

Hot Science for Cool Educators and Students

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Should we laugh or cry? I felt like doing both. Here I take a broad view of science illiteracy: Underperformance in classrooms, and lack of science awareness outside of it.

- 1) A lack of inspiration and confidence about science is believed to contribute to decreasing interest in science and technology careers among K-12 students (NRC 2006)
- 2) U.S. high school students in 2009 were in the bottom 25% in math and bottom 33% in science proficiency (Planty 2009 for NCES).
- 3) Texas, in particular, has a large population of groups that are chronically under-represented in the STEM work force, and these groups have limited prospects for improving their status because they under-perform in STEM-related academics (Brown 2009).



- 1) Most Americans lack an understanding of the basic science needed to grasp the potential impacts of inaction on issues such as climate change and species extinctions
- 2) Many people report they don't feel comfortable or confident in university settings and science talks (Kahlor 2010)
- 3) Research-1 universities are not solely centers for STEM research and development. These institutions contain untapped resources for K-12 educators, students, and parents in the form of
 - 1) powerful science outreach forums,
 - 2) real-life role models, and
 - 3) timely content for teaching resources.

Teachers Need Support



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- 1) Teachers are under-resourced and over-leveraged for time to keep up-to-date on emerging science topics
- 2) Teachers don't have enough time to come up with effective ways to teach these topics in the classroom
- 3) They need extra resources to teach touchy topics like climate change and evolution

Informal Science Learning Opportunities

- Most people learn science in informal settings
- Decision-makers are calling for increased focus on ISE
- Powerful upside: integrate informal & formal learning!

Most people learn science within informal environments (NRC 2009)
Managers and Educators are calling for increased ISE support (e.g., NSF)
Powerful upside: integrate informal & formal learning!

Hot Science – Cool Talks Lectures



- 1) 84 Talks over 14 years on UT's Campus, with entertaining, fascinating speakers such as Sally Ride, David Orr, and Tyrone Hayes as well as a myriad of talented researchers on UT's campus
- 2) Average of 450 people per event
- 3) Picture shows that science talks can be truly entertaining



- 1) We webcast to people who can't attend in person, providing
 - 1) audio,
 - 2) video,
 - 3) Powerpoint Presentation, and
 - 4) Real-time Q&A with the speaker

Hot Science – Cool Talks Fairs



Hot Science – Cool Talks Workshops



Workshops have been held on-site at Events, and we currently support a flourishing Satellite Viewing Parties of the Webcast that bring teachers, content experts, and students together remotely.

2012/2013 so far:

- 7 Satellite viewing events
- Over 210 Teachers and 7 content experts participated
- 630 PD Credit hours awarded
- CD-ROMs with customized lesson plans being sent to EACH participating teacher

Teaching Curriculum CD-ROMs

The University of Texas at Austin Environmental Science Institute
HOT SCIENCE - COOL TALKS
Outreach Series Volume 80



Last Call at the Oasis:
Will There be Enough Water for the 21st Century?
Dr. Jay Famiglietti

TEACHING MODULES

Saving Water Now: The Water Conservation Problem (Grades K-2)
Making Liquid Gold: Water Filtration by People and Mother Nature (Grades 3-5)
Groundwater: The Hidden Resource (Grades 6-8)
Exploring Aquifers: Porosity and Permeability (Grades 9-12)

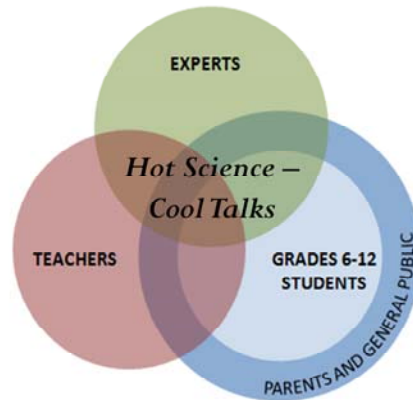
LEARNING MODULES

GRACE: A Giant Water Scale in the Sky
Trouble in the Top Soil: Erosion as a Global Threat
Desalination as a Water Purification Technique

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Hot Science – Cool Talks Outreach

