

# The Integrative Nature of Geography: Bridging the Gap in the Environmental Science Curriculum

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## ABSTRACT

A firm definition of geography is often elusive and at times, the field is criticized for borrowing heavily from other disciplines. However, this article argues that the real strength of geography is its integrative nature. The purpose of this article is to discuss geography's integrative nature and how this strength can be integrated into the undergraduate environmental science curriculum. Two brief examples are provided from the author's own teaching and research experiences. Concept mapping in an introductory environmental science class allows students to visualize the complexity and integrative nature of environmental issues. In the atmospheric science classroom, students are introduced not only to the physical processes of weather hazards, but to the social dimensions as well. It is imperative that future scientists, advocates, and decision makers learn to critically integrate across disciplines to solve the world's most pressing environmental issues.

## KEYWORDS

Applied Geography, Higher Education, Interdisciplinary, Undergraduate Teaching

## INTRODUCTION

Academic disciplines are typically defined by either the objects of study (i.e. astronomy studies space) or by the methods with which topics are addressed (i.e. mathematics) (Baerwald, 2010). Geography falls into the latter category marked by a spatial inquiry and analysis approach. Geography, unlike some other disciplines that have well-established foundations and conceptual knowledge, borrows heavily from other fields. For the geographer-geomorphologist, geology provides many of the foundational concepts upon which landscapes are understood. For the geographer-climatologist, atmospheric science provides those key foundational processes. The political geographer relies on work in political science and government. Geography may be criticized for its reliance on other disciplines, but I argue here that this contains the discipline's key advantage – its interdisciplinary or integrative nature.

By suggesting geography is an integrative discipline, I am suggesting nothing novel. Geographers are well versed, both in word and in practice, the interdisciplinary nature of geography. G.K. Gilbert (1909) addressed the Association of American Geographers, discussing the value of "scientific trespass". Baerwald (2010) writes about geography's inherently interdisciplinary nature in his

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Presidential Address published in the *Annals of the Association of American Geographers*. Baerwald (2010) adds that integrating geography with concepts and skills from other relevant disciplines to address a relevant issue is “at the heart of geographic inquiry”. Furthermore, Baerwald (2010) makes mention of transdisciplinary, whereby a common interpretation or understanding of a discipline is employed. In her Presidential Address, Gober (2000) “...challenges the discipline of geography to develop new intellectual habits that are open to new opportunities in disparate parts of the discipline...” Others have also addressed GIScience as a multidisciplinary field (Blaschke & Merschdorf, 2014; Goodchild, 2004). The discipline of geography is “well-positioned” to synthesize the natural, physical, social sciences, and humanities (Gober, 2000).

The purpose of this paper is to discuss the value of geography’s interdisciplinary nature and inherent integrative strengths for incorporation into the undergraduate environmental science curriculum at higher education institutions. I share my teaching experiences as a physical geographer working in a non-geography environmental science department. I place emphasis on my own teaching and research interests in weather and climate hazards. It should be noted, however, that these fields are simply mediums to discuss the issue at hand and could very easily be interchanged with other fields. The reader is encouraged to reflect on how their own interests could facilitate integrating geography into non-geography curricula. I also note that geography here is intended to mean applied geography as discussed by Pacione (1999) with its emphasis on applying spatial knowledge and skills to solving social, economic, and environmental issues.

Never has there been a time in history when an integrative approach is more necessary to solve our most pressing environmental issues (to say nothing of the social and economic issues we face locally, nationally, and globally, like education, healthcare, and criminal justice reform). Crumbling infrastructure and poor governance leading to lead contamination in Flint, Michigan impacts some of the most vulnerable communities (Davey & Pérez-Peña, 2016). Oil pipeline construction in North Dakota and other locations pits industry and economic interests against landowners and indigenous peoples (Healy, 2016; Turkewitz, 2017). Deforestation in the Amazon (Fearnside, 2015), bleaching of coral reefs (Harvey, 2017), drought, conflict, and food production (Eklund et al., 2017; Gleick, 2014; Kelley et al., 2015) are all just a small subset of the environmental issues that we as a global society face. These issues, however, are far from one-dimensional, but instead are multi-dimensional combining earth sciences and ecology, as well as economics, law and policy, in addition to questions of culture, ethics, and our ever-evolving relationship with nature and with each other. While foundational material in any discipline will always be important and necessary in the classroom, today’s undergraduate students are tomorrow’s scientists, advocates, and decision makers. They will need to be able to critically think about these issues and integrate the disciplines to solve our most pressing issues. Geography and geographic thinking are well-suited to address the challenges of interdisciplinary critical thinking.

## **Multidisciplinary is not Interdisciplinary**

It may be easy to use the terms multidisciplinary and interdisciplinary interchangeably. However, these two terms mean different things and therefore manifest themselves differently in the environmental science curriculum. This is a key distinction. Jantsch (1972) described multidisciplinary approaches as bringing scholars together from different fields in such a way that those fields remain unchanged. Multidisciplinary is used here as including material in the curriculum from various disciplines. This may mean that students take courses in chemistry, biology, earth science, and social sciences. It may also mean that different modules in a course represent different disciplines. For instance, a course on watershed management may include a policy and law module during a particular week. However, there is no deliberate effort to engage students in thinking across these disciplines. From experience, it is often left up to the student to do this on their own.

Interdisciplinary or integrative, however, is used to mean that students are actively engaged in trying to think across these same disciplines to fully understand an environmental issue. Such an

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