

Fostering Student Activism About the Climate Crisis Through Digital Multimodal Narratives

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Abstract: A challenge with engaging students in taking action to address the climate crisis is that they may assume that they have little or no agency related to having an impact on audiences or policymakers. In this report, we describe students' use of videos and digital storytelling as multimodal tools for communicating the need to address the climate crisis with different audiences. We discuss the importance of narratives in digital storytelling as a means to foster student engagement with issues of sustainability, as well as provide an overview of different types of digital multimodal productions students can create to promote a sense of agency. Next, we describe one program in-depth (Project IF) and explain how the similar use of digital tools promotes creative problem solving and leveraging media to explore climate issues. We conclude with a discussion of the critical media literacy practices associated with the effective use of digital tools for addressing the climate crisis.

Keywords: multimodality, adolescent literacies, digital literacies, climate crisis, narrative

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Introduction

A challenge with engaging students in taking action to address the climate crisis is that they may assume they have little or no agency in terms of having an impact on audiences or policymakers. However, through active participation in creating digital multimodal productions (e.g., videos or digital stories) for real-life audiences, students can acquire a sense of agency associated with the belief that they can serve as change agents regarding their future life on the planet.

This report describes students' use of videos and digital storytelling as multimodal tools for encouraging audiences to take action to combat the climate crisis. First, we posit that narratives are an important means of fostering engagement with issues of sustainability. We then provide an overview of different types of digital multimodal productions that students can create about the climate crisis to promote a sense of agency among viewers. Next, we describe one program in-depth with adolescents in Miami, Florida—Project Imagine the Future (Project IF)—and explain how the similar use of digital tools promotes climate crisis education, including a) problem solving through multimodal narratives, b) multiple modes to explore climate issues, and c) reaching diverse audiences through their digital productions. Lastly, we conclude by discussing the critical media literacy practices associated with effective use of digital tools for addressing the climate crisis.

Narratives in Digital Storytelling for Framing the Climate Crisis

In this report, we employ the term “climate crisis,” rather than “climate change,” given the need for urgent action to transform status-quo energy production, economic, transportation, and agriculture systems that preserve reliance on carbon-production damaging the planet. This change is inspired by not only scientific knowledge about the climate crisis but also the moral need to enact change in these status-quo systems. As was the case with the civil rights movement, fostering change in these systems requires a social and political movement inspired by people pushing for change. In generating digital stories about the climate crisis, students are creating narratives that portray people coping with the effects of the climate crisis as a moral challenge related to whether humans can survive on a warming planet (Arnold, 2018; Moezzi et al., 2017). Students can also employ digital tools to understand and portray how ecosystems are evolving due to the climate crisis. For example, the EcoMUVE curriculum project (<http://t.ly/b1D7G>) developed at the Harvard Graduate School of Education employs Multi-User Virtual Environments (MUVEs) as virtual worlds for engaging students in ecosystems such as ponds and forests to study changes in those systems, including how species in a forest have changed over time (Dede et al., in press) (For a video: <http://t.ly/Avm2G>).

Narratives themselves revolve around portrayals of “eventness” (Bakhtin, 1981), which is the unusual or extraordinary deviation from norms of what was a healthy planet now being threatened by effects of the climate crisis. Narratives about the climate crisis dramatize this “eventness” (Bakhtin, 1981) through portrayals of people and characters coping with increasing

temperatures, wildfires, sea-level rise, flooding, droughts, famines, health effects, etc. (Beach, Share, & Webb, 2017; 2019/2020). In one study, viewers of narratives about the climate crisis on the National Geographic Channel's "Years of Living Dangerously" show found that viewers reported high scores on emotional involvement, 90% learned something new about the climate crisis, 75% gained a realization about the relevancy of the climate crisis to their lives, and 50% took action to address the climate crisis (Khalamayzer, 2016).

