Personalized curriculum captures students' imagination, interest

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Henry Louis Gates, Jr. PBS' "Finding Your Roots" show host and Alphonse Fletcher, Jr. University Professor, Harvard University and director, Harvard's Hutchins Center for African & African American Research listens to Athina Ramphal. Credit: Christian Berg, WPSU, Penn State

Focusing on their personal DNA and genealogies, middle school students appear to have learned as much as their peers who used case studies, according to a Penn State researcher.

"We noticed that both groups got the content, but once all was said and done, the case study group would have preferred to do the work on themselves," said Elizabeth Wright, postdoctoral scholar working with Nina Jablonski, Evan Pugh Professor of Anthropology, Penn State.

During the two-week camp held at Penn State, the University of South Carolina and the American Museum of Natural History, middle school scientists tried to answer the question "Who am I?" The camp included instruction and investigation in the topics of personal DNA family genealogy, anthropology, health and evolution. Wright, a former middle school science teacher with seven years classroom experience, who worked with high school students for her doctorate in curriculum and instruction in science education at the University of Washington, designed the curriculum for the camp.

She presented preliminary findings of research done to find out the efficacy of the curriculum with respect to student learning and interest today (Feb 17) at the annual meeting of the American Association for the Advancement of Science in Austin, Texas.

Three sets of campers focused on their personal family histories and DNA while another group used case study data. A fifth group was the basis of an online video series "Finding Your Roots: The Seedlings" produced by WPSU and also available on the PBS "Finding Your Roots" classroom page.

"The initial data support our hypothesis that middle school students prefer learning about themselves," said Wright. "While learning gains were the same between the personal and case study camps, as soon as the

case study campers had the opportunity to do personalized research, most campers took it."

"We already see that they are taking what they are learning and taking it back to schools," said Wright. "One camper who never spoke up in science class before the summer camp wasn't happy with the science electives being offered in her school, so she proposed a one-on-one independent study course and got it done. Another young woman took our curriculum, modified it to meet the needs of elementary students, and led a three-day camp in Atlanta this summer."

While the study wanted to look at an educational intervention to encourage engagement with science and perhaps even pursuit of science, another aspect was inevitable. The students for the study were chosen to be a diverse sample who were not necessarily science enthusiasts. Looking at genetics and genealogy, the subject of race was certain to come up.

Adalynn McKeague and Shataira Hightower investigate hominid skulls. Credit: Christian Berg, WPSU. Penn State

"Many teachers are white women," said Wright. "We don't always have shared experiences. I don't know what it is like to be a 14-year-old boy of African-American descent. I don't know what it's like to be a 16-year-old immigrant from Guatemala."

As a teacher, Wright noted that talking about race is not comfortable and teachers can become lost if they have not already thought about race.

"The camp curriculum frames race as a biological, reality and biologically speaking, skin color—the amount of melanin in one's skin—serves an important role in survival to reproduction, but it is also a lived experience. If we don't address both realities, we do students a disservice."

Which does not mean that there are not some very uncomfortable moments.

"One 10-year-old stared at the screen with his genetic ancestry on it," said Wright. "Then he said, 'The only reason I have any European in me is because one of my ancestors was raped.'"

Wright acknowledged that this was very likely the case. She asked him to also consider the possibility that there may have been a consensual, loving relationship, but conceded to the child that he was probably correct.

"As uncomfortable as it is, as educators we can't walk back from that truth," said Wright. "As a society, as individuals, we have no hope of

fixing any of our collective issues if we don't have this conversation."

Besides an understanding of the scientific basics, the campers learned other things. According to Wright, regardless of whether they were dark-skinned or light-skinned, campers were all willing to listen. When a 13-year-old dark-skinned boy spoke of never going into the corner market without being tracked, white children who had never experienced this became frustrated and angry and became advocates.

Ireland McDyre looks at her own DNA with Brandon Ogbunu, assistant professor of biology, Brown University. Credit: Christian Berg, WPSU, Penn State

"What could we do if these young scientists were available for months?" said Wright.

No camper was left out. Even if a child was adopted and had no idea of their biological parentage, their DNA data would point them to a geographic location from which they came. Campers were encouraged to explore those cultures and perhaps incorporate some of them into their lives.

A unique part of the camp experience was time set aside for the young scientists to do their own research. One camper explored the effects of ultraviolet radiation on lumbriculus worms. Another looked into the relationship of human and canine DNA.

One camper, a gifted artist, created a genealogical tree of anime characters. Various anime-type traits—both recessive and dominant—were assigned to characters and inherited down the line. The tree came complete with drawings of the anime characters and their respective traits.

"She clearly understood the concepts," said Wright. "Although it wasn't a traditional inheritance tree, there were traits and they were passed on, showing heterozygosity or homozygosity."

The summer camp curriculum is intended to be a portion of a middle school curriculum. Other researchers are working on modules for undergraduate college students and testing the results at Spelman College and Morehouse College.

Henry Louis Gates Jr., PBS "Finding Your Roots" show host and Alphonse Fletcher Jr. University Professor, Harvard University, is a collaborator on the project. He is also director of Harvard's Hutchins Center for African & African American Research.

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