Using the Lived Experiences and Narratives of Black Heritage and African American Gullah/Geechee to Learn Science Concepts

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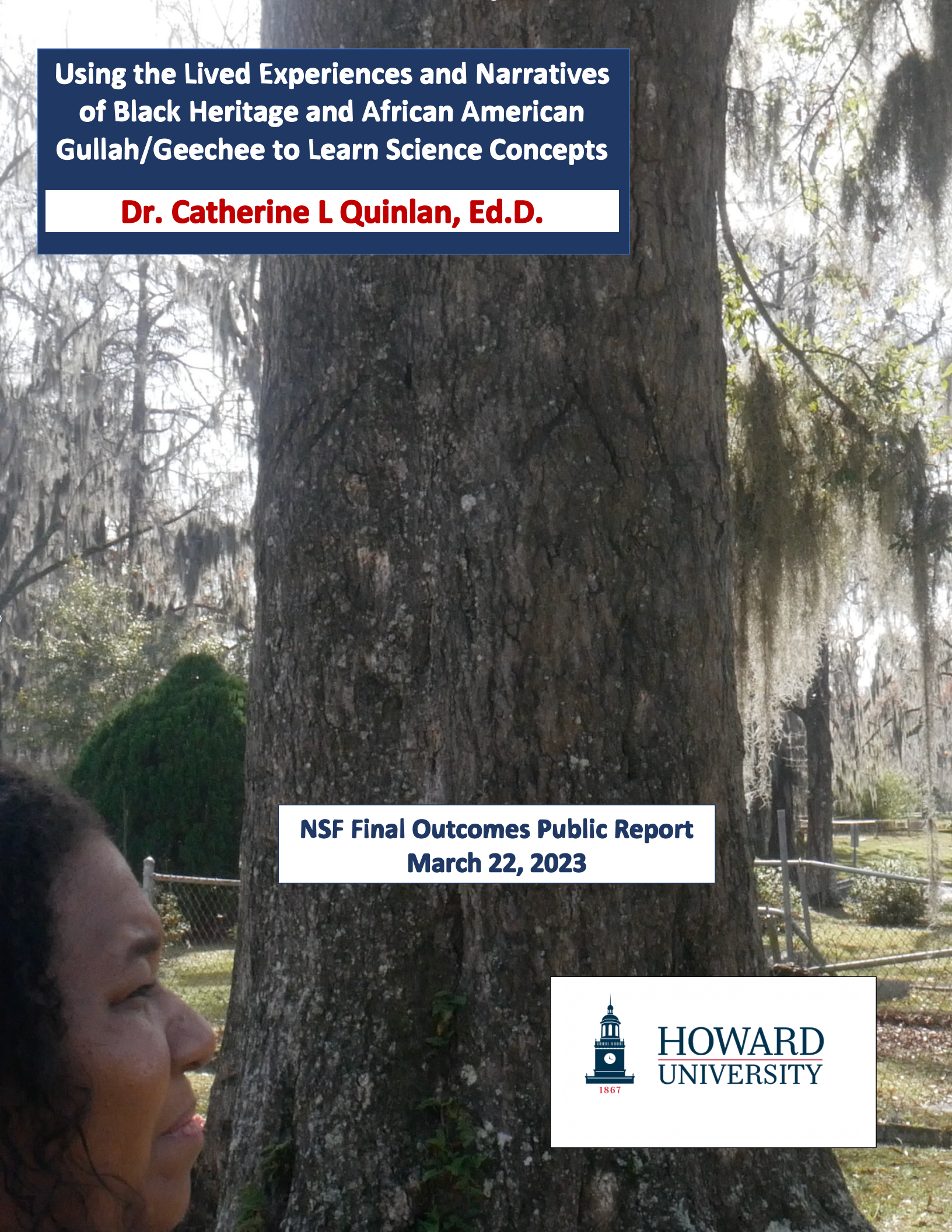

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Starting Rather Than Ending with African American Experiences And Narratives
This project at Howard University studied how the narratives, lived experiences, and heritage of people of Black African heritage could be used to create a culturally representative science curriculum, and subsequently develop and implement a culturally representative science curriculum supported by the Next Generation Science Standards.

