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Seven questions around interdisciplinarity in energy research

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ABSTRACT

“Interdisciplinarity” is one of the most “fashionable” words to be found in contemporary energy research. The hype and the fuzziness that can characterise its use conceals a bright promise for research: the possibility of opening up new research perspectives, of finding new answers, but also of raising new questions. In this article, we explore interdisciplinarity in energy research through seven questions (corresponding to seven sections): “what does it mean?”, “why?”, “who’s involved?”, “how?”, “what?”, “what barriers?”, and “what prospects?”. In the “what does it mean?” section, we will try to illustrate the “degrees of interdisciplinarity” in energy research by means of definitions emanating from recent work. The “why” question focuses on the main benefits of interdisciplinarity, while “who’s involved?” raises the issue of “by whom and with whom”. The “how” section essentially looks at methods and frameworks. The “what” question introduces the main topics of interdisciplinary energy research, presenting the papers that make up this special issue. “What barriers?” and “what prospects?” conclude the paper with an attempt to identify the new research paths that are beginning to emerge.

1. Introduction

In the opening article of the first issue of *Energy Research and Social Sciences*, Sovacool [1] called for more interdisciplinarity and comparative approaches in energy research. It is not an exaggeration to suggest that his call marked a milestone. Of course, this was not the first call of its kind. Indeed, we are witnessing a continuous increase in both the demand for and the production of interdisciplinary work in all fields. Energy research is no exception. The pursuit of interdisciplinarity is, for example, required in calls for funding emanating from both the public and the private sectors. Studies show that the number of interdisciplinary publications, though still far from constituting a majority, is nevertheless continuously rising [2]. Public stakeholders expect research to deliver interdisciplinary empirical studies that reflect the complexity of the energy issues affecting a territory, a neighbourhood, a system. Nonetheless, the ubiquity of the word “interdisciplinary” does not mean that there is a consensus on the meaning of interdisciplinary research in energy research. As often happens with “fashionable” words when they filter into society and, more profoundly, into research, the meaning can become blurred, or the word can be used more as virtue signalling than for genuine applications.

In fact, “interdisciplinarity” is not an unambiguous term. A useful preliminary distinction in an attempt to make sense of “interdisciplinarity” is

between semantics and pragmatics, that is to say between the literal meaning of words and the uses to which words are put. When the focus is restricted to the semantics of interdisciplinarity, a number of alternative clarification strategies arise. Perhaps the most obvious is the epistemological strategy, which seeks a definition in terms of the necessary and sufficient conditions that scientific content must meet in order to qualify as interdisciplinary. This approach has the appeal of being intuitive: interdisciplinarity consists in some theoretical or methodological “bridging” between disciplines A and B that enables disciplinary “imports” and “exports”. But for all its appeal, this approach suffers from a major drawback: it presupposes that the term “scientific discipline” is exempt from the ambiguities that haunt “interdisciplinarity”, as though the theoretical and methodological contents that characterise a given discipline – and, perhaps trickier still, its boundaries – were clear and uncontroversial. Unfortunately, they are not. Without solid ground on each side, the image of interdisciplinarity as “bridging” may lose its relevance.

Circumventing some of the problems inherent in this epistemological approach, a more promising definition of “interdisciplinarity” can be attempted from a sociological point of view, on the basis of how the demarcations between disciplines are viewed, acknowledged, or understood in social terms as such. In some national contexts, there is a single official authority that decides what counts as a discipline, such as the Conseil National des Universités (CNU) in France, which recognises 52 distinct disciplines. As we shall see, not only the categorical

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distinction between inter- and monodisciplinary work but also degrees of interdisciplinarity are conceivable from this perspective.

In an attempt to make sense of “interdisciplinarity”, we made a distinction above between semantics and pragmatics, beginning with semantics. When the focus is shifted to the pragmatics of interdisciplinarity, we need to include a description of what this entails. To achieve this, we decided to approach interdisciplinarity in energy research through seven questions – “what does it mean?”, “why?”, “who’s involved?”, “how?”, “what?”, “what barriers?”, and “what prospects?” – corresponding to the seven main parts of the article. In the “what does it mean?” section, we will try to illustrate the “degrees of interdisciplinarity” in energy research on the basis of definitions emanating from recent work. The “why” question focuses on the main benefits of interdisciplinarity, while “who’s involved?” raises the issue of “by whom and with whom”. The “how” section essentially looks at methods and frameworks. The “what” question introduces the main topics of interdisciplinary energy research, presenting the papers that make up this special issue. “What barriers?”, and “what prospects?” conclude the paper. A focus on energy consumption at the scale of individual buildings is proposed to illustrate and highlight some specific issues relating to interdisciplinarity.