We posit the value of the use of multimodal, digital narratives for engaging audiences through visual images, animation, video, and audio as "transmedia storytelling" (Jenkins et al., 2013) portraying the climate crisis effects in ways that enhance audiences engagements with these narratives.

"Transmedia storytelling" involves several different media literacy practices (Jenkins et al., 2013). For example, The Extreme Ice Survey (EIS) project (<http://extremeicesurvey.org/about-eis/>) involves video recordings of ice melt in 18 different glacier sites throughout the world, a project that included the production of James Balog's documentary, Chasing Ice (<https://chasingice.com/>) (Balog, 2013). Balog created a TED Talk video (<https://tinyurl.com/y4nbcbbk>) based on his images of melting glaciers that function as visual narratives that portray changes over time about the loss of ice resulting in sea-level rise.

This use of time-lapse photography represents the media literacy practice of "Immersion" (Jenkins et al., 2013) that invites audiences to experience these visual narratives in ways that foster audience's engagement in the need to understand how the planet is changing over time as itself an unfolding narrative. The fact the audiences may equate the loss of ice leading to sea rise in their local sea coast communities means that they are more likely to experience "Immersion" in response to multimodal narratives that portray negative environmental impacts on their own local region or community (Moekle, 2020). Students in Linda Buturian's (2016) courses at the University of Minnesota create digital stories about local environmental issues, for example, impacts on local rivers and lakes in ways that enhance "Immersion" given potential audience engagement with these effects (for a video about her digital storytelling instruction <https://tinyurl.com/wqmgz9j>).

The media literacy practice of "Performance" (Jenkins et al., 2013) relates to how digital media producers use specific production techniques in creating multimodal narratives, for example, use of video close-ups or editing, to enact rhetorical relations for engaging their audiences to achieve uptake related to the need for action. For example, Balog's editing or commentary for his documentary serves to convey the larger point for his audience about how glacier melting reflects the climate crisis effects.

"Spreadability" (Jenkins et al., 2013) involves how audiences can readily share and disseminate multimodal digital texts to other audiences to enhance audience uptake, leading to changes in audiences' perspectives and attitudes about the need to address the climate crisis. Balog's creation of a TED Talk video enhanced its audience "spreadability" resulting in the fact that the video, as of 2020, has had over a million views.

To effectively employ these different digital media practices in creating multimodal, digital narratives, students need to consider the extent to which their digital narratives foster "Immersion" related how their narratives will engage their audiences; "Performance" related to their effective use of production techniques to engage those audiences; and "Spreadability"—the

extent to which their narrative will be disseminated to audiences beyond the classroom.

Students' Digital Multimodal Production Projects on The Climate Crisis

A growing number of projects focus on youth effectively creating digital multimodal narratives given how the production of multimodal narratives can impact youth's beliefs on the importance and urgency of addressing the climate crisis (Beach & Smith, 2020). Students' engagement in multimodal digital productions serves to enhance their sense of agency and activism as evident in the Climate Education in an Age of Media (CAM) project (tinyw.in/wGTA) in which students created short PSA videos (tinyw.in/Jdb0) about the climate crisis (Rooney-Varga et al., 2014). Through participation in this project, students not only increased their knowledge about and interest in addressing the climate crisis, but also 68% of students indicated that creating and sharing their videos enhanced their sense of agency to take action. Similarly, a study of students in grades 4-7 in a school in Athens, Greece, found that through creating stories as digital comics, students changed their stances from initially believing that the climate crisis could not be reversed to then believing that it could be addressed through needed actions (Theodorou et al., 2018). Students at Bates College generated an archive of digital stories portraying impacts of the climate crisis on rural Maine in ways that resulted in students noted how they acquired new understandings about the effects of the climate crisis on agriculture (Rush, 2018).

