A Modified Template for Biographies of Diverse STEM and STEM Education Professionals

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Introduction

For years I've tried to make sense of the importance of representation in my research and classrooms, and in different ways in my lived experiences, whether explicitly or implicitly. As a high school biology teacher, I wanted to go beyond showing students Black scientists and, in some ways, I might even have underestimated the importance of showing students the images of Black scientists even if seemingly ceremonial.

Imagine my surprise at the reaction of STEM undergraduate majors when I showed them the images of Black scientists among the White scientists in the high school biology textbook, I had worked on with National Geographic Learning/Cengage, as one of the two editors. One never can tell what will surface from beneath the nether regions of our minds, our emotions, and our hearts to reveal what is or has always been important to us. More important is that images, whether ceremonially or meaningfully used or included can be powerful. This doesn't mean we should aim for the ceremonial as many have found so easy to do. When depth becomes important and our inner emotions and feelings about what we really want are challenged, the ceremonial will disappear. Think of all the ceremonial practices for inclusion and equity and which ones work and which ones don't work. One of the questions I ask in one of my up-and-coming book is whether or not we mean it because even that will be revealed – in time – as it has for some.

This publication shares some of the outcomes that have resulted from my research. As a high school biology teacher for 16 years, I've had the opportunity to use many approaches, one of which involved sharing the experiences of scientists. What I found in students' reactions led me to modify a previously created biography template previously published and used by NASA affiliates or educators that accompanied a previously used and available curricula Astroventure on NASA.gov. Some of my outcomes of using space were shared in a prior publication in the National Association of Biology Teachers' journal of American Biology Teacher. Here I share the modified version of the biography template I created in 2016. I will share some of the benefits in today's talk on "Thinking about Thinking: Using Afro-Histories to Understand Afro-Futuristic Science Lessons" sponsored by The REC Network. I'm sharing this because the African Proverb holds true:

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"If you want to go fast, go alone. If you want to go far, go together" African Proverb

I went as far as attaining IRB approval years ago and even collected information on Black scientists and engineers at Howard which one of my graduate students did but never had the time to follow true. Therefore, I wanted to take this opportunity to share that those who want to publish their biographies so that they are their own authors, please upload to the link to be published so that they could be available to the public and our children. In a follow up version I will discuss the importance of this for our children, both cognitively and emotionally.

In my up-and-coming book I've also analyzed some of this publicly available biography data to make comparisons with Black scientists, which I've done years ago but only recently began to talk about. Please see upcoming book which will be available in August 2024.

This resource shares a modified version of the template that I created to provide meaningful inclusion in science. The template attends to the importance of the cognitive and the emotional and important considerations that our children, particularly children of color and particularly our Black children need to know and understand to help them thrive. I created this modified template as a research template that could be used as a potential resource for the K-12 classroom. The template was not my original idea but was derived from a pre-existing template available on NASA.gov. However, what led me to use this template and to modify it was that very few of the exemplars represented Black scientists of engineers. As a matter of fact, only about a handful were Black. I added three questions to the template that I thought were important - namely the questions on the obstacles and challenges faced, how I made it, and advice to people of African origins.

As part of the resources, I've shared both a sample of my own biography which would look differently if I rewrote it years from today, or if I had written it years ago.

Science Education Researcher

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Science Education Researcher and Professor, Author/ TEDx Speaker

Associate Professor,

I use applied cognitive theories to explore how students learn. I focus on creating culturally representative curricula that situates Black people in science education

How I first became interested in this position

In some ways I stumbled into science education research. I received my Masters in Science Education from Teachers College, Columbia University and was teaching high school biology when my husband decided to return to college for a second career. We had no children and fewer responsibilities at the time, so I decided to enroll in a non-matriculated course at Teachers College. I took the course, History of Science Education and enjoyed researching the topics I was assigned, and the freedom to take my research and presentation in the direction I wanted. Most of all, the impact of my discoveries about Black people missing from this history led me wonder about the historical details. There began my pursuit and matriculation into a doctoral program.

What helped me prepare for this job

I was always an independent worker and in some ways a workaholic when it came to academia. In high school I read the entire physics textbook on my own for a year, took the passing examinations, and graduated with a distinction in physics because my high school did not offer physics. Even though I met with a physics teacher a couple of times to do experiments I missed out on the hands-on experience so I'm more theoretical in my approach and experiences in science.

