



Making Cultural Assets Count in Community College Math: Lessons Learned From Piloting Real-Life Math Tasks in a Yucatec Maya School

As a researcher and a community college math instructor, I have experience with culturally responsive instruction in and out of the classroom. Culturally responsive instruction requires faculty to craft tasks and assignments that deepen students' conceptual understanding of course topics while illuminating their cultural assets and building on their cultural knowledge.

As educators, we do not magically know the cultural background of all of our students. Consequently, it can be challenging to design an assignment that engages everyone. Using my experience performing a six-month ethnographic study in a Yucatec Maya village in the Yucatán, I have created and piloted a culturally responsive task in my own classroom that can be replicated in other math courses.

The Yucatec Maya

Two Yucatec Maya boys, aged five and nine, want to fly a kite, but they have no money. They engineer a kite using hand-torn black plastic garbage bags, salvaged fragments of wood, and a medley of red, blue, and yellow cotton twine and fishing line. For an hour they pilot their construction at the ocean's edge without adult supervision. They experiment with launches: Tossing the kite up against the wind, with the wind, from the top of a stone wall, and from inside an abandoned boat. They innovate and improvise. They lengthen the kite line by adding salvaged beach string; add weight to the tail; and adjust how the kite line is attached to the cross spar. Three times they extricate the kite from the branches of an Uva del Mar tree (Darling, 2019).

Yucatec Maya students come to school with a wealth of cultural knowledge around practical problem solving. However, local schools miss opportunities to build upon these cultural assets during math instruction as educators rely primarily on government-provided curriculum. When I piloted two math problems that built on students' cultural knowledge in a Yucatec Maya school, students preferred drawing from their own funds of knowledge, *sentido común* as they call it, rather than

using the preset algorithms to solve math problems. Like many studies, my study suggests that incorporating cultural assets into math instruction bolsters a student's sense of belonging, engagement, and ultimately, achievement.[i]

Culturally Responsive Tasks in the Math Classroom

Drawing on this research, I created the following assignment for a pre-statistics math class:

Create, modify, or copy a real-life data set that is either skewed left or skewed right. Use data that is important to you; data you care about.

1. List all the data in the original data set and explain any modifications to the original data.
2. Create a histogram of the data set.
3. Explain what real-life conditions cause the data to be skewed left or right.

Notice that the assignment uses verbs from Bloom's Taxonomy that promote higher-order thinking: "Create" and "explain." Asking students to create word problems or data sets that are culturally relevant to them is one way to gather ethnographic information about your students' backgrounds while simultaneously inviting them to celebrate topics that resonate with their core values and cultural backgrounds.

Barbara

Barbara, a White student from a rural background, modified a data set of wolves in Yellowstone National Park to indicate that it skewed left (Figure 1). She was born in Northern California, where she was raised to value a culture of hunting, wildlife management, and outdoor living. She aspired to be a game warden. She graphed a data set of the number of wolves in Yellowstone from 1996 to 2018 on a histogram. However, she found that the graph was bell-shaped, and not skewed. She decided to create a histogram that included data from 1926 to 1996, because in 1926 there were record numbers of wolves in Yellowstone, but virtually none between 1926 and 1996. Adding this data made the data set skew to the left.

Don't miss Dr. Darling's upcoming three-part online workshop, "Teachin' It! Tips to Facilitate Inclusive, Inquiry-Based Learning Online in Community Colleges," October 2, 9, and 16, 2020.

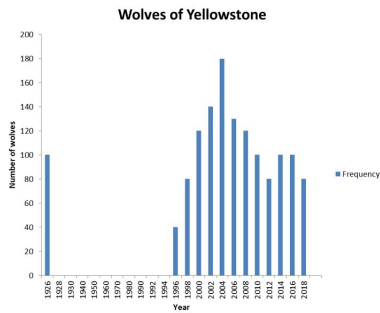


Figure 1

Anahi

In a second example, a Latinx student, Anahi, created a data set of a family tree that included 45 sisters, brothers, parents, nieces, and nephews (Figure 2). She was born in Mexico and many of her family still lived there. She explained that making a family tree was how she held her family close. She created the data set and a corresponding histogram of the ages of these family members. In the end, she needed to add the ages of her deceased grandparents in order to skew the data to the right.

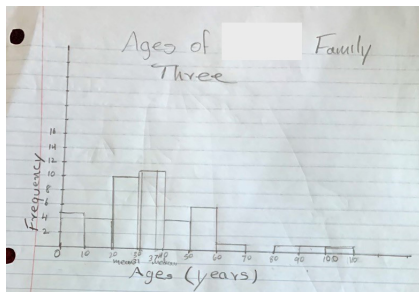


Figure 2

Students reported enjoying the assignment, although they said it was hard to create or modify the data set to make it skewed. Students demonstrated an improved understanding of skewness, histograms, and the relationship between real-life situations and shapes of data sets. The class seemed to grow closer to each other when they heard about each other's core values.

Conclusion

While it is not always easy to create culturally responsive math tasks, research indicates that culturally responsive instruction is an important part of improving students' sense of belonging, engagement, and achievement. Asking students to create word problems or data sets that are meaningful to them invites students to embrace their cultural and core values during math instruction.

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