Along with changes related to attitudes and agency, research demonstrates how creating digital stories serves to enhance students' sense of confidence and their willingness to address the climate crisis (Smeda, Dakich, & Sharda, 2014). Analysis of students' creation of digital stories in an Australian school through the use of Moviemaker software and voice recordings found that students were highly engaged through working collaboratively with peers as well as the fact that students from diverse, multilingual backgrounds were more comfortable communicating primarily through a visual medium.

Approaches for Creating Digital Stories about The Climate Crisis

Digital storytelling about the climate crisis, the primary focus of this report, involves students creating multimodal, digital stories portraying people describing or explaining the effects of the climate crisis through the use of the previously mentioned media literacy practices (Jenkins et al., 2013) For creating digital stories, students need to consider the need to be strategic in appealing to their audience, employing digital technical skills, and creating meaningful content as important on criteria in producing digital stories (Digital Storytelling for Social Impact Project; <https://tinyurl.com/yyk8t78c>) (Rockefeller Foundation, 2014). Additionally, a survey of 3,000 participates as part of the Climate Visuals project (<https://climatevisuals.org/>), found that audiences valued productions that portrayed "real people" coping with local, specific effects of the climate crisis.

To prepare students for creating digital stories about the climate crisis, students benefit from reading examples of "cli-fi" literature (tinyw.in/b3JK) as novels and short stories portraying the effects of climate change on characters' lives (Beach, Share, & Webb, 2019/2020). Students could also select literary texts specific to their own regions or communities (ourclimateourfuture.org/map), as well as story maps (storymaps.arcgis.com) to gain an

understanding of how narratives portray current and future the climate crisis effects in their particular regions or communities. Teachers and students could also access resources about digital storytelling in general from the Center for Digital Storytelling (www.storycenter.org), The Center for Story-based Strategy (www.storybasedstrategy.org), and The Educational Uses of Digital Storytelling (digitalstorytelling.coe.uh.edu).

Digital Storytelling for Addressing Issues of the Climate Crisis: Project Imagine the Future

One example of digital storytelling project that involved students in addressing issues of the climate crisis is the Project Imagine the Future (Project IF) designed to support young adolescent students (grades 5–8) in developing disciplinary expertise and identities while working with peers to create multimodal sci-fi narratives (Smith & Shen, 2017). Through a design-based research approach, Project IF (led by Ji Shen and Blaine Smith) has involved multiple iterations as both an after-school program and an elective course for culturally and linguistically diverse students. The culminating product for Project IF is a sci-fi narrative constructed through multiple modes (text, visuals, sound, and animation) and digital formats (e.g., hyperlinked text, Scratch animations, Pixton comics, infographics, and interactive flipbook). Centered around the concept of “eventness” (Bakhtin, 1981), the project challenges students to choose a relevant environmental issue to explore (e.g., the climate crisis) and suggest solutions through their creative narrative.

During the program, Project IF students participate in a scaffolded workshop sequence to support their process (Smith & Shen, 2017). First, they learn more about environmental issues through a variety of sessions, including web-based science units, hands-on activities (e.g., design a “cool” house using paper and cardboard), and field trips (e.g., university science labs and botanical garden). Second, students read and analyze examples of science fiction to understand the genre and gain inspiration for their narratives. Third, students participate in a variety of sessions where they learn from “experts”—ranging from practicing scientists (e.g., marine biologists, geophysicists, and medical scientists) to sci-fi authors and filmmakers. Fourth, many sessions include a short tech tutorial where students learn how to use digital tools and programs, including an online comic creator (Pixton), video editing software (e.g., MovieMaker or iMovie), Scratch for creating animations and games, and iKOS for collaboratively composing online.

Students also develop individualized roles within their collaborative teams to complete their multimodal sci-fi narratives (Jiang, Shen, & Smith, 2019). On the first day of workshops, three main roles are presented for students to potentially embody: The *scientist* contributes by researching and integrating relevant scientific content into the project; the *writer* develops the narrative; and the *designer* creates the multimedia that drives and enhances the story. After reflecting on the roles, students form groups ranging from three to five members and select roles that highlight their interests, skills, and past experiences.

In the following section, we present examples of the three main ways students participating in Project IF engaged with issues of the climate crisis through their collaborative multimodal projects. We expand on these examples to describe the affordances of media making digital tools for youth developing agency and engaging with issues of the climate crisis in unique and creative ways.

Problem-Solving Climate Issues through Narratives

The multimodal sci-fi narratives offered students creative freedom for exploring climate issues and offering unique solutions. Situated in Miami, Florida, many students participating in Project IF chose locally relevant climate issues to tackle in their sci-fi narratives, ranging from global warming, sea-rise, flooding, to superstorms that have impacted their local community. As such, these narratives may enhance the “immersion” (Jenkins et al., 2013) experience of the anticipated audiences. Each group found creative and individualized ways to engage with their issue through narrative, including integrating their interests, popular culture (e.g., movies, video games, anime), and aspects of their own identities. For example, one group entitled their story, “The Squad,” which involved each of the five group members assuming certain superpowers to fight the climate crisis. In narratives like these, students integrated scientific information they learned during the composing process with elements of fantasy.

This type of multimodal composition offered students unique and individualized opportunities for leveraging their interests when interweaving science concepts into their narratives as well as demonstrating creative solutions for climate issues. For example, one group integrated a plot element where the protagonist designed a machine that could generate oxygen to combat increased carbon dioxide from burning fossil fuels. Students’ solutions were not always realistic (e.g., using telekinisis to stop a tsunami), but the sci-fi narrative genre provided the freedom to investigate climate issues, stretch their imaginations, and take risks to propose solutions.

Using Multiple Modes to Explore Climate Issues

Along with offering openness to explore issues through the genre of science fiction, students leveraged multiple modes (e.g., visuals, sounds, text, animation) in creative ways and applied techniques to enhance the “performance” (Jenkins et al., 2013) of their narratives (Figure 1). Almost all students incorporated digital comics created with Pixton to develop characters and illustrate important scenes in their projects. Many students included photographs or embedded videos that connected to science concepts (e.g., showing research evidence on how deforestation has an impact on human health) or elaborated on the action in their narratives. Some groups created and embedded Scratch (<https://scratch.mit.edu>) animations and games, as well as a variety of music and sound effects, to enhance their sci-fi narratives. A few groups created infographics and data visualizations with the program Venngage (<https://venngage.com>) to provide data for key science concepts connected to their projects. Overall, students constructed multidimensional sci-fi narratives where different media and modes provided unique perspectives and representations of science concepts. This freedom in communication allowed students to engage with the climate crisis in a variety of meaningful and individualized ways.

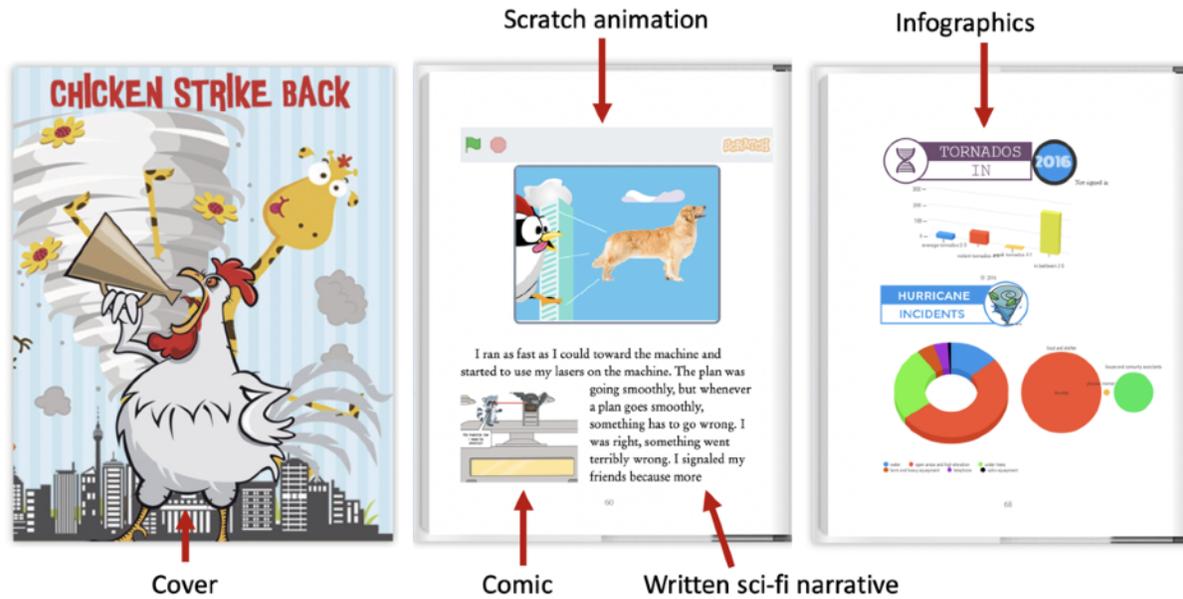


Figure 1. Excerpts from a multimodal sci-fi narrative focused on animals combating the climate crisis with student-created comics, animations, visuals, and infographics.

Reaching Multiple Audiences through Digital Multimodal Productions

Consistent with the notion of “Immersion” (Jenkins et al., 2013) with the need to achieve positive uptakes from audiences, given the shareable, easily-consumable, and engaging nature of digital multimodal productions, students can effectively mediate interactions with authentic audiences. For example, students in Project IF shared their digital sci-fis on the climate crisis in multiple venues. Within the program, they participated in peer workshops and presentations with peers in the program to gain feedback on their work at different stages.

Further, they shared their sci-fis through online platforms such as iKOS and Pixton, where they could receive ratings and feedback from peers and other viewers related to effective productive techniques consistent with “Performance” (Jenkins et al., 2013). These low-risk opportunities to share in the classroom over time helped students become more comfortable asking for, applying, and giving feedback to one another, a process that scientists themselves use to seek input from others.

Related to “Spreadability,” students also shared their sci-fis with broader authentic audiences outside the classroom. Their final work was posted online on the Project IF website and shared widely, which encouraged students to take ownership of the content and consider the larger impact their projects could make. The culminating event where students shared their work was at an international sci-fi film festival that took place annually in the local community. Engaging multiple audiences allowed students to see their work in a professional light, raise their awareness about uptakes from their productions, and experience how science learning takes multiple forms.

Conclusions and Implications

Several of the examples presented in this article demonstrate how students can leverage digital storytelling to engage audiences and emphasize the need to take action to address the climate crisis. Fostering students' effective use of digital tools in the classroom requires the media literacy practices of:

- understanding “eventness” (Bakhtin, 1981) related to knowledge of the climate crisis for effective portrayals of deviations in ecosystems associated with the climate crisis effects.
- using of multimodal, visual tools to portray issues of sustainability related to the climate crisis designed to engage audiences in the need to take action.
- adopting roles based on specific expertise through collaborative production of digital stories.
- accessing and reflecting on potential and actual uptake from audiences to revise their productions to engage their audiences.

Teachers can assist students in acquiring these practices through sharing a variety of examples, scaffolding the composing process (Smith & Shen, 2017), modeling their own engagement in the need to address the climate crisis, and supporting their students as change agents.

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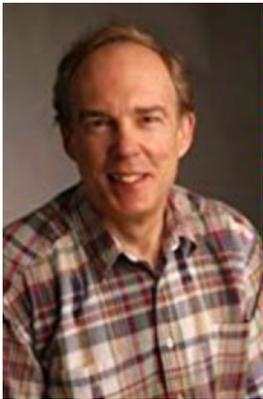
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