Minorities and Native Americans in STEM

Course Information

Emily Sukhai

This course is targeted towards students majoring in environmental science. I chose this target group because it is important to realize the history of STEM. In addition it is important to explain the importance of STEM to individuals who are pursuing that field for a job. Without input from people who live in the area, it is hard to make a logical decision about the environment without knowing how it can and might affect the people living in and around the area.

Course Description

During this course we will be exploring STEM careers and how the amount of minorities in STEM impacts fair decision making. We will also go in depth into STEM programs in schools and how that impacts the amount of minorities in STEM careers when they're adults.

Course Schedule

Unit 1: The History of STEM

BIG Question: What are the past discoveries from STEM and how are they different today?
Argument of the Unit: The past inventions from the STEM field significantly influence modern life.
Key Words: STEM, Stephen Hawking, analytical engine, Ada Lovelace, human forward.
Link to Reading: The History of STEM
Annotation of Reading: Some of the most influential discoveries from STEM include concrete, Wifi, and vaccines. Wifi was discovered after a scientist tried to find out if Stephen Hawking's theory about black holes was correct. Concrete was thanks to the ancient Egyptians and their first version of concrete that they used to build the pyramids. Finally, Ada Lovelace is considered the first computer programmer because of her contribution to a more advanced analytical engine. This engine was used to solve basic math problems, but is now what it is today. This article helps, because it explains the contributions that STEM has had on our modern day society. This also helps to show that not only were men involved with STEM, but one the most important discoveries was thanks to a women. That shows how even though the science field is dominated by men, there are still women who made huge contributions.

Unit 2: Native American Representation in STEM

BIG Question: How do sacred cultural rituals play into why many Native Americans avoid joining STEM careers.
Argument of the Unit: Many young Native American Students are exposed to cultural taboos about STEM and science by older relatives and the stereotypes play a role in the decreasing amount of Native Americans in STEM
Key Words: Taboo, sacred, HINU, IRB
Link to Reading: Cultural Taboo Amongst Native Americans Joining STEM
Annotation of Reading: During a survey, 50% of students say that they observe tribal taboos and 50% have grandparents or parents that observe tribal taboos. What is most fascinating is that 67% of students say if science classes were more respectful to cultural taboos, such as avoiding them or providing alternatives they would be more likely to take them. In addition, 74% of those respondents said that they would consider taking science classes were female and 36% of those respondents were male. An example of science class not respecting culture of Native Americans are dissections of humans, snakes, lizards, horses, etc. This article is helpful by showing that even though many science classes are offered, many students feel a cultural duty to their tribe to not participate in activities that defy their beliefs. This is also a good example of how education for certain tribes should be modified to best respect their cultural needs.

Unit 3: Getting Younger Generations Involved in STEM

BIG Question: How does the introduction of STEM in schools impact the amount of younger people joining STEM careers and pursuing STEM related majors?
Argument of the Unit: The low amount of young people in a STEM related job is a result of the lack of encouragement to join STEM in schools and universities.
Key Words: HBCU, K-12 education
Link to Reading: Increasing STEM Participation With Younger Generations
Annotation of Reading: This reading helps shed a light on how little many schools care about expanding their STEM programs. The author reflects on a study done by the Bayer Corporation that shows the direct relationship between young people pursuing STEM careers and the amount of encouragement from schools. In the United States, we are falling behind because of the lack of encouragement. In countries in Europe and Asia more than 10% of 24 year-olds have degrees in STEM related careers , compared to the US which has a STEM degree rate of less than 6%. This

article is helpful to my argument by showing the comparison between countries where STEM is encouraged in both schools and media. This article doesn't dive deep into the minority percentage, but shows the percents as an overall amount. The article also points out that in many cases the media plays a role in showing individuals in STEM careers in a negative light. This helps my argument as well by showing me that not only do schools play an important role in helping to expand the STEM careers, but also the media and influential people.

