terms, people under this paradigm believe that there is a reality (a concrete process or structure) to be unveiled through scientific inquiry. We might never be able to fully know it, but we can imperfectly and probabilistically apprehend it. In practical terms, this entails methodological approaches such as experiments, statistical techniques and hypothesis testing. Qualitative work within this paradigm is also possible, such as

ethnography, grounded theory, action research and case studies (e.g. Eisenhardt & Graebner, 2007; Eisenhardt, 1989; Yin, 2009).

Meanwhile, in the social sciences, a broader range of paradigms are also possible in addition to the aforementioned objectivism: constructivism, subjectivism and inter-subjectivism (Cunliffe, 2011; Aboelela *et al.*, 2007; Guba & Lincoln, 1994). Under those other paradigms, reality is not a concrete given but relational, embedded in social relations and situated in time and place; or socially constructed, sometimes contested; or symbolic, linguistic, discursive or contextual – just to mention some of the examples given by Cunliffe (2011). Therefore, methodologies range from narrative ethnography, reflexive autoethnography, semiotics, hermeneutics, discourse analysis, participatory inquiry, action research to dramaturgy and poetry. The list goes on. Some methods do overlap with objectivist research methods. For instance, action research, case studies, and ethnographies can be conducted under different paradigmatic views. However, the way they are conducted within each research paradigm differs.

Paradigmatic alignment eases communication. The terms are more similar and the methods closer. Thus, objectivist social scientists might have an easier time working with fellow natural scientists. This doesn't mean the others should give up on the quest. However, trans-paradigmatic research teams should take special care to avoid unspoken assumptions. When the assumptions are clear to everybody, the unfolding methodological decisions are also better understood, leading to a potentially deeper interdisciplinary dialogue in all phases of the research, from framing compatible research questions to discussing results. It is also helpful to team up with researchers coming from paradigms with which you are willing to dialogue, even if they are different from your own. If researchers in the same team do not give credibility to each other's paradigms, working together can get unbearable (e.g. a biologist who doesn't believe that power relations matter for shaping reality(ies) working with a social scientist who heavily relies on critical theory in her/his work or a social scientist who doesn't value research-seeking patterns or generalisation teaming up with a mainstream epidemiologist). In addition, having some general knowledge about other existing paradigms can come in handy for any researcher willing to get involved in interdisciplinary projects. Social scientists are *often* trained in statistics and have some knowledge on objectivist approaches because it is the science mainstream. The other way around is unfortunately usually not true – which might be a good takeaway for interdisciplinary graduate and undergraduate programmes training novice natural scientists.

This broader understanding of other disciplines is essential for grasping the nature of the work within each science: the daily work specificities, the research pace and step-by-step. Social sciences usually require a longer review of previous theory in addition to up-to-date empirical knowledge on the subject of interest. Thus, longer preparation time before data collection is not uncommon. Natural sciences research, in contrast, may require more time after data collection, for instance, to prepare and treat samples before extracting or systematising the data to be analysed. This should also be taken into account when designing interdisciplinary projects, so that the timeline does not jeopardise the work of a particular researcher or research area within a project.

Thirdly, cooperation between natural and social science researchers should take into account the symbolic ***power imbalance*** between the so-called "hard" and "soft" sciences. Although the connotations of the nicknames "soft" and "hard" are self-explanatory, it doesn't hurt to explicitly state that scientific legitimacy is more often associated with or attributed to the natural sciences (e.g. Hedges, 1987; Storer, 1967). This has consequences in terms of interdisciplinary collaboration. Disciplines can be seen as cultures, within which scholars share a set of core values. Groups of scholars, as well as any other social group, present intergroup bias, i.e. a tendency to favour ingroups rather than outgroups (Urbanska, Huet, & Guimond, 2019). However, empirical studies

available so far have shown that there is an asymmetry in this favouring, to the detriment of social scientists (Urbanska *et al.*, 2019; Kirby, Jaimes, Lorenz-Reaves, & Libarkin, 2019). "Hard" scientists more often don't acknowledge the potential contribution of social scientists than the other way around. The authors found that this tendency decreases for researchers who have already engaged in interdisciplinary collaboration (Urbanska *et al.*, 2019). Hence, a solution for this symbolic power imbalance based on this empirical evidence would be increased interdisciplinary collaboration, fostering a virtuous cycle. Composing research teams can even or accentuate those asymmetries. We notice that composing teams with a disparate number of researchers per field accentuates power imbalance. Of course, other factors such as institutional hierarchies, leadership profiles, time management in meetings and credibility and trust between fellow researchers coming from different knowledge areas also play an important role in the group dynamics.

