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### Infusing Literacy and Math into a Socio-Culturally Responsive Summer Science Camp

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**TITLE:**

Infusing Literacy and Math into a Socio-Culturally Responsive Summer Science Camp

**RELEVANCE:**

This presentation will address two strands that are a focus of this conference – HEAD and HEART. This presentation will describe pedagogical approaches implemented during a Summer Science Camp that infused literacy and mathematics into a science instructional unit to provide an equitable opportunity to learn through purposeful academic instructional practices at our local Boys and Girls Club. This Summer Science Camp presented students with a caring curriculum incorporating achievement motivation, student empowerment, and cooperative learning. The pedagogical approaches used in this instructional unit provided students with opportunities to work cooperatively, develop critical thinking skills, enhance their motivation and knowledge, and empowered them to achieve success.

**BRIEF DESCRIPTION:**

This presentation will describe a Summer Literacy in Science Camp conducted with students in intermediate and middle level at our local Boys and Girls Club. The students participated in reading and writing activities incorporating culturally relevant books, research, journal writing, innovative presentations, and daily science labs focused on the investigation of the surface and tap water in our community.

**SUMMARY:**

During the Summer 2019 we created and implemented a Literacy in Science camp at our local Boys and Girls Club facilities. Our objective was to engage students in a culturally responsive science unit with an interdisciplinary approach. The program was one week long, meeting four hours every day. This instructional unit sought to answer the following guiding questions:

How does the water quality compare in different parts of Statesboro?

- a. How does surface water quality differ in various communities in Statesboro?
- b. How does tap water from different suppliers in Statesboro compare?

This project included the reading of culturally relevant books on the topic of water, daily science labs with experiments aimed at answering the guiding questions, different types of journal writing (e.g., free write, framed paragraphs) to reflect on learning as well as to practice the vocabulary involved in the daily lessons.

The students were presented with opportunities to research water quality, create posters to prevent water pollution, and create bar graphs to display the results of lab testing on the surface water and ground water samples from the local area. Students worked collaboratively throughout the week long camp while completing the labs and literacy and math tasks. At the end of the unit, student dyads created a videotaped Newscast to report on one of the local water sources as a means to demonstrate their learning.

Our purpose was to make this project culturally relevant by applying the content of the unit to places and situations that the students were familiar with. They all were able to relate to the

location of the different ponds and creek – our surface water samples. Additionally, they learned that there are at least three different tap water suppliers serving their community.

Most importantly, in this project, the students were given the opportunity to engage in daily discussions where they were able to express their opinions and develop their critical literacy skills and agency as concerned citizens to protect the environment and our water quality.

### **EVIDENCE:**

The pedagogical approaches used in this project are grounded on social constructivism, culturally responsive pedagogy, critical literacy, and multimodality. Social constructivism is based on Vygotskian (1978) perspectives where learning is seen as a social process. From this theoretical perspective, students learn through interaction using language as the means to enhance academic cognition (Vygotsky, 1978). Culturally responsive pedagogy places the students' cultures and experiences at the center of the curriculum while providing challenging and empowering curricula (Gay, 2010). This pedagogical approach is based on Ladson-Billings (1995) culturally relevant tenets that focus on the students' academic success, development or maintenance of cultural proficiency and critical consciousness. Culturally responsive pedagogy is interconnected with critical literacy. Critical literacy is based on Freire's (1970/2000) perspective of literacy for empowerment. The pedagogical approaches based on critical literacy promote students' critical thinking skills and awareness. Students develop awareness of their socio-economic context, question relations of power or social inequality and become agents of social change. During this program, students written responses were grounded on multimodality (Kress, 2010). This theory includes approaches that incorporates different modes people use to communicate or to make meaning (speaking, writing, audio, gestures, body language, visual representations/images).

### References

- Freire, P. (1970/2000). *Pedagogy of the oppressed: 30th Anniversary Edition*. London: Bloomsbury Publishing.
- Gay, G. (2010). *Culturally responsive teaching: Theory, research, and practice* (2<sup>nd</sup> ed.) New York: Teachers College Press.
- Kress, Gunther (2010). *Multimodality: A Social Semiotic Approach to Contemporary Communication*. New York: Routledge.
- Ladson-Billings, G. (1995). But that's just good teaching! The case for culturally relevant pedagogy. *Theory into Practice*, 34(3), 159–165.

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### **FORMAT:**

Individual Presentation

### **BIOGRAPHICAL SKETCH:**

**Alma D. Stevenson** is an Associate Professor of Literacy at Georgia Southern University. Her research explores sociocultural perspectives on literacy in culture, identity, science, and academic achievement. She seeks to cultivate affective support and positive identity formation in

historically marginalized minorities, especially Latina/os and African-Americans. Her research looks to construct empowering curricula and pedagogies that advocate for social justice and educational equity. She also examines resources to support culturally sustaining pedagogies including literature for youth and home languages and cultures.

**Shelli Casler-Failing** is an Assistant Professor of Middle and Secondary Mathematics Education at Georgia Southern University. Her research investigates the methods and strategies for improving instructional practices in the learning of mathematics. She focuses much of her research on how the integration of LEGO robotics can promote equitable mathematics learning for all students. She also examines how teacher candidates' understanding of teaching with LEGO robotics technology can be enhanced through in-depth learning in their mathematics methods classes.

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