



Including the Humanities in STEM Education

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Movement toward integrating STEM and the Humanities -a SENCER journey

- 1995 Traditional Science to New Century College: Byer Model, How People Learn, LC movement
- 1997-2015 SENCER; Smithsonian Mason Semester, DoNOW KQED, Field Courses, Coyote teaching... about 20 courses
- What is Learning Anyway? 2014-15
 - S. Carroll, K. Oates, D. Burns, J. Labov, T. Wood
Ideas from SENCER faculty. SSI presentations
- Listening to wisdom of elders

Why does this approach matter?

- Adapts to knowledge about how people learn
- Responds to current institutional constraints temporally
- Responds to student needs
- Fun

“From Neurons to Neighborhoods”

National Academies of Science

- Theme 1: All children are born wired for feelings and ready to learn
- Theme 2: Early environments matter and nurturing relationships are essential
- Theme 3: Society is changing and the needs of young children are not being addressed
- Theme 4: Interactions among early childhood science, policy, and practice are problematic and demand dramatic rethinking

“Disciplinary silos don’t tend to correlate with the biology of the real world” (Lewontin, 1991; NICHHD)

- Bruce Alberts’s *Molecular Biology of the Cell* and the Periodic table
- Structural silos in biology departments and the memorization of facts and figures and the battles at the expense of a student’s expense
- Reflection on 6 million years of Hominid evolution provides obvious insight



Mason Core

- Critical and Creative Scholars
 - inquisitive, open-minded, capable, informed, and able to integrate diverse bodies of knowledge and perspectives
- Self Reflective Learners
 - identify and articulate individual beliefs, strengths and weaknesses, critically reflect on these beliefs and integrate this understanding into their daily living
- Ethical, Inquiry-Based **Citizens**
 - tolerant and understanding, communicate about problems of local, national and global significance
- Thinkers and Problem Solvers
 - able to discover and understand natural, physical, and social phenomena; who can articulate their application to real world challenges; use connections in historical, literary and artistic fields

Human Creativity: Science and Art

- Knowledge growth through inquiry of issues important to us all: (constantly changing)
- Focused on Climate Science and Biodiversity
- Development of visual art created to deepen emotional ties to the science

Mandala Course

The mandala of Akshobhya



Class demographics Spring 2018

- 13/22 students first generation college (59%)
- 10/22 students identified as Caucasian (45%)
- 76% female
- 80% will **not** pursue STEM majors/careers
- 60% want to become teachers

Let's look at SALG results.... Salgsite.org

Thomas Wood INTS 103 Spring 2018 Post-Test
Science and Art instrument #82088

Course Activities

- Discover how people learn (full week 1)
- Current Events, Discussion of readings or films, Smithsonian museum visits, lectures, in the field with artists
- Written exams, open book and application of concepts required
- Weekly reflection, moderate writing
- Visions of Nature: visual literacy practice, museum visits, work with artists, create visual art and reflect Semester long, three major components