Finally, although not as often mentioned as the previous points, ***epistemic trespassing*** is also worth some attention if one is willing to improve interdisciplinary collaborations. Despite the different formulations for epistemic trespassing, [5] we can roughly define epistemic trespassers as those who give testimony [6] or pass judgement on a subject within a knowledge field or domain in which they lack competence (Ballantyne, 2019). Epistemic trespassing is neither inherently good nor bad. Pavličić *et al.* (2023) enumerate examples of experts that were able to give remarkable insights into a field of knowledge other than their own, probably because they had a fresh view of the subject. In regard to epistemic trespassing in scientific collaboration, Gerken (2023) argues that intra-scientific testimony, i.e. testimony taken from scientists coming from a field other than one's own, is routine and essential for scientific collaboration. Also, he underscores that this kind of collaboration involves a default trust, since it would miss its point if scientists had to be constantly checking their colleagues' testimonies.

However, there are cases in which epistemic trespassing can be harmful. For instance, it can put people's lives in danger, especially in fields that require a high level of expertise or experience, such as medicine (Pavličić *et al.*, 2024). In scientific collaboration, it can be problematic because: (i) it is not always properly based (it might be the case, for instance, if a sociologist gives a testimony on trickle-down economics); (ii) recipients often regard it as an expert testimony, although the person is not actually an expert in the field about which he or she is making a statement. Thus, the testimony can be misleading (Gerken, 2023, p. 514).

Then, how to appropriately trespass? Assessing epistemic trespassing gets especially delicate in fields that are interdisciplinary by nature. Gerken (2023, p. 514) suggests that, in order to make unproblematic epistemic trespassing: (i) the recipients must be aware that the trespassing is happening and (ii) have clarity about the trespassing testimony being deference-based, i.e. based on the testimony of an actual expert in the field of knowledge in question.

Furthermore, deep knowledge of one's own subject is certainly useful for appropriate and fruitful epistemic trespassing and for identifying problematic trespassing of others as well. Particularly in the case of doctoral students, this knowledge is not always this deep yet, which makes the act of trespassing – by them or by surrounding researchers – especially misleading. It does not mean they should not be exposed to epistemic trespassing in general, but that coordinators, supervisors and doctoral students themselves should take special care when trespassing.

Wrapping up. Let's take a practical example that illustrates the overlaying of some of those aspects in a routine scenario of collaborative research: in an interdisciplinary project involving social and natural sciences, a hypothetical professor Jonas is the research coordinator responsible for the natural sciences part of the project, whilst Monica is the professor and research coordinator responsible for the social sciences part. Jonas asks for a team meeting with all the researchers from both fields. He is not trained in any kind of social science epistemology or methodology. He has rather orthodox training in biology, and his

research consists of laboratory experiments and clinical trials. Also, Jonas is the Ph.D. thesis supervisor for all the natural science researchers involved in the interdisciplinary project. In the meeting, Jonas suggests that the qualitative data collection, to be conducted only by the social scientists in the team, must be done in a shorter period than expected: 3 months instead of 6. He argues that there are new qualitative data analysis pieces of software available that can make nice word clouds very quickly. He actually saw some of the results with these beautiful clouds in a report for another project he was involved with.

This comment might seem harmless at first sight, but it can turn out to be very dangerous epistemic trespassing in the context of scientific collaboration. Jonas was the only research coordinator present in that meeting, meaning he had a certain degree of authority in relation to all other participants. The natural science researchers at the table (Jonas included) are not trained in qualitative research methods whatsoever.

It might be obvious to any social scientist trained in qualitative research that Jonas' comment is inaccurate because (i) word clouds are far from being a comprehensive result from in-depth qualitative analyses. It is one amongst many other resources for qualitative data visualisation and often not enough as the only one; (ii) the software might speed up the data analysis, but it does not help to reduce the duration of data collection. However, the inaccuracy of the suggestion is probably not so obvious to the other researchers at the meeting. By hearing this comment from their research coordinator and thesis supervisor, who is indeed an expert in their field, they are prone to take his testimony as true or reasonable, although it is not. They also have more reason to fear questioning him, considering the power dynamics in place. Hence, the social scientists at the meeting will have a harder time convincing their fellow researcher colleagues and coordinator that the suggestion does not make sense. All this could be have been avoided had Jonas acknowledged he does not have the knowledge nor the skills to cut the duration of the qualitative data collection by half, which, in an ideal scenario, as a quite strategic decision, should have been discussed in the presence of Monica, at least to even the power imbalance between research fields in that specific meeting.