2. Interdisciplinary energy research – what does it mean?

In the wake of the publication of the journal *ER & SS*, which offers a discussion space that is comfortable for the humanities and social sciences but does not exclude other disciplines, a significant number of articles focusing on the (re)definition of “multidisciplinarity”, “interdisciplinarity” and “transdisciplinarity” have emerged. Other journals too are increasingly exploring this question. A global reading of the main and most recent publications leads to the conclusion that there are nuances between the definitions of the nature of interdisciplinary (energy) research. These nuances express different levels of “radicalism” in the expectations of a shift of paradigm vis-à-vis monodisciplinary research. A first, essentially “conventional” definition emphasises the collaboration between several disciplines around a common research topic. For this collaboration to be effective, appropriate frameworks need to be constructed, based on a common research agenda [3]. In most of the literature, however, there is a consensus that this type of research should rather be defined as multidisciplinary. Multidisciplinary approaches are seen to entail a collaboration between disciplines that is additive rather than integrative, focused around a single object while somehow remaining compartmentalised and juxtaposed, unable to progress to a co-construction of the research process [4]. It is this co-construction that is the basis of interdisciplinarity as defined by authors associated with the second level of “radicalism”. Combined with an attempt to integrate the perspectives of different disciplines, it manages to achieve a synthesis of knowledge to provide a holistic understanding of the problem [5,6].

This concept of a synthesis of knowledge is also present in the literature that promulgates a more “radical” definition of interdisciplinarity. In this case, however, the emphasis is placed on openness to new research perspectives [7]. An interdisciplinary study should make it possible to go further than mono- and multidisciplinary approaches. This does not mean that its results are more significant, but simply that they would not have been achievable otherwise. In his article, Sovacool makes this point when he states that “interdisciplinary research can lead to synthetic theories or conceptual frameworks that would not be possible within the confines of a single discipline” [1, p. 14]. A similar view can be found in Biggart and Lutzenhiser [8] concerning the analysis of energy-related behaviours. Going even further, other authors argue that interdisciplinarity should make it possible to generate new kinds of questions and approaches, [9], to establish a new level of discourse and integration [10] and innovative translations and hybridisations of disciplines [11,12]. It has to go through “a process of different disciplines learning from and teaching each other and

adapting standard approaches in order to form new perspectives, which requires collaborations and communication from the very beginning of the development of research ideas” [10, p. 248]. Finally, representing the final degree of radicalism, the birth of an autonomous “new discipline might be necessary, if a distinct ontological and epistemic perspective is required” [9].

As regards transdisciplinary research, one of the definitions most widely used in the literature is that of Klein [7], pursued in his most recent work [13], which describes it as joint and interdisciplinary work by researchers in close collaboration with other actors outside the research milieu (public stakeholders, professionals, ordinary citizens, etc.). The goal is to test the application of the theories and methods developed in concrete case studies founded in the real-world experience of stakeholders. In response to the paucity of results capable of being applied widely to other contexts, and in particular the poor capacity of this type of action to generate new theorisations, recent literature has proposed a broader vision of transdisciplinarity. According to Max-Neef [14], the primarily empirical nature of standard transdisciplinary action means that it can answer only the first two questions in the four-level matrix he has developed, which are “What exists?” and “What are we capable of doing?”. In order to tackle the complexity of contemporary problems, transdisciplinarity needs also to enable us to deal with the final two questions, i.e. “What is it we want to do?” and “How should we do what we want to do?”. Further, transdisciplinary research lacks a decisive element, namely the research perspective, and should include ethical and normative aspects [11]. In the research-perspective cube proposed by Spreng [15] and inspired by the Max-Neef matrix, transdisciplinary studies should be at the wedge, the top right-hand rear corner of the cube.

This rapid and obviously non-exhaustive presentation of theoretical references concerning the definition of “multidisciplinary”, “interdisciplinary” and “transdisciplinary” energy research provides a glimpse of the difficulty of conducting – but also of recognising – studies of this kind. Indeed, it is not always easy to determine whether a publication opens up new methodological perspectives, contributes to the development of new approaches or offers a theoretical perspective on empirical studies. That is why the published reviews providing analyses and statistics on the number, spatialisation, distribution, etc., of interdisciplinary publications are forced to base themselves on keyword searches. Just by way of a single example, Xu et al. [2] used “multidisciplinary”, “transdisciplinary”, “cross-disciplinary” and “interdisciplinary”, together with words related to energy, as keywords to identify interdisciplinary research. In Sovacool [1], articles were considered to be interdisciplinary if they met at least one of three criteria: they involved one author experienced in at least two conventional disciplines; or one author who held an interdisciplinary position; or at least two authors holding positions in at least two different disciplines. This method makes it possible to measure the first of two possible dimensions that, in our eyes, constitute interdisciplinarity, namely disciplinary mix (number of distinct disciplines involved) on the one hand, and direct interdisciplinarity (number of interdisciplinary journals cited) on the other. Using this technique, sets of articles or scholars could be described, for example, in a comparative space in which they display varying degrees of disciplinary mix (horizontal axis) and direct interdisciplinarity (vertical axis). By distributing the articles or scholars considered within the resulting quadrants, one could assess where they form clusters and the degree of correlation between these dimensions. An alternative, diachronic way of using the data produced by this method would be to look at the levels of interdisciplinarity manifested by a set of scholars over time on both dimensions. This inevitably produces a proxy for the real extent of interdisciplinary energy research. Reviews that have undertaken a detailed exploration of the content and methods used, by identifying precise examples of interdisciplinary energy papers, are few and far between [16]. Equally rare are original papers that have explored the differences between “multidisciplinary”, “interdisciplinary” and “transdisciplinary”. And, more

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