Using The Lived Experiences and Narratives of African American Gullah/Geechee Peoples
This research used the cultural resources of the Gullah/Geechee peoples, along with best practices in science education pedagogy, to create science lesson units that were culturally representative of African Americans. The cultural resources of Black students who attend a Historically Black College and University (HBCU) informed the interest and direction of the science lessons created, even as students learned about science in the Gullah regions.

Inquiry Explorations Supported by Next Generation Science Standards
The science inquiry lessons and products were implemented in undergraduate science methods courses for pre-service teachers and disseminated at science education conferences and webinar presentations. Participants and attendees engaged in inquiry, discussions, and hands-on activities supported by the three dimensions of the Next Generation Science Standards – the Disciplinary Core Ideas, Crosscutting Concepts, and the Scientific and Engineering Practices.

Pragmatic Methodologies and Approaches
This research used the best practices of qualitative research methods, qualitative data collection and analyses, and applied cognitive theory, along with pre- and post-questionnaires, adapted to explore the following research questions: How do participants' attitudes and views of the nature of science change? More, specifically, how did participants' feelings, attitudes, and views about the social, racial, and cultural embeddedness and nature of science change? How did participants' understandings about including Black heritage and the lived experiences and narratives of Black people in the United States, in science, change? How did participants' pedagogical and science content knowledge change? Future research should address questions about how participants used their cognitive resources to understand and engage in science, that is culturally embedded in the lived experiences of the African American Gullah peoples. This research has implications for embedding the cultural underpinnings of African Americans and of Black heritage into Western science in K-12 classrooms.

Inquiry Lessons Using 5E Model as Treatment
The inquiry lessons created were used as treatment to understand how student participants' views of the nature of science changed. This research has significant implications for understanding the epistemological views of the nature of science as well as science as a way of knowing. The research had significant findings that were not shown in prior science education research and has important implications for the way science

education research is done and for treatment methods used. The treatment created will be made available to collaborators and other stakeholders interested in understanding the impact of using the science capital and cultural resources of Black heritage in the science curricula, created at an HBCU.

Launch of Research Lab: Black Representation in the Science/STEAM Curriculum Lab (BRISC)
At the end of this project, BRISC research lab was launched. BRISC standards for Black Representation in the Science/STEAM Curriculum. The importance of launching this lab was to include undergraduate students as researchers in this project, along with other stakeholders and collaborators. The focus on STEAM enables interdisciplinary and multidisciplinary discussions between students from different majors, and using "science as a way of knowing" that centers Black heritage and experiences.

Multimedia Products
Various multimedia products were produced that can be used as engaging phenomena in various contexts, including but not limited to science, history, culture, social studies, English, and other humanities and social sciences for both the K-12 and Higher Education settings. The video clips were the result of ethnographic explorations that situated this research in the Gullah/Geechee island of South Carolina, namely St. Helena and in Georgia. Three Gullah/Geechee African Americans were interviewed to draw from the lived experiences and narratives of African American Gullah/Geechee peoples. Mr. Gregory Grant is curator and historian at the Geechee Kunda

Cultural Center and Museum in Riceboro, GA. Ms. Sonja Griffin Evans is a Cultural Heritage Artist, and Ms. Patricia Elaine Sabree is Owner and Gullah Artist of Sabree's Gallery of the Arts. The interviews were analyzed for themes that aligned most with science and the learning of science concepts. The video clips were disseminated through the YouTube channel @VisibilityInSTEM. The names of the videos reflect the emergent themes. These included but were not limited to our discussions about *Knowledge of Plants – Sweet Grass*, as the video was titled. This was created because of the potential to extract from and draw parallels between this process and the scientific practices of the Next Generation Science Standards (NGSS). This connection will be further developed in future works and lessons. Two video clips addressed the sustainability practices of the Gullah/Geechee African Americans. Sustainability concepts were further explored in publications under review.

The most popular multimedia used were *Native Practices and Plants that Heal* and *Food Adaptations and the Making of Sugar* and the animation *Silent Sugar: The Impacts on Societies.* The animation is widely dispersed both on the YouTube/@VisibilityInSTEM and by. the animation company hired on their social media platforms bringing the number of views there to the thousand ranges.

