EDITORIAL

The Case for Case Studies in Confronting Environmental Issues

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OVERVIEW

In its most distilled form, a "case study" involves investigation of "real-life phenomenon through detailed contextual analysis of a limited number of events or conditions, and their relationships" [1, 2]. The "case" may focus upon an individual, organization, event, or project, anchored in a specific time and place. Most cases are based on real events, or a plausible construction of events, and tell a story, often involving issues or conflicts which require resolution [3]. They also frequently include central characters and quotations and dialogue [4]. Often the objective of a case study approach is to develop a theory regarding the nature and causes of similarities between instances of a class of events [5]. More broadly, case studies seek to illustrate broader, overarching principles or theses.

In recent years, researchers have increasingly embraced the study method in recognition of the limitations of quantitative methods to provide in-depth and holistic explanations of social problems [6]. A case study, in the context of environmental issues, usually involves the focus on an actual environmental situation, commonly involving a decision, an issue, a challenge, or an opportunity faced by a group of individuals, an organization, or a society.

Case studies enjoy a natural advantage in research of an *exploratory* nature. As Yin concludes, case studies allow a researcher to "reveal the multiplicity of factors [which] have interacted to produce the unique character of the entity that is the subject of study" [7]. *Explanatory* case studies can facilitate conducting causal studies, and in extremely complex and multivariate cases, help to structure analyses that employ pattern-matching techniques [8]. *Descriptive* case studies help researchers to formulate hypotheses of cause-effect relationships from descriptive theories [8].

Case studies have been employed throughout history to facilitate the pursuit of knowledge and its dissemination. The Hippocratic Corpus in the fifth century BC employed case studies to develop insights into medicine that stimulated discoveries for centuries to come [9]. The case study approach also informed the work of Darwin, Freud, and Piaget.

The formal use of case studies in academia began at Harvard Law School at the turn of the twentieth century [10]. In recent years, empirical research has demonstrated the value of the case study method as a pedagogical tool in the classroom, with case studies employed in the humanities, social sciences, engineering, law, medicine, and business [11, 12]. Case studies have also been used by practitioners in a wide array of fields, including medicine, law, and business [13, 14, 15, 16, 17]. In environmental science and policy sectors, case studies are particularly salutary in providing practitioners with examples of best practices [18], and to assist them in developing effective recommendations and policy prescriptions [8, 19, 20].

Many learners are more inductive than deductive reasoners. Case studies can help to facilitate learning by helping them to reason from examples, analogies, and models, as well as from basic principles [21, 22, 23]. Studies surveying faculty and student learning results associated with the use of case studies demonstrate significant increases in student critical thinking skills and knowledge acquisition, as well as enhanced ability to make connections between multiple content areas and to view issues from different perspectives [24, 25, 26]. Case studies also promote active learning, which has been proven to enhance learning outcomes [21, 27, 28, 29]. Through careful examination and discussion of various cases, "students learn to identify actual

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problems, to recognize key players and their agendas, and to become aware of those aspects of the situation that contribute to the problem" [30, 31, 32]. Moreover, cases can serve as models or paradigms that facilitate understanding similar cases [33].

Additionally, case-based instructional methods usually employ empirical or realistic narratives to afford students the opportunity to integrate multiple sources of information in real-world contexts in ways that might not be captured through experimental or survey research methods [6]. Studies have indicated that this can increase student motivation to participate in class activities, promoting learning and increasing performance on assessments [34]. It also often affords students the opportunities to engage with ethical and societal issues related to their disciplines [35], as well as facilitating interdisciplinary learning [34]. The fostering of effective integrative learning experiences in the classroom was identified as one of the four essential learning outcomes in the *Learning for the New Global Century* report of the Association of American Colleges and Universities [36].

Case studies have proven to be a valuable component of teaching environmental studies and science by fostering critical transdisciplinary perspectives conductive to addressing environmental issues [37], as contributing to efforts to "flip the curriculum" in an effort to foster engaged learning in environmental studies and science courses [38]. Case studies are also a valuable tool for environmental practitioners. They can provide guidelines for best practices [15, 39], as well as lessons learned by others in any given professional sector, including in the environmental arena [40, 41]. The case study method has proven to be an effective tool to assist environmental professional in developing effective recommendations and policy prescriptions [19, 20]. Also pertinent to the environmental sector, case study research can also help to identify relevant variables to facilitate subsequent statistical research [42]. Moreover, case studies can be employed in organizations for training purposes to foster problem-based learning and the ability to formulate solutions [43].

THE BENEFITS OF AN ONLINE JOURNAL FOCUSED ON ENVIRONMENTAL CASE STUDIES

Most instructors and environmental professionals that have utilized case studies in the classroom, or in their work, have found them to be a valuable tool [6]. However, within the classroom environment one of the main obstacles to using case-based instructional method is lack of preparation time, with most instructors currently preparing their own case studies [35]. The imposing nature of case study construction, as well as the imposing cost of developing cases internally [38], ensures that many instructors eschew this teaching method.

Moreover, there is imposing challenge of developing effective discussion questions to scaffold case-based learning exercises [4, 44]. Case studies also are often not subjected to sufficient academic rigor, undermining their effectiveness and credibility [45, 46]. Finally, many instructors are intimidated by the challenge of student evaluation when case studies are incorporated into the educational process [47].

Case Studies in the Environment hopes to address all of these challenges. It will seek to develop a substantial compendium of case studies in the following categories in field of environmental science and studies:

- Ecology and Biodiversity Conservation
- Climate Change Mitigation and Adaptation
- Environmental Law, Policy and Management
- Energy and the Environment
- Water Management, Science and Technology
- Sustainability

Each case study will be 1,500–3,000 words, and will be subject to peer-review by experts in the field of both environmental studies and science and case studies. Moreover, each case study will be accompanied by a set of suggested discussion questions to help scaffold their use in the classroom,[1] as well as a set of Power Point slides for lectures or presentations in professional environments. It is our hope to ultimately develop a community of academics and practitioners around case studies through workshops, conference panels and online interaction.

1. Teaching notes can help facilitate the effective use of case studies in the classroom, or in the professional sector in several ways, including helping the user to "explore possible angles they might have missed," and derive insights into how the case study was used in the past and what pitfalls the user may face [48]. Knowing the "right questions" to ask students is particularly critical; thus, having accompanying discussion questions to a case can greatly assist instructors in ensuring optimal use of case studies in the classroom [49].

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