



Education

Jessica Morales, Tiana Scott, Amanda Sanchez

Education Module in Human Evolution for Third Graders

Faculty Mentor: Sarah Lacy

Science topics considered difficult to understand, such as evolution, are often saved for secondary education and rarely presented to younger students. However, pedagogical best practices suggest that major ideas should be presented to students throughout their education at various age-appropriate levels. Ecology is an exciting topic to students of all ages, and evolution can be engaging for elementary school students. As a part of the California STEM Institute for Innovation and Improvement (CSI3) program STEM Teacher in Advanced Residency (STAR), Masters of Education and California teaching credential students take on an internship with a California State University Dominguez Hills STEM professor while completing their in-classroom training. Students working in a biological anthropology laboratory designed a human evolution learning module for 3rd graders at a high need public elementary school. Using 3rd grade educational standards, they designed five activities around human evolution within biology, social studies, mathematics, english and language arts (ELA), and art. A final project of diorama connects all five subjects and encourages the elementary school students to explore the topic interdisciplinarily, which should hopefully engage students with preferences across all subject matters. Students will also have access 3D printed technology to print pieces to add to their dioramas, reflecting the global aspect of past humans. The 3rd graders will present their dioramas to the biological anthropology professor supervising the project: meeting a professor is also an important example of career exploration for young students. The STAR students 3-D printed the fossil skulls for the module, which are usually expensive to purchase and unavailable to most primary school educators. Now this interdisciplinary educational module is available online to any educator with access to a 3-D printer.

Tong Nguyen

The Comparative Effectiveness of Static Images versus 3D Models in Learning Anatomical Landmarks and Procedures

Faculty Mentor: Jen Lucarevic

Allied healthcare roles require an extensive base of knowledge. In the field of Orthotics and Prosthetics in particular, a thorough understanding of anatomy and procedures is crucial for treating real life patients, however much of the education is presented in a flat two-dimensional manner. Information presented in a clear and concise manner improves efficiency of understanding and establishes a strong base for long-term knowledge. This study will analyze the comparative effectiveness of learning, measured in accuracy and selected time taken to learn fictitious anatomy or arbitrary procedure. Participants will be students enrolled in the Orthotics and Prosthetics Master's Program at California State University Dominguez Hills. Participants will be given a set of learning tasks; some presented with 2D text and photos study material, and others presented with an interactive 3D model, then given three minutes to learn anatomical landmarks and then identify and spell that anatomy. For the procedures, they will be given either 2D or 3D study material, and then as perform the described procedure using clay. Results will be discussed in accuracy and spelling of anatomical landmarks, and procedural shape and location performance. Given a short amount of time, I predict more knowledge can be learned effectively through tangible 3D models than through the classical method of written descriptions and static images.

In my results, there was a significant difference in study time for the anatomy test between 2D and 3D method participants ($p < .01$). Students spent about 3x more studying the 3D anatomy model. There was no significant difference in study time for the procedure test between 2D and 3D method participants, however it was closely approaching significant ($p = .06$). No significant difference in anatomy or procedure scores between 2D and 3D ($p = .72$).



Christine Hume- Dawson

Ecology of Ladybugs and Aphids

Faculty Mentor: Brynne Bryan

Elementary students should be exposed to the scientific process early in their educational careers. The scientific process requires students to engage in critical thinking and advanced cognitive skills that they can apply to their other school subjects. Ecology is the perfect branch of science to engage students and expose them to the scientific process. As part of my CSI3 internship with Dr. Brynne Bryan, I conducted an experiment that I could utilize in my 4th grade classroom to expose my students to ecology and the scientific process. Using 4th grade science standards, I developed an ecology unit in which students will engage in the scientific process by forming hypotheses and making observations, utilizing technology to conduct research, and writing about their findings. The students will compare and contrast the diet of native ladybugs. They will have access to videos depicting the behavior of ladybugs isolated with milkweed aphids and ladybugs isolated with non-milkweed aphids. Students will also learn how to use the i-Naturalist website to conduct research on different species and post their own findings. Students will be able to see themselves as scientists and make new discoveries and connections to ecology.

Itzel Marin, Rihab Shuaib

Navigating The California State University (CSU) System: The Lack of Support for Female Students of Color.

Faculty Mentor: Jenn Brandt

Every year, more women of color go into Higher Education to pursue a four-year degree. In the California State University (CSU) System, 56.7% of students are female and 60% are students of color. These students are sold the idea that they will graduate within four years. On the other hand, only 27% of first-time freshmen graduate on time. The question being addressed in this research is: What kind of support are female students of color lacking that are preventing them to graduate on time? In an effort to answer this question, we began our research by researching the statistics of female students of color not graduating within their four-year plan. Secondly, we will conduct a state-wide survey. This process will consist of reaching out to all 23 campuses to ask these students about their personal experiences within the CSU system. The data will prove that female students of color are not receiving the support they need to ensure a four-year graduation. The mission is for administration to become aware of these needs and to implement additional resources onto their campuses — with the purpose of increasing the retention rate of female students of color.



Nicole Santillan

Applying Community Cultural Wealth into Classrooms: An Ethnographic Study Examining Cultural Wealth in the City of Gardena

Faculty Mentor: Jen Stacy

Analyzing cultural practices promote understanding for educators with regards to students' funds of knowledge (Nieto, 1994) brought to the classroom. This insight informs educators' ability to relate to their students, calibrate resources by supporting their socioemotional development, and incorporate the community's cultural wealth into teaching. Dominant society fills students with knowledge it deems valuable but may not match students' cultural practices (Yosso, 2005). Not recognizing students of color could be perceived as giving students an "equal" learning environment, it actually hinders the students' learning opportunities. Teachers must learn about a community's cultural wealth in order to develop relevant learning experiences.

This research study examines the wealth in Gardena, a city in Los Angeles County, to understand the cultural practices of residents within this city. I used ethnographic methods to gather data through databases, observed the community, interviewed a resident, and gathered artifacts within the city. I then coded the data by cultural themes and analyzed it through Yosso's (2005) framework of community cultural wealth.

Findings from the ethnographic data showed an overarching cultural practice of socialization through community events in Gardena. Additionally, cultural practices included linguistic and aspirational capital (Yosso, 2005). Within these findings, Gardena embraced socialization with events and event suppliers throughout the city thus allowing for economic growth with the use of its own resources. These findings also resulted in acknowledging the practice of linguistic capital shown through signs displayed with Spanish and English variations. Lastly, the community is rich in aspirational capital promoting youth programs for young residents. My findings displayed valuable practices where educators should not relinquish the funds of knowledge students possess. Educators can use ethnography to learn about cultural practices and wealth in order to incorporate new, acquired knowledge of their students and the communities they come from to enhance learning.

Brenda Edelen

Students Performance with Continuous and Discretized Quantities and Working Memory's Connection in Proportional Reasoning Task

Faculty Mentor: Kreshnik Begolli

This study examines children's performance on a proportional reasoning task. It compares two visually depicted quantities of proportions: continuous (e.g. liquid in a beaker) and discretized (e.g. liquid in a beaker with markings). The study included 193 students ranging from 3rd to 6th grade. The participants were asked to rate three containers with a ratio of chocolate syrup to milk from least chocolatey, medium chocolatey, and most chocolatey. This study also examined whether working memory predicts performance on the described proportional reasoning task. The study found that children performed higher with continuous than discretized visuals. However, there was no correlation between a working memory and proportional reasoning despite a positive trend. Teachers should introduce proportions with continuous quantities then discretized and further studies should examine the relation between working memory and proportional reasoning.