Chapter 16
Systems Thinking about Severe Storms in Social Studies Education

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ABSTRACT

Systems thinking provides a powerful cognitive and pedagogical tool for considering problems related to sustainability. This chapter pays particular attention to critical conceptual aspects of systems thinking as manifest in the use of a curriculum guide addressing Hurricane Katrina called Teaching the Levees: A Curriculum for Democratic Dialogue and Civic Engagement. The three educators in this study used the Teaching the Levees curriculum guide in order to focus on a specific disciplinary aspect of social studies education. The educators also integrated a variety of social, ecological, economic, and political issues in their lessons. The inclusion of these disciplines supports the perspective that the educators were engaged in systems thinking, particularly in how they conceived of the patterns in which events emerged, the interconnectedness of discrete elements, and the impact of feedback loops within the system. The chapter also addresses ramifications of systems thinking within social studies education.

INTRODUCTION

The increasing severity of hurricanes brings forward numerous challenges for U.S. communities that ought to be addressed in social studies classrooms where discussion of social issues is a priority (Crocco & Chandler, 2010). Social studies, as an inter-disciplinary K-12 school subject, emphasizes citizenship education and civic decision-making. Although the constituent disciplines comprising social studies (generally seen as history, geography, economics and political science) have addressed environmental problems for many years, the current focus should be expanded to include contemporary events (Cole, 2007). Never before have such issues been as urgent as they are today. Greenhouse gas emissions are rising and the impact of severe storms is becoming more regularly and widely felt (Hansen, Kharecha & Sato, 2013; Emanuel, & Rotunno, 2011; Emanuel, 2005). As noted by the 2010 U.S. census, more than 88 million US residents live in coastal areas that are likely to be negatively impacted by the severity of superstorms similar to Hurricanes Katrina and Sandy in future years (Izzo, 2012).

Increasingly, sustainability has become an avenue into discussions about extreme storms within social studies classrooms (Cloud, 2003). Sustainability is an arena of inquiry, discourse, and action aimed at considering issues at the intersection of the social, ecological, economic, and political realms. The ability to think systemically relies upon holistic consideration of the dynamic processes, functions, and feedback loops that characterize the operations of complex systems (Cole, 2007). To date, however, this dimension of sustainability education within social studies has been underdeveloped (Crocco, Marri & Chandler, 2013). In this chapter, we offer a case study of the application of systems thinking to a prominent topic of sustainability education, that is, teaching about Hurricane Katrina and its aftermath in the Gulf Coast area of the United States.

Sea level rise due to climate change, overdevelopment of low lying urban areas, and race- and class-based inequalities in access to adequate housing, resources, and medical services have put coastal communities and their most vulnerable populations at great hazard from increasingly potent storms (Cutter & Emrich, 2006). Likewise, the recovery from such disasters is most difficult for the poorest families, who suffer from loss of income, a higher-than-normal rate of chronic diseases like hypertension and an exponential rise in mental health problems, particularly among children, for years afterwards.

More than a year after Hurricane Katrina, for instance, a third of working class families earning less than $20,000 before the storm did not regain their previous income level, and instead became dependent on public assistance (Redlener, 2006). Consideration of such problems, especially as they manifest themselves under the umbrella of sustainability education, requires an emphasis on how we view the interconnectedness of our society, how we critically assess the elements that, taken together, become human and ecological disasters related to climate change, and how we determine what actions need to be taken to ensure a sustainable present and future world (Selby, 2007). In short, we need to teach about such problems holistically, considering the elements of severe storms as part of a dynamic, interconnected, and complex system in which several elements have repercussions for the other elements (Meadows, 2008).

Systems thinking, which has been developed over the last several decades within the disciplines of science, engineering, business, geography, medicine, and education, provides a powerful analytical tool for considering problems related to sustainability (Dillard, Dujon & Kin, 2009). This case study pays particular attention to critical conceptual aspects of systems thinking: the social, ecological, economic, and political aspects of a disaster as manifest in the use of a curriculum addressing Hurricane Katrina called *Teaching The Levees: A Curriculum for Democratic Dialogue and Civic Engagement.*

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