

## Chapter 5

# Interdisciplinarity in Sustainability Science: Challenge or Opportunity?

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### ABSTRACT

*Over the last few decades, Sustainability Science (SS) has gained momentum and emerged in the academy with an extraordinary performance in knowledge production and contributions to the research and publications enterprise, growth in academic programs at the undergraduate and graduate levels, creation of centers/laboratories, and formation of scientific communities, networks and associations. Increasingly, terms like integration, collaboration and bridging of fields and disciplinary boundaries are in the forefront of conversations and/or debates. The key question addressed by this review essay is this: Is interdisciplinarity in Sustainability Science a challenge or opportunity for educational institutions and local communities in the 21<sup>st</sup> century? Considering the recent momentum in educational advancements and institutional progress, the study outlines relevant literature on interdisciplinarity in SS; synthesizes recent thinking and developments in SS and attempts to address what challenges and opportunities people across the globe face in sustainability education and research and in the development of academic programs and sustainable communities. When scientists, policy makers, academics get together as teams, partners and collaborators they are likely to be engaged in interdisciplinary work and possibly doing sustainability research, policy development and problem-solving to deal with the pressing demands and challenges of the 21<sup>st</sup> century society. In this context, it is urgent in science and society to seek solutions to major sustainability problems such as climate change and one way to address that is by doing interdisciplinary work in Sustainability Science.*

### INTRODUCTION

This paper focuses on interdisciplinarity in Sustainability Science (SS) and explores the phenomenal rise of academic programs on SS and their likely influence in sustainable community development. As Frodeman (2011) once wrote: ‘...the age of disciplinary knowledge may be ending, but the true shape

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of interdisciplinarity, and the essential characteristics of sustainability are as yet unknown (p. 111). With the topical currency of interdisciplinarity and SS, the key question addressed here is this: Is interdisciplinarity in Sustainability Science a challenge or opportunity for developing educational institutions and local communities in the 21<sup>st</sup> century? By contending a parallel narrative through an interpretative lens, as informed by the literature germane to interdisciplinarity and SS, this article is centered on three key aspects. *First*, it examines key perspectives on interdisciplinary thinking in current knowledge production beyond the traditional single disciplinary approach to systematic inquiry. Here, “systematic inquiry” means careful examination or investigation of a problem from a scientific, scholarly, professional or technical way to build new knowledge in a field or discipline (Wylls, 2003). *Second*, it discusses the trends in the growth of Sustainability Science in terms of academic program development in educational institutions (i.e., universities and research centers). The evolution of Sustainability Science (SS) is examined as an international science, an emerging field and vibrant forum linking disciplines across natural, physical and social sciences through the lens of academic program development in educational institutions across the globe. *Third* is to explore how interdisciplinarity in SS in a comparative context, relates to efforts toward building community sustainability. Broadly, the prospects for ‘interdisciplinarity’ are promising. As Frodeman (2011) claims, the term has become an idea embraced by almost every university’s strategic plan and seen as a boom industry with a growing academic community. It crosses and bridges disciplinary boundaries (interdisciplinarity) and makes knowledge more pertinent to non-academic actors (transdisciplinarity). Increasingly, the growing interest is on the “how” rather than the “why” of interdisciplinarity in knowledge production, not only in creating new and additional knowledge but also in finding solutions to pressing societal and environmental issues (Lele & Norgaard, 2005). When scientists get together as teams, partners and collaborators, they are engaged in interdisciplinary work and possibly doing sustainability research to deal with the changing demands and challenges faced by society in the 21<sup>st</sup> century. But first, what do we mean by ‘interdisciplinarity’?

### **WHAT IS ‘INTERDISCIPLINARITY?’**

Interdisciplinarity has, over the years, attracted scientists from the social and natural sciences to other areas of research practice. In early times, great minds during the scientific revolutions in 17<sup>th</sup> Century Europe like Isaac Newton and Robert Boyle made discoveries that dealt with every kind of interdisciplinary challenge (Merton, 1938). The principle of interdisciplinarity means an integration of theories, concepts, techniques and data from diverse bodies of knowledge (Porter et al., 2006; Rafols & Meyer, 2010). Since the 1970s, there has been an exponential growth of publications, a variety of networks and wide discussions of the concept (Klein, 1990). As Klein noted, the interdisciplinarians have yet to establish a common identity because they were still in a state of social and intellectual marginality. Interdisciplinarity is seen to challenge the academic status quo as it ‘represents an innovation in knowledge production- making knowledge more relevant, balancing incommensurable claims and perspectives, and raising questions concerning the nature and viability of expertise (Frodeman, 2010, xxix). By the 1990s, a majority of people from various fields and disciplines were immersed with interdisciplinary research. By “interdisciplinary research” means “... a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge... to solve problems whose solutions are beyond the scope of a single discipline” (NAS, 2004 p. 2).

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