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The ideal form of transdisciplinary research as seen from the perspective of sustainability science, considering the future development of IATSS



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ABSTRACT

Sustainability science aims to solve pressing global challenges by integrating the natural sciences with the social sciences and the humanities. This also reflects the aims of IATSS. An interdisciplinary approach removes barriers, but a transdisciplinary approach additionally seeks to create a new, unified direction with a focus on solving problems, engaging a broad range of stakeholders outside academia. IATSS has been successful in removing barriers between specializations, but it must consider shifting from the interdisciplinary toward the transdisciplinary, and how to connect with a wider community of stakeholders.

Scientific knowledge must be combined with other knowledge systems such as traditional and local knowledge, leading to a more effective interface between science, policy and society. Advanced methods and technology must be tailored to reflect local conditions and values—each transportation society is supported not only by technology and institutions but also by culture and patterns of behavior.

Population decline and aging are among the greatest challenges facing Japan, and addressing them in the context of a transportation society will be an important issue on the agenda of IATSS. It will be critical not only to look at the physical, economic and social issues, but also to focus on people themselves. In Japan the development of renewable energy has accelerated since the Fukushima nuclear accident, but it needs to be linked to the broader rebuilding of resilient local communities. For IATSS the challenge is to consider transportation frameworks suitable for such compact cities and rural communities.

Considering the future development of IATSS, I suggest promoting strategic participation at related international events, and building institutional links with existing networks. Rather than serving as a specialist journal, *IATSS Research* should look at traffic safety in a broad sense, and discuss visions for transportation societies as well as concrete research findings.

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1. Transcending the interdisciplinary, moving toward the transdisciplinary

Over the last decade or so I have worked with research groups at Harvard and other universities as part of the global effort to create and develop the field of sustainability science [1]. A distinguishing feature of this field is its fusion of the natural sciences with the social sciences and humanities to create a new, holistic science. Another is that it seeks the means to solve pressing global challenges. I believe these aims are fundamentally the same as those of IATSS.

For many years, however, I have been disappointed by a common tendency to only make superficial or token efforts toward fusing the natural sciences, the social sciences and humanities. I have witnessed this through my own participation in interdisciplinary projects. Research projects often intend or claim to be interdisciplinary, yet turn out to consist of several groups with specialized expertise, that their team leaders are left to tie together in writing at the end. Through this experience, I have come to realize that in order to conduct truly interdisciplinary research it is not enough to simply assemble people with different fields of expertise; instead, we must nurture coordinators who possess the unique leadership skills needed to keep them working together.

The International Council for Science (ICSU) has established a review panel to evaluate its activities and to help shape its future activities. As a member of this panel, I once again face the challenge of trying to define what “interdisciplinary” means. Despite the extensive use of the word, its meaning remains somewhat elusive.

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ICSU is deeply involved with Future Earth, an ambitious new research initiative that seeks to tie together existing organizations engaged in research on the global environment, and to present a framework for further advanced research in the area. Participants in the initiative include international organizations that until now have been supported by specific scientific fields. The International Geosphere–Biosphere Program (IGBP), for example, engages in natural-science-related efforts focused on global monitoring systems, the International Program on Biodiversity Science (DIVERSITAS) focuses on biodiversity, and the International Human Dimensions Program on Global Environmental Change (IHDP) takes a social-science approach. Although these organizations have all targeted the issue of the global environment, their discussions have not been systematically organized; rather, discussions among groups of geoscientists, biologists, and social scientists have been pursued independent of one another.

To overcome this, the ICSU has taken a central role in establishing the new Future Earth initiative to integrate research for global sustainability. Now, of course, the ICSU faces the true test: whether the ambitious and much-needed initiative will fulfill its promise.

The review panel met in Singapore in October 2013. Among the interesting topics of discussion was the difference between the interdisciplinary and the transdisciplinary. The interdisciplinary is certainly preferable to the multidisciplinary, as the latter fails to transcend the barriers between disciplines. Yet the interdisciplinary merely removes barriers within the academic world. A transdisciplinary approach, however, seeks not only to transcend boundaries but also to create a fusion. That is, the walls between disciplines must be removed and a new, unified direction established with a focus on solving problems. In addition to transcending the barriers between disciplines, it also becomes important to establish connections with stakeholders outside academia, with wider society. Fig. 1, drawn by Professor Joske Bunders of VN University Amsterdam, presents an easy-to-understand summary, showing the transdisciplinary at the far end with a loose boundary separating the academic from wider society [2]. The key point here is that the participation of various non-scientist stakeholders from the non-academic environment—that is, engaging in dialogue with society—is the hallmark of transdisciplinary research. Transcending the interdisciplinary, then, means transcending the academic. I think this is the direction in which we must take scholarship.

