SEPA Science Education Partnership Award

Supported by the National Center for Research Resources, a part of the National Institutes of Health

2011 Annual Conference ✦ Seattle Washington

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Overview

The SEPA 2011: NCRR Science Education Partnership Award Annual Conference was held May 8–11 at the Renaissance Seattle Hotel in Seattle, Washington. Principal Investigators, staff, evaluators, and teachers from 87 SEPA projects, as well as NIH NCRR staff members and other interested individuals, participated in the Conference; a total of 244 individuals attended.

The Conference theme, "Science Education: The Changing Landscape" was addressed in plenary and breakout sessions. The Conference also provided opportunities for updates by NIH staff, discussions of evaluation methods and tools, regional meetings, sharing educational materials that have developed out of SEPA projects, networking, and an exchange of information among SEPA projects.

Conference Organizing Committee

Theresa Britschgi - Seattle BioMed
Ann Chester - West Virginia University
Jeanne Chowning - Northwest Association for Biomedical Research
Bridget Coughlin - Denver Museum of Nature and Science
Sonsoles de Lacalle - Charles Drew University
Louisa Stark - University of Utah

Conference Supported By

NIH NCRR Grant R13 RR024901
Louisa A. Stark, PhD,
Principal Investigator

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SEPA 2011: Annual NCRR Science Education Partnership Award Conference
Science Education: The Changing Landscape
Renaissance Seattle Hotel, Seattle, WA

May 8-11, 2011
Schedule

Sunday, May 8

6:00 - 8:00pm Early Conference Check-in
Visions Room (28th floor)

6:00 - 8:00 **Welcome Reception**
Visions Room (28th floor)

7:30 - 9:00 **Satellite Session: National Association of Health and Science Education Partnerships (NAHSEP)**
NAHSEP is the professional organization for individuals and programs engaged in health and science education partnerships. Membership is free. Everyone is invited to attend

Seneca Room (4th Floor)

Monday, May 9

All sessions will be held in the Madison Ballroom (2nd floor, access from hotel lobby), unless otherwise noted

7:00 - 8:00am Late Conference Check-in (outside Madison Ballroom)
Buffet Breakfast
Set up posters in North and West Rooms (3rd floor)
See poster list for location assignments (pages 26 - 30)

8:00 - 8:30 **Welcome from the SEPA 2011 Conference Organizing Committee**
Louisa A. Stark, University of Utah

Welcome from Seattle area SEPA Projects
Jeanne Ting Chowning, Northwest Association for Biomedical Research
Theresa Britschgi, Seattle Biomedical Research Institute

Conference Schedule and Logistics

8:30 - 9:30 **Plenary Presentation**
Representative Jay Inslee (D-WA)

9:30 - 9:45 Break

9:45 - 10:30 **SEPA Program Overview and Update**
L. Tony Beck, NIH NCRR SEPA Program Officer

10:30 - 11:00 **SEPA Website Update**
Nancy Place and William Sanns, University of Texas Health Science Center at San Antonio

11:00 - 12:15 **A Five-Year Federal Strategic Plan for STEM Education: Implications for SEPA**
Bruce A. Fuchs, Director, NIH Office of Science Education

12:15 - 1:30 Lunch - SEPA Project Mentor-Mentee groups meet over lunch

1:30 - 2:45 **Poster Session I** – Even numbered posters
North and West Rooms (3rd floor)

2:45 - 3:15 **SEPA Regional Alliances: Why, How and for Whom?**
Michael Chorney, Penn State University College of Medicine

3:15 - 3:30 Break

3:30 - 4:30 **SEPA Regional Meetings**
Meet SEPA projects in your region, share projects, best practices, and challenges. Discuss opportunities for collaboration.

Region	States	Room
Northeast	CT, MA, ME, NH, RI, VT	Spring (4th floor)
Mid-Atlantic	DC, DE, MD, NJ, NY, OH, PA, WV	Seneca (4th floor)
Southeast	AL, AR, FL, GA, LA, MS, NC, SC, TN, VA, PR	East (3rd floor)
Midwest	IA, IL, IN, KY, MI, MN, MO, WI	Marion (4th floor)
Great Plains	KS, NE, ND, OK, SD, TX	James (4th floor)
Rocky Mountain	AZ, CO, ID, MT, NM, NV, UT, WY	Municipal (1st floor)
West	AK, CA, HI, OR, WA	Columbia (4th floor)

4:30 - 4:45 Break

4:45 - 5:15 **Let's Get Healthy Exhibit**
Jackie Shannon, Project Director, Let's Get Healthy Exhibit

5:15 - 6:45 Networking (South, West and North Rooms, 3rd floor)
Experience the Let's Get Healthy exhibit

Dinner on your own – sign up at registration desk for participant-initiated group dinners

Tuesday, May 10

All sessions will be held in the Madison Ballroom (2nd Floor, access from hotel lobby), unless otherwise noted

7:00 - 8:00am Breakfast

PI meeting for all new SEPA projects – East Room (3rd floor)
(required for new PIs)
L. Tony Beck, NIH NCRR SEPA Program Officer

8:00 - 9:00 **Evaluating the SEPA Program and Projects**

Update on the SEPA Evaluation Feasibility Study
Joy Frechtling, Westat

Panel Discussion
L. Tony Beck, NIH NCRR SEPA Program Officer
Bruce A. Fuchs, Director, NIH Office of Science Education

9:00 - 9:15 Break

9:15 - 10:30 **Trends in Science Education: Learning Pathways, Disciplinary Practices & Educational Equity**
Philip Bell, PhD, Associate Professor of the Learning Sciences, Director of the Institute for Science and Math Education, University of Washington

10:30 - 10:45 Break

Please sit with people you don't know and/or people from other SEPA projects for the Community Conversations

10:45 - 12:00 **Community Conversations**
Facilitator: Jeanne Ting Chowning, Northwest Association for Biomedical Research

12:00 - 1:15 Lunch

What Constitutes "Rigor"? Discussion on balancing needs and interests of stakeholders with need to document learning
Facilitator: Erin Dolan, Virginia Polytechnic Institute and State University
East Room (3rd floor)

1:15 - 2:30 **Poster Session 2** – Odd numbered posters
North and West Rooms (3rd floor)

2:30 - 2:45 Break

2:45 - 4:00 **Breakout Sessions**

Mixed Data Design and Analysis – What's Right for Your Project?
Evaluation Strand
Marion Room (4th floor)

Personalized Museum Exhibits: Education and Research Considerations
ISE and Evaluation Strands
Spring Room (4th floor)

SEPA Diabetes, Obesity, Cardiovascular (DOC) Working Group: Developing a Strategic Plan
SEPA DOC Strand
Seneca Room (4th floor)

Effective Recruitment and Retention: Reaching Your Target Group and Keeping Them Engaged
Teacher Professional Development Strand
East Room (3rd floor)

Commercializing Products from SEPA Projects
Sustainability Strand
James Room (4th floor)

Partnering with Native American Communities
Collaboration Strand
Columbia Room (4th floor)

Teaching About Clinical Trials: Jigsaws and Structured Academic Controversies – Classroom Strategies for Exploring Challenging Concepts
Sharing Materials Strand
Madison Ballroom

4:00 - 4:15 Break

4:15 - 5:15 **Breakout Sessions: Sharing Best Practices and Challenges**

Evaluators – Marion Room (4th floor)
Facilitator: Molly Stuhlsatz, BSCS

Informal Science Education – James Room (4th floor)
Facilitator: Bridget Coughlin, Denver Museum of Nature & Science

Project Managers – Seneca Room (4th floor)
Facilitators: Mel Limson, American Physiological Society
Adrienne Loffredo, Wake Forest University School of Medicine

Teachers – Spring Room (4th floor)
Facilitators: Mario Godoy-Gonzales, Royal High School, WA
Margaret Shain, American Physiological Society

Dinner on your own – sign up at registration desk for participant-initiated group dinners
See restaurant recommendations at http://learn.genetics.utah.edu/sepa2011/html/restaurants.cfm

Wednesday, May 11

All sessions will be held in the Madison Ballroom (2nd Floor, access from hotel lobby), unless otherwise noted

7:00 - 8:00 Breakfast

8:00 - 9:15 **Breakout Sessions**

Work in Progress: Developing an Instrument to Assess General Science Literacy in Middle School Students
Evaluation Strand
Seneca Room (4th floor)

Evaluation Designs
Evaluation Strand
East Room (3rd floor)

Communicating Complex Ideas in a General Public Exhibition and Building Strategic SEPA ISE Connections
ISE Strand
Marion Room (4th floor)

Science in the Context of Health Living: SEPA as Part of the National Movement
SEPA DOC Strand
Spring Room (4th floor)

The Role of SEPA PI's in Building Students' Success in STEM Careers
Collaboration Strand
Madison Ballroom

Using "Critical Friends" Discussion Protocols – Responsible Conduct of Research Example
Teacher Professional Development Strand
Columbia Room (4th floor)

Think Twice – Applying Critical Appraisal Methods to Transformed Peer-Reviewed Scientific Literature
Sharing Materials Strand
James Room (4th floor)

9:15 - 9:30 Break

9:30 - 10:45 **Breakout Sessions**

Using Cognitive Interviews to Assess Assessment Quality
Evaluation Strand
Spring Room (4th floor)

Evaluation Instruments for Measuring