

Chapter 15

Using Digital Tools for Studying About and Addressing Climate Change

Richard W. Beach

University of Minnesota, USA

Blaine E. Smith

University of Arizona, USA

ABSTRACT

Grounded in research-based examples, this chapter provides a resource for students, teachers, and researchers to critically engage with issues of climate change through leveraging the affordances of digital tools. In particular, the authors discuss the affordances and challenges of students using digital tools to address climate change. They also review research in this field, including studies on visualizations, analyzing information, social media, digital videos, digital role-play, video games, and virtual and augmented reality. The chapter describes how digital tools offer meaning-making possibilities for students to propose solutions to climate change through engaging multimodal narratives, as well as share their voices through digital activism. Considering that global climate change is perhaps the most serious problem human beings have ever faced, this chapter offers implications for curriculum and instruction to aid educators with designing digital projects for students to understand climate change and find ways to take a stand.

INTRODUCTION

Climate change has emerged as the most pressing global challenge facing humanity as the effects of climate change associated with extreme weather events, flooding from sea rise/Arctic melts, droughts, fires, and increased temperatures impact people's daily lives. In 2013, 56% of people in 23 countries indicated that climate change was a major threat to their country; that percentage increased to 67% in 2018 (Poushter & Huang, 2019).

DOI: 10.4018/978-1-7998-0246-4.ch015

In this chapter, the authors examine research on how young people are not only learning about climate change through digital media, but also how they are using digital media to convey their perceptions and inform audiences of the need for action to address climate change through interdisciplinary approaches that combine environmental science with humanities and the arts.

Framing climate change as a “wicked problem” (Lehtonen, Salonen, Cantell, & Riuttanen, 2018; Sun & Yang, 2016) implies the need to transcend traditional disciplinary boundaries and dichotomies through meshing scientific and humanities/arts-based inquiry. As suggested by Activity Theory of Learning (Engeström, 2009), critical understanding of how different systems impact climate change requires application of different perspectives related to large objects or motives driving these systems (Jacobson et al., 2017).

Two key factors in fostering awareness of climate change are level of education and access to communication. Analysis of survey data from 119 countries from the Gallup World Poll conducted in 2007 and 2008, related to factors associated with awareness of climate change, found that educational attainment was the single strongest predictor of climate change awareness, followed by beliefs that climate change is caused by human actions, were significant factors related to awareness (Lee et al., 2015). Within the United States, the level of civic engagement and access to communication about climate change were significant factors. These findings suggest the importance of education and communication access for enhancing climate change awareness.

Use of digital tools allows students to understand and communicate perceptions of the causes of climate change as shaped by economic and energy systems through reduction in reliance on fossil fuels, as well as changes in the systems of agriculture, dying coral reefs, energy production, transportation, and water/forest management related to political/community actions. Through effective digital communication, the authors present possibilities for students to engage their audiences associated with compelling visualizations, framing of issues, and identifying potential audiences (Ballantyne, 2016; Rooney-Varga, Brisk, Adams, Shulman, & Rath, 2014; Wibeck, 2014).

For this research review on the use of digital tools for understanding and addressing climate change, the authors drew on other’s research as well as their own research (Beach & O’Brien, 2014; Beach, Share, & Webb, 2017; Castek & Beach, 2013; Castek, Beach, Cotanch, & Scott, 2014; Jiang, Shen, & Smith, 2019; Jiang, Smith, & Shen, 2019; Smith & Shen, 2017; Smith, Shen, & Jiang, 2019) including links to resource websites (goo.gl/4dgv23) for *Teaching Climate Change to Adolescents: Reading, Writing, and Making a Difference* (Beach, Share, & Webb, 2017).

BACKGROUND

Use of Affordances of Digital Tools to Address Climate Change

Use of digital media tools involve different affordances—defined as those features of digital media that serves to engage students in learning about climate change. These affordances include multimodality—the use of different modes/formats, hyperlinking—connecting within and across other media, and interactivity—engaging students in sharing, remixing, and collaborative participation (Beach & O’Brien, 2015), as well as the affordances of persistence, visibility, spreadability, and searchability (Boyd, 2014).

By focusing on these affordances of digital tools, teachers are considering how tools can be used to achieve their own learning objectives based on their perceptions of the affordances of those tools.

23 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/using-digital-tools-for-studying-about-and-addressing-climate-change/238436

Related Content

Collaborative Writing in Composition: Enabling Revision and Interaction Through Online Technologies

Christopher R. Friend (2013). *International Journal of Online Pedagogy and Course Design* (pp. 1-17).
www.irma-international.org/article/collaborative-writing-in-composition/78908

Achievement Emotions in Paper-Based Exams vs. Computer-Based Exams: The Case of a Private Saudi University

Reem AlSufayanand Dina Abdel Salam El-Dakhs (2023). *International Journal of Online Pedagogy and Course Design* (pp. 1-21).
www.irma-international.org/article/achievement-emotions-in-paper-based-exams-vs-computer-based-exams/322084

Combating the “Gimme More” Mindset in Modern Classrooms: Citizenship Education vs. Entitlement

Marian Evelyn Irwin (2016). *Handbook of Research on Applied Learning Theory and Design in Modern Education* (pp. 734-746).
www.irma-international.org/chapter/combating-the-gimme-more-mindset-in-modern-classrooms/140775

From Educational Innovation to Educational Design

Mohamed Khaldi (2024). *Innovative Instructional Design Methods and Tools for Improved Teaching* (pp. 36-59).
www.irma-international.org/chapter/from-educational-innovation-to-educational-design/339504

Evaluating the Accessibility of Online University Education

Mark O. Pendergast (2017). *International Journal of Online Pedagogy and Course Design* (pp. 1-14).
www.irma-international.org/article/evaluating-the-accessibility-of-online-university-education/164970