The process of creating the animation included feedback from a member of the advisory board and community members. Focus groups provided feedback on the draft which informed the final product. The focus groups consisted of teachers and other professionals from diverse

backgrounds. The considerations and processes that went into creating the multimedia products along with the research methodology, were captured in a peer-reviewed Tier 1 science education journal article (see publication #1)

Discussion and Implications

This research has implications for using processes that center Black heritage and African American lived experiences and narratives in the science curricula. In my observation, our society openly operates under the assumption that African Americans have either contributed nothing to the United States or have nothing to contribute of intellectual value. This is even with the understanding that many "hidden figures" result because of a lack of recognition. This is even after acknowledging the various talents and contributions to many different areas – the most obvious is music – which I believe is sometimes emphasized because it places emphases away from the intellectual capital of Black people, as much as it highlights the creativity of Black people. It would not be far-fetched to assume that de-funding music in the K-12 public schools and leaving the development of music to the private sector would lead to a shift in the development of these skills that favored those who could afford to pay for lessons, or those with access to musical talents within their community – such as the church settings or community centers, if available.

When similarities emerge between various people of color, it is not uncommon to attribute these customs to people of color who are not of Black heritage, especially when it is positive or highlights a strength. I have observed, with great pain, the tendency to attribute cultural practices to other people of color, with excitement, and at the cost of ostracizing Black people. Alternatively, I observe the need to attribute other cultural practices to Black people because of a deeply seated belief that Black people in the United States did not bring cultural practices that are in of themselves fascinating or exciting, unless and until some other culture places a stamp of approval on it.

Conclusion

While this project has garnered a great deal of support, which is well appreciated and would not have been possible without this support and funding, it has also revealed, with subtlety, the visceral and nuanced reactions that led me as principal investigator to talk less about "Cultural Representation" and more about "Black Representation". Visceral reactions when talking about culture versus Black people, Gullah/Geechee versus Black people, or African Americans, has confirmed the depth of the psychological approaches needed when looking at ideas that address inclusion, equity, and belonging for Black people.

Selected Research Publications and Creative Works From This Project

1. Quinlan, C.L. (2021) Emergent themes and pragmatic research methods for meaningful cultural representation of Blacks in multimedia products for the science classroom. *International Journal of Science Education*. Open Access https://doi.org/10.1080/09500693.2021.1959959
2. Quinlan, C.L. (2020, December). *Silent Sugar: The Impacts on Societies.* [Animation].
3. Quinlan, C.L. (Producer, 2020, June 2). *Visibility In STEM: Native Practices and Plants That Heal.* [Video].
4. Quinlan, C.L. (Producer, 2020, May 24). *Visibility in STEM: Oyster Beds and Tabby Sustainability Practices*. [Video].
5. Quinlan, C.L. (Producer, 2020, May 13). *Visibility In STEM: Food Adaptations and the Making of Sugar*. [Video].
6. Quinlan, C.L. (2020, February 17). *Visibility In STEM Episode 4: Knowledge of Plants – Sweet Grass.*[Video]. YouTube.
7. Quinlan, C.L. (2020, January 20). *Visibility In STEM Episode 2: Our Ancestors, Agricultural Engineers* [Video].

About the Researcher

Dr. Catherine L. Quinlan, ED.D.

Brief Biography

Dr. Catherine L. Quinlan is Associate Professor of Science Education in the Department of Curriculum and Instruction at Howard University. She graduated with her doctorate in Science Education from Teachers College, Columbia University. She has made it her life's goal to bridge theory and practice in science education and is committed to creating practical curricula products with meaningful Black representations for the classroom. Dr. Quinlan is one of two program consultants for the new National Geographic/Cengage High School Biology Program, the first high school biology program to include Black scientist and engineer explorers. Dr. Quinlan is also a TEDx speaker and author of a new chapter book series for elementary aged children titled *Keystone Passage,* which blends light fantasy and adventure with the historical, social, and cultural assets of Black heritage. Her interdisciplinary expertise is displayed in her recent publications where she created an instrument to measure the social and cultural self-efficacy indicators for persistence of HBCU students, as her article is titled.

Websites

Videos: YouTube/@VisibilityInSTEM
BRISC Research Lab: BRISCLAB.org
Personal website: VisibilityInSTEM.com
Twitter: @ProfQuinlan
Howard University Profile:
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