My role models or inspirations

I have multiple role models in my family and acquired more and more as I go. In graduate school I admired how the then chair of the department, Dr. O. Roger Anderson was versatile in combining neurocognition, lab work, and science education effectively. I admired my dissertation advisor's focus on qualitative research methodology and on mentoring us as doctoral students.

My areas of expertise

Merging interdisciplinary and multidisciplinary approaches to develop new research and new ways of seeing things. Combine schema theory, argumentation, and inquiry science pedagogy

My education and training

My doctoral work was the beginning of my formal training. Since I wanted to re-invent how Black narratives and lived experiences were included, I spent a great deal of time reading, researching, testing approaches out, piloting, studying, and reading the research literature until I was able to put it all together. More specifically I wanted to further my training in curriculum development, so I began by implementing different, strange, or challenging curricula to stretch myself and my students. This was the fun part.

What I like about my job

I like learning new things. I've come to realize that when I'm not cognitively stimulated, I become bored and uninterested so I like to try new things in my courses and set the courses up so that students can learn from me and from each other, and I can learn from them. I enjoy seeing their aha moments after they are done wrestling with ideas.

What I don't like about my job

Because I like learning new things and seek cognitive challenges I don't like when my job is reduced to what seems to be menial tasks that anyone can do. I begin to feel like an administrative assistant without a vision or direction or meaning attached to my expertise and my talent.

My advice to anyone interested in this occupation

Learn how to write well. Science education is itself an interdisciplinary field. Science educators come with a science background which they merge with one or more fields of interest by looking at science from different approaches –

whether it is a focus on science education pedagogy, cognitive psychology, humanities, qualitative, quantitative, and so on. You begin to see and gauge your own interests, abilities, and goals when you begin to write. The long pages of feedback I receive from peers have helped me write better. Understand that expertise takes time to develop and take the time to learn about the areas you'd like to master. Use criticism and feedback to help you grow.

Additional challenges/obstacles I faced because of my race/ethnicity/culture

I think I was lucky in this journey that people were placed in my path to help me succeed. In hindsight I call it divine intervention that in a predominantly White institution I had two mentors and role models whose ego did not surpass their interests in helping their students succeed – one a White male and another a Black female. However, I know that the interdisciplinary nature of my dissertation generated questions from outside faculty which my mentors foresaw might lead me to not graduate. Therefore, I'm going to reveal something for the first time – I was previously enrolled in a Doctor of Philosophy program and switched to the Doctor of Education after completing those requirements. While I was protected from the details, I went along with it because my research was entering into unchartered territory using schema theory in science education, which no one had done before, and that I risked inviting people from applied cognitive fields and I had the privilege of trusting my mentors.

How I made it this far despite obstacles/challenges

Tenacity, vision, and self-awareness. I entered this field with one main goal in mind - to attend to the lack of Black representation in the narratives which define our belonginess, acceptance, significance, value, and recognition attached to our interests. Understanding people has helped me to redirect my energies to spaces that recognize the value I bring. I see my work as bigger than the individuals and egos I've worked with, whether Black or White, or other Races. Taking my expertise to the spaces that needed or wanted them has helped shed light on what I do. A lack of recognition can be painful, but self-awareness and continuous emotional growth has helped me to understand myself and other people while making the best decisions in spite of my feelings or their actions.

Advice to people of African origins interested in this occupation

You're very needed in this role, and I've met some who unknowingly are interested in science education but are unfamiliar with the field or don't know that the field exists. I've met students in science whose research interests align best with science education than they do with science itself because they're more interested in working with people or teaching people or in researching social issues in science. My advice is to take the time to explore the field and to understand what job opportunities are in any field. You can do this by reading the research literature and looking at the job listings. I recommend starting with the two most popular organizations that are most reflective of the field to understand the field, the Association for Science Teacher Education (ASTE) (theaste.org), and the National Association for Research in Science Teaching (NARST) (narst.org).

Additional information/links (optional)

Visibility In STEM: https://www.visibilityinstem.com; BRISCLAB: https://brisclab.org;

Howard University profile: https://profiles.howard.edu/catherine-quinlan