Changed the way I study/learn

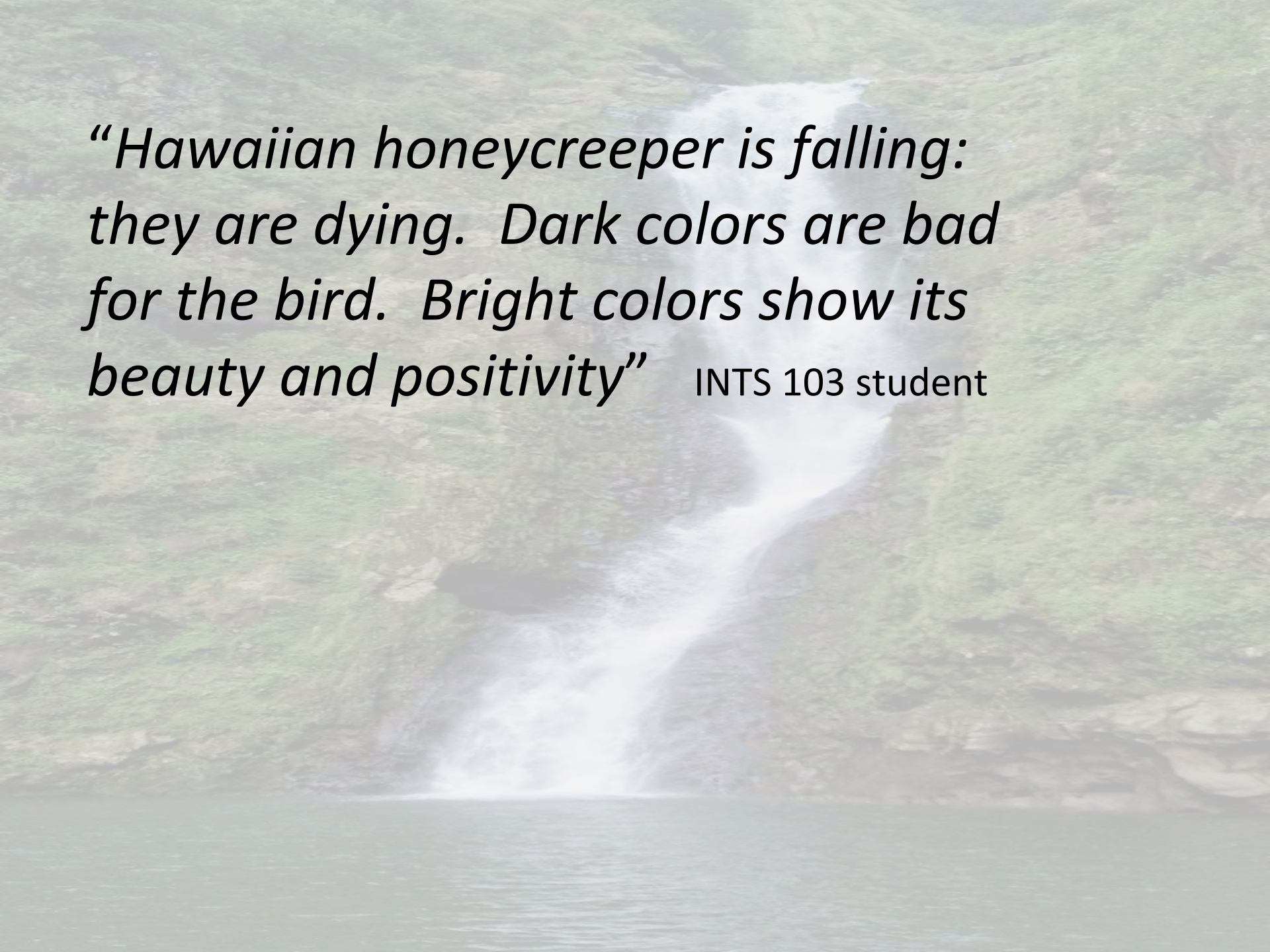
- “I am now more inclined to use images to help me learn and relate a subject to something I learned in the past.”
- “I definitely engage more with what I'm being taught in multiple ways.”
- “I don't think it has changed how I learn, more how I think about learning”
- “I think about this topic fairly often”
- “I do the same things, it's ingrained in me at this point ”
- “This class has opened me up to the idea of seeking current events that are relevant to what ever I am studying as a way of seeing applications of a subject. This strengthens my understanding of the topic. ”

The way this class was taught ...

- “I remembered key ideas by the activities that we did. The timeline and animal activity helped me remember the concepts more than just talking about it.”
- “We were taught in a manner where we reviewed previously taught subjects which really helped put the information into my long term memory.”
- “I definitely liked how the class was taught because the teacher made it a lot easier to understand by putting topics into real-world perspectives.”
- “Having information reinforced through a variety of sources made information easier to recall. Information that was enforced only through powerpoint is what I now find most difficult to grasp.”
- “I appreciated the weekly reflection assignments as they helped me to remember key ideas we discussed each week.”

How has your understanding of the subject changed?

- “This class really helped change my perspective on what biodiversity means for the planet”
- “I was familiar with the concept of climate change prior to taking to this class. However, my understanding of the subject such as the process, the causes, and consequences increased drastically after the coursework. I can say I am more knowledgeable about the subject and can in fact discuss the matter in the future as I was unable to do so prior to taking the class as my knowledge and understanding of climate change was extremely limited ”
- “I use it outside of class ”
- “This class has clarified my understanding of the topic while also adding a sense of urgency to my desire to become involved in real world solutions to climate change. ”

A photograph of a waterfall cascading down a rocky, mossy cliff into a pool of water. The water is white and frothy as it falls, and the surrounding rocks are covered in green moss. The background is a soft, out-of-focus green, suggesting a lush forest or garden.

*“Hawaiian honeycreeper is falling:
they are dying. Dark colors are bad
for the bird. Bright colors show its
beauty and positivity”* INTS 103 student