Integrating Stakeholder groups



Teacher Ratings

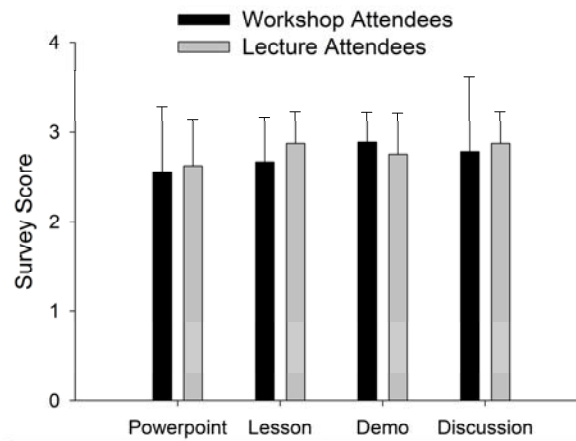
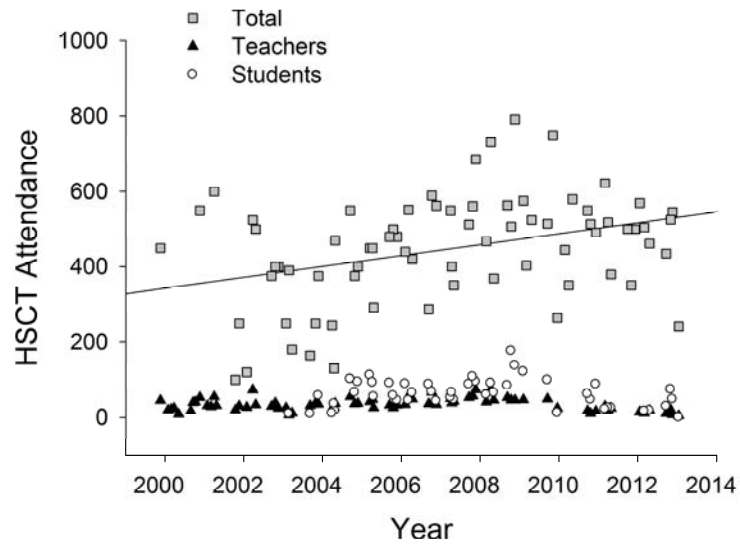
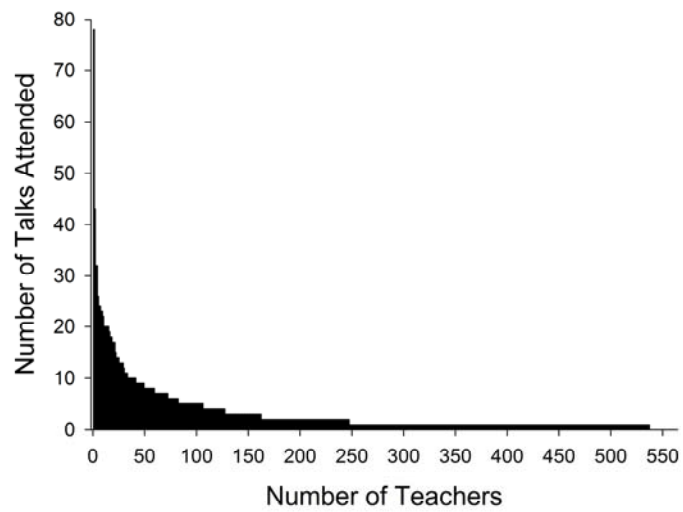


Figure 3: Attendee ratings of workshop deliverables. Two survey groups (workshop and lecture) for teachers who had previously attended workshops were provided to control for self-selection effects in sampling. 1= No Benefit, 2 = Moderate Benefit, 3 = High Benefit

Hot Science – Cool Talks Attendance



Teacher Attendance Frequency





Teacher attendance frequency at Hot Science – Cool Talks




Expanding Teacher Access: A Portal

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VOLUME	DATE	SPEAKER	TOPIC	LECTURE MATERIALS	WEBCAST
84	March 6, 2013	Dr. Jason Kalirai	Space Telescopes as Time Machines: Hubble's Legacy and the Future through the James Webb Space Telescope	PowerPoint Presentation PDF Presentation	
83	February 22, 2013	Dr. Robert Bullard	Environmental Justice: Progress Towards Sustainability	Powerpoint Presentation PDF Presentation	
82	January 8, 2013	Dr. Kerry Emanuel	Hurricanes in the Gulf of Mexico: The History and Future of the Texas Coast	PowerPoint Presentation PDF Presentation	

Familiar Faces...



- 1) Adult attendees; 37% had a bachelor degree and 38% had an advanced college degree such as an M.A., M.D., J.D., or Ph.D.
- 2) The estimated household income of the interviewees ranged from less than \$10,000 to more than \$200,000, with 72% estimating their household income before taxes to be more than \$50,000.
- 3) Interviews with the attendees *without* college degrees suggested several key barriers to attendance that they needed to overcome, including a lack of program awareness, a lack of motivation, fear of not fitting in on a college campus, and a lack of confidence in their ability to understand the content.

Connecting with Underserved Populations

- Support for Spanish Speakers attending ***Hot Science – Cool Talks***: a Pre-Lecture Primer
- Spanish-Translated ***Hot Science – Cool Talks*** Webcast



- 1) While women and minorities now constitute 70% of college students, they represent only 45% of students receiving undergraduate STEM degrees (President's Council of Advisors on Science and Technology, 2012).
- 2) At higher education levels, the majority of U.S. STEM doctoral degrees are awarded to foreign students (Wildavsky 2010).
- 3) The AISD serves as our starting point recent surveys show the district serves a student body that is 63% "economically disadvantaged", 29% "English-learner"

Connecting with Underserved Populations

- Targeted Audience Research (UT College of Communications)
 - Identify & Overcome attendance barriers
 - Develop effective outreach messaging
 - Locate target audience outreach venues

- 1) Improve HSCT Outreach with new messaging: Communications, Portal, Webcast
- 2) Place HSTCT Message within identified outreach venues
- 3) Connect HSCT Venues – Website, Portal, YouTube, Facebook – with Target Audience Venues – “play where they play”

Thank You

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Questions?