Unit 4: Getting Minorities Involved in STEM

BIG Question: How do having a mentor and programs such as iSTEM effect a student's willingness to engage in STEM classes and careers, and how will that affect the overall number of minorities joining the STEM workforce.
Argument of the Unit: Recent data indicates that both females and ethnic/race minority groups are severely underrepresented in the science and engineering workforce.
Key Words: iSTEM learning, informal science, Funds of Knowledge, mentoring
Link to Reading: Native Americans in STEM
Annotation of Reading: With a fear of running the STEM program into the ground, many schools implemented mentoring programs. The mentoring programs were helpful in encouraging students of both genders and all races to take more STEM classes, as well as helping students understand the material and get higher grades. The iSTEM project was founded in 2012 as a collaboration between the University of Arizona, Pascua Yaqui Tribe, and public schools that primarily serve Latino and Native American youth. This was to see if in-school mentoring and out-of-school science explorations would help retention of science knowledge of 3rd-8th graders. This was especially helpful for Native American youth to try and break free of the cultural taboos they observed from their relatives and realize that while science may go against some of their beliefs, not all sciences do and there is a path for everyone. This article is especially important to my project because it shows that even though the amount of minorities in STEM is low, there are plans to improve not only the minority population but also the younger generations of Native Americans.

Unit 5: Improvement of Underrepresentation of Native Americans

BIG Question: In what way(s) are members of the Joint Working Group helping to raise the number of minority students in STEM related careers.
Argument of the Unit: The United States' failure to achieve its diversity goal for STEM careers is also attributed to the failure of the academic "pipeline" to maintain a steady flow of underrepresented minority students.
Key Words: URM (underrepresented minority), underrepresentation, Joint Working Group

Link to Reading: Improving Underrepresentation
Annotation of Reading: An issue for many URM students is that while they plan to pursue degrees in STEM at the same rate as white students, but they do not graduate at the same rate. As a way to fix this problem, the Joint Working Group came up with a 5-step process to help encourage members of URM groups. The Joint Working Group's mission is to not only help students learn the joys of science, but also to help fix the gap between minority groups and white, male students. Another problem that was brought up was issues with finances for school systems. In most cases, schools that have the most funding were primarily private schools, or schools that are predominantly white. This is an issue, because students in schools that don't have as much funding are where the majority of URM students went and the funding for STEM related courses don't really exist. This, very long article was useful because this shows how the Joint Working Group has taken steps to further increase the college age URM students.

Unit 6: Current Percentage of Native Americans in STEM

BIG Question: How do the types of schools various minority groups enroll in differ from students in majority groups, and how does that affect the number of Native Americans and minorities in STEM related career fields?
Argument of the Unit: Even though schools and jobs have to accept a certain percentage of minorities, many students feel as if they are not "welcomed" into many 4-year universities and then later on in their desired career field.
Key Words: AI/AN, S&E (science and engineering), NSF, LSAMP
Link to Reading: Current Minorities in STEM
Annotation of Reading: Many American Indian students when looking at further education enrolled at a public 2-year school, and 36% of students went to a public 4-year university or college. Furthermore, the amount of students that graduate with a degree in a STEM related field drops to about 10% and only 3% go on to get a job in STEM fields. Even more shocking, only .03% of individuals in engineering are Native Americans and .05% of individuals the have jobs in biomedicine are Native Americans. As a result of this, America has fallen to 6th in the world for diverse STEM careers and continues to fall. It is also worth mentioning that wages between white males, and males of minority groups can be as high a difference as $20,000 a year with women in minorities falling behind anywhere between $10,000 and $40,000 less than white males. This article helps to show that even though steps are being taken to increase the amount of minorities in STEM, it is not occuring as fast as we once hoped.

Unit 7: Pipeline Expansion in the Dakotas

BIG Question: Why is the pipeline expansion such an important topic to Native Americans, and should a group of people with little to knowledge of the land and its importance to Native Americans be allowed to infringe on that land with something that goes against Native Americans beliefs?
Argument of the Unit: The protests lead by Native Americans are an example of centuries old protest traditions and they were protesting to save their values and beliefs of the land.
Key Words: Standing Rock, scare tactics, bureaucratic, Dakota Access Pipeline, protests
Link to Reading: Standing Rock Protest
Annotation of Reading: The Dakota Access Pipeline was debated in 2015, it caused an uproar that had not been seen in recent years. Thousands of people from all walks of life came to show support to the tribes that lived in North and South Dakota. Members from tribes that had been fighting all came together to protect the land. The Rosebud Sioux tribe from South Dakota called the proposed pipeline an act of war. Over 400 people were sprayed with tear gas and water in below freezing temperatures after crossing a river to protest the pipeline. The pipeline caused so much upset because of the infringement on sacred lands. Many tribes believe that the earth and animals are sacred and should be protected. The people who debated the pipeline had no knowledge of how Native Americans see and treat the land, and only one Native American sat on the council to debate the pipeline. He said the pipeline could cause catastrophic damages to the land if a spill occured and that the land should be protected. This article shows how the low amount of Native Americans in STEM careers can negatively impact honest and fair decision making for their sacred lands.