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

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!
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
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

HOT SCIENCE - COOL TALKS

TEACHING MODULES
- Sailing 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)
- Explaining Aquifers: Porosity and Permeability (Grades 9-12)

LEARNING MODULES
- UNAIDS: A Giant Water Hole 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

![Bar chart showing survey scores for Workshop Attendees and Lecture Attendees across Powerpoint, Lesson, Demo, and Discussion categories.]

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

Environmental Science Institute

Tales Archives

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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”
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?