Honest and purposeful interdisciplinary dialogue: take-aways for future work

The added value of interdisciplinary research is undeniable. It fosters creative solutions that were not possible within a single discipline. Access to methods from other disciplines, the development of new ones and the discovery of new fields of application for solutions play an important role. Through our collaboration, we developed a framework connecting access to public policies to the health status of participants through diets, including the quality of microbiome and presence/absence of antimicrobial resistance. Applying this framework requires a range of different methodologies: 24h-recalls and blood tests (nutrition or health sciences); microbiological testing of faeces, vegetables and water (microbiology); document analysis, survey, in-depth interviews and observation (social sciences). It was possible only due to the involvement of researchers from different disciplinary backgrounds.

However, doing interdisciplinary research can be very challenging. Based on our own experience, we argue that honest and purposeful interdisciplinary dialogue helps. By honest, we mean open to contradiction, with trust in the colleagues with whom we collaborate, especially regarding their field of expertise, respectful of other disciplinary traditions and with different paradigmatic and methodological approaches; by purposeful, we mean that research should not be interdisciplinary just because it is fashionable, but rather because the research questions really require a joint effort from different fields. Ideally, interdisciplinary dialogue should last from the writing of projects to the discussion of results and possible solutions (in the case of applied research). Building on the team-related challenges we have previously discussed, we summarise key recommendations that should be taken into account in order to accomplish that.

(1) Acknowledge what you don't know what escapes your expertise. Mastering the fundamental knowledge of your discipline eases the recognition of the lack of knowledge of another's discipline, which is vital for critical and respectful collaboration.

(2) Be clear when communicating ideas (testimonies) from other fields of knowledge, and be sure you are stating where those testimonies come from. This enables thoughtful and unproblematic epistemic trespassing and fosters innovative solutions.

(3) Respect and trust the expertise of the non-disciplinary colleagues. It is the basis for fruitful exchange. If this is missing, cooperation should be questioned.

(4) After acknowledging the unknown and choosing colleagues you trust, be open to learning others' language(s). If possible, dive deep into others' paradigmatic premises and methodological traditions. Your non-disciplinary colleague(s) will be your (and you will be their) teacher(s) in this journey, in which contradiction should be welcome.

(5) Be aware of existent power imbalances and take the possible measures to even them.

This commentary does not aim to be a comprehensive review of team-related obstacles to disciplinary research, but to present some of the main challenges we have faced and into which we have been putting some thought for the last couple of years. This has been a meaningful exercise for us authors because we believe and have already begun to witness the power of interdisciplinary dialogue for tackling practical problems through our work as we start to discuss research results with each other, other colleagues, research participants and other stakeholders. We hope the recommendations we drew from our experience help illuminate our and others' future interdisciplinary research endeavours.

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Notes

1. For the sake of clarity, we are taking Urbanska *et al.* (2019) definition of interdisciplinary research: "any research involving two or more individuals from different disciplinary perspectives with the goal of producing new knowledge (...)" (p. 2).
2. (i) Multidisciplinarity contrasts disciplinary perspectives in an additive manner, meaning disciplines provide their viewpoint on a problem with little interaction. (ii) Interdisciplinarity combines disciplines to a new level of integration suggesting component boundaries start to break down so that each discipline can affect the research output of the other. (iii) Transdisciplinarity occurs when discipline perspectives transcend each other to form a new holistic approach so that the outcome will be completely different from what one would expect from the addition of the parts (Huutoniemi, Klein, Bruun, & Hukkinen, 2010; Klein, 2010).
3. For instance, the United States National Institutes of Health (NIH) strategic plan for future funding prioritised interdisciplinary projects (Aboelela *et al.*, 2007, p. 330–331). The NIH Common Fund has to date a program dedicated to interdisciplinary research (National Institutes of Health, 2024); Pedersen (2016) writes about the European context and also highlights the increase of funds towards interdisciplinary research. In contrast, Bromham, Dinnage, & Hua (2016) argue that projects with a higher degree of interdisciplinarity struggle more to get funded based on the quantification of interdisciplinarity of research projects in Australia.
4. This also entails additional benefits. According to research (e.g. Comanaru and Dewaele, 2018), multilingual persons often have superior cognitive talents such as problem solving, multitasking, and memory recall.
5. See Gerken (2023) for an in-depth discussion on the different formulations.
6. "(...) [A]n assertion offered as a ground for belief or acceptance" (Gerken, 2023, p. 505).

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