Developing a Culturally-Relevant Civic Science Approach to Improving Scientific Literacy of Latino Youth

Rationale: Public policy discourse involves science-related issues – climate change, water (un)availability, sustainability of natural ecosystems – and thus, our state needs scientifically- and civically-engaged individuals. Unfortunately, scientific literacy in the U.S. is undesirably low. The 2015 NAEP eight grade science assessment revealed California is fourth from the lowest. A gap exists with Whites (164) outperforming their Latino (129) eighth grade counterparts by 35 points. School-based science, traditionally taught within a passive "acquisition-of-knowledge" paradigm emphasizing a 'canonical' vision of science, has not served marginalized adolescents in preparing for the workforce, let alone participating in science-related public issues. Often, traditional science education discounts or ignores young people's background and lived experiences at the expense of helping youth reach their potential. Furthermore, traditional science education does not normally emphasize knowledge of, and sensitivity to, cultural diversity or awareness of structural organizational inequity within the broader society.

Reaching marginalized youth with science education programming will require culturally-relevant approaches. Civic (Citizen) science may be one approach to engage youth in science such that they may learn about, and apply, their science learning in purposeful ways, particularly in addressing meaningful issues identified by and in their communities. Approaching science from a personal and community perspective may engage marginalized youth in culturally-relevant science education, expand access for marginalized youth to science-related civic engagement (e.g., activism, public engagement, informed decision-making), and contribute to improved scientific literacy, positive youth development, and broader community development. This project complements the UC 4-H Latino Initiative aimed at reaching Latino youth with high quality programming to improve scientific literacy, advance youth development, contribute to a well-informed citizenry, and support community development.

Overall Goal and Objectives: Develop, pilot, and evaluate a culturally-responsive *youth participatory action research (YPAR)* program (YPAR is a form of citizen science) in six counties (Del Norte-Humboldt, Sonoma-Marin, and Santa Cruz-Monterey). The program will help improve the scientific literacy, positive youth development, and civic engagement of 160 marginalized adolescents (predominately Latino). The programmatic focus will be expanding access for Latino youth to meaningful science-related environmental issues, and thus support them in utilizing scientific data to advocate for practices and/or policies meaningful in their communities. The applied research focus will be to identify key YPAR program elements that contribute to scientific literacy, improve indicators of youth development, expand access to civic engagement, and support community development.

Research & Evaluation Approach: Through a mixed-methods investigation, we will identify key program elements that facilitate science learning, youth development, science-related civic engagement, and community development in environmentally-focused YPAR programs. Additional research questions include: What organizational capacity is needed to implement a YPAR program reaching marginalized youth? What do youth report knowing about, identifying with, and having prior participation in, the scientific enterprise before and after the program? What do youth report about their capabilities and confidence to affect science-related community change? What are the skills and resources needed to support youth in identifying and advocating for meaningful environmental issues? What are the pedagogical practices used by adults to engage and motivate young people in a YPAR program? What effects do these practices have on affording and/or constraining youth participation?

Potential Impact: Reaching marginalized youth with science education is a high priority for government and non-profit organizations. The findings from this project will contribute to the research and practice of culturally-relevant science education. Additionally, findings will contribute to the field of informal science education and improve the model for replication throughout ANR and 4-H.