Society must be included within the grand arena of sustainability science; it must not be shut out. Scholarship and society have to co-evolve. Scholarship must consider transdisciplinary problem solving and present a vision for an ideal society, while society should evaluate the usefulness of the vision and decide what should become of it. In this way, sustainability science will evolve into a higher-level academic system; society and scholarship will improve simultaneously. It is critical that we discover a new direction that incorporates mechanisms for such coevolution.

Issues such as nuclear power safety, for example, have previously been discussed in terms of science and technology as well as in terms of society, but now must be discussed more broadly with a focus on sustainability. The most important thing in doing so is transparency and communication, yet all too often these elements are lacking. When I was invited to give a lecture at the launch of the Nuclear Education and Research Initiative, part of The University of Tokyo's Global Centers of Excellence (COE) Program, I spoke from the perspective of sustainability science and highlighted the importance of seeking a dialogue with society. Unfortunately, the response to the nuclear power plant accident at Fukushima Daiichi clearly showed a lack of transparency and communication. In order to solve such problems and regain the trust of the international community, therefore, I worked in coordination with the Nuclear Regulation Authority of Japan to establish a global communications program at the United Nations University. On 3 February 2014 we held a symposium in Fukushima City called “Information Sharing and Communication for Recovery in Fukushima—A Human Security Approach,” with the participation of experts from Japan and overseas.

Seen from this perspective, I think IATSS has been successful in removing the barriers between specializations by having everyone work together on common projects. But have we achieved true fusion? That is, have we transcended specialization to produce results that stand on their own, or are we still at the stage of simply producing new results through cooperation between existing specialized domains? This is a matter of assessment, but with respect to the current and future direction of IATSS, I think our way forward becomes clear when we consider the challenge of shifting from the interdisciplinary toward the transdisciplinary. Certainly we already keep society in mind as we consider the relationship between society and our individual disciplines, but I think the issue of how we understand our connection to an even wider community of stakeholders is of enormous academic significance.

2. Comprehensiveness and specialization in the interdisciplinary

I believe that disciplines are important. Most IATSS members have their own discipline, but I believe there is a need to plant the seeds of a transdisciplinary approach, as a direction for IATSS to move in the future. In addition to sustainability science, another similar initiative at The University of Tokyo involves the Institute of Gerontology. When thinking about our aging society, medicine is certainly important, as is the insurance system, not to mention our views on life and death. It is important, therefore, to get the school of medicine involved, and the school of economics, and the school of humanities and sociology. An individual faced with such a challenge would consult a doctor for certain issues, an insurance agent for others, and a perhaps a priest for others, exercising overall control and maintaining balance as an individual. An individual is capable of coordinating and managing these different

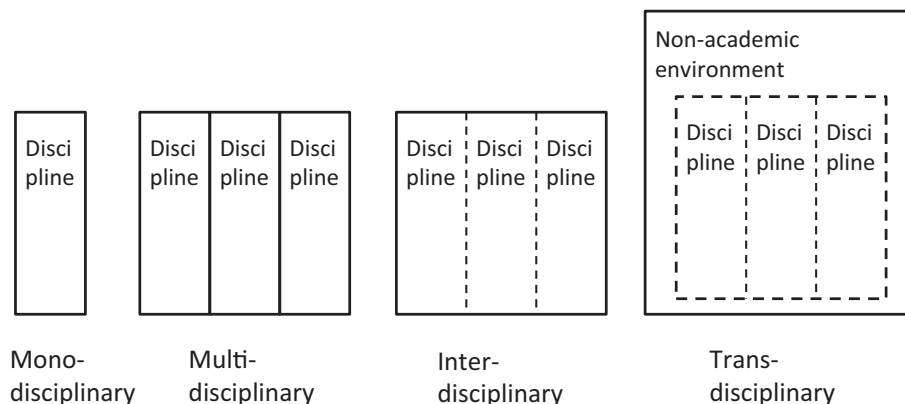


Fig. 1. What is transdisciplinarity (Bunders, 2011)?

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