"My Favorite Part Is When We Tell the Truth": Identity and Agency in Middle School Youth's Climate Science Digital Storytelling

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Abstract: The Green Ninja Film Academy middle school curriculum combines climate science, art and English Language Arts to promote youth voice through youth-created films that situate learners and communities in the social, cultural and environmental impacts of climate change. In this iterative design-based research study, data sources include surveys of climate science proficiency and identity and agency with respect to climate science (N=316), as well as case studies from classroom observations, interviews and curricular artifacts of one focal sixth grade classroom. Analyses suggest youth used filmmaking as a tool of identity negotiation and performance as they played with possible science and social trajectories.

Introduction

Preparing youth and communities to equitably address the impacts of a changing climate is perhaps the most pressing educational challenge of the current century. However, the perspectives, experiences, resources and needs of non-dominant communities are underrepresented in climate science and climate decisions, making foregrounding voices from these communities a priority for equitable climate action (Cook, 2015). In this work, we explore the efficacy of a middle school curriculum, the Green Ninja Film Academy (GENIE), to support youth voice on climate science issues. The GENIE curriculum combines the traditional processes of storytelling (selecting and researching a topic, writing a script and developing an interesting story) with a technology-rich experience. This study addresses the following research question: To what degree does participation in the GENIE unit, including creating and sharing Green Ninja films, inform students' perceptions of and identification with climate science, as well as personal and collective action to mitigate climate change impacts?

Theoretical framing

We conceptualize and position youth as change agents and cultural historical actors in their community (e.g., Gutiérrez 2008). We take a sociocultural perspective to examine youth science identity construction and agency with respect to climate action and participation in social and scientific communities. We consider filmmaking as a mediator of identity construction, and explore youth-constructed "horizons of choice" - a picture of their possible futures - within the confines of the structures in place, such as gender, ethnicity, and social class (DeWitt & Archer, 2015, p. 2174). Here, we examine how film creation was used as a tool of identity construction and consider how learners position themselves as historical actors and/or change agents, and played with imagined futures, characters and selves in films.

Methodology

GENIE is a six-week middle school unit which includes lessons in climate science, storytelling and filmmaking. The second pilot of GENIE took place in four schools in the Western and Midwestern United States in February-May 2017 (N=316). Data sources include survey assessments of science, identity and agency, films and culminating science portfolios for all students, and video recorded observations of class meetings (~35 hours), interviews, and qualitative field notes for one focal sixth grade classroom. Survey responses were analyzed for changes between pre and post for all students who completed both assessments (N=296). Qualitative case studies were prepared for students at Manzanita School, a K-8 inclusive school with a predominately Hispanic, low-income student population. Interview and classroom observations were transcribed and coded using a grounded theory methodology (Lofland & Lofland, 1995) to identify processes the mediated youth identity work, and instances in which youth navigated identity, agency or scientific content and practice.

Major findings

Pre- and post-assessments

Analysis of the science assessment for the full student population (N=296) show gains in several areas, including identifying correct characteristics of greenhouse gases, distinguishing between climate and weather, identifying characteristics of the carbon cycle, identifying actions to reduce carbon footprint, defining the

greenhouse effect, and selecting characteristics of cradle-to-cradle design. No significant changes were seen pre/post in the identity/agency instrument for the full student population, a result attributable in part to large student variance. However, segmenting students according to their initial interest in and identification with the environment as measured by Environmental Index (EI), a subset of the survey questions, revealed a negative correlation (R^2=0.31) between EI and change in EI over time (i.e. students with low initial environmental interest increased EI while those with high interest decreased). Students with low initial EI reported higher levels of recognition by peers for their scientific accomplishments in the post assessment ($p<0.05$).

Case study: The Sapphire Table

The Sapphire Table encompassed five students: Lena, Natasha, Jacklyn, Alexis and Eva. The group's filmmaking process was characterized by tension over leadership of the group, authorship of the story, as well as significant humor and engagement in the theatricality of the filmmaking process. The narrative of the film was based mainly on stories by Lena and Natasha, and these stories related to their own identity work and ideas of climate agency. Lena was a trilingual aspiring mechanical engineer whose story delved into reciprocal relationships between good/bad and environment/technology. Her climate story centered on "good" and "bad" twins, and focused on dichotomous tensions that resonated with her ongoing negotiation between being good at school and engineering and valuing this academic success, and disengaging during episodes of frustration and anger. In her survey and interview, Lena used characters from her story to express her own personal characteristics and relationship with the environment, suggesting that the filmmaking space was an opportunity for her to play with possible selves or variations of self in her science identity work.

Natasha drew on her aunt's experience with cancer in her story, a narrative of how a woman became more environmentally friendly during recovery from an illness and was able to travel to the past. Natasha told us that after her cancer diagnosis, her aunt "turned her life around …one of the things that she did, she helped the environment at the same time." Natasha reframed this personal story as one of agency over climate solutions, connecting a meaningful family experience and the science content. Natasha and Jacklyn agreed that their favorite part of making their film was having the opportunity to "tell the truth" about climate change. Jacklyn stated, "My favorite part is when we tell the truth and … make the environment healthy again," and Natasha agreed: "Telling the truth about the environment." Natasha constructed a personally consequential analogy to her life through her film that empowered her to speak "the truth" about climate impacts.

Discussion and significance

Analysis to date suggests that students on average demonstrated gains in scientific content related to climate scinece and data analysis, as measured in the science assessment through the GENIE unit. In addition, the identity and agency survey suggests that there varied experience for youth with an initially high versus low interest and affiliation with science and the environment. Preliminary analyses demonstrate that case study students drew on ideas and values that were of personal, family and community consequence to construct their narratives, and that social dynamics within the group shaped the resulting film and story, as students negotiated for positions of authoring and power within film construction. This supports an initial assertion that the holistic, multidisciplinary GENIE filmmaking experiences allowed learners to actively situate themselves in roles and pathways as they authored identities in relation to personal and societal changes across time and space in ways that supported hope, agency and engagement. Further the suite of possible pathways and roles was at times shaped, constrained or afforded through negotiation with peers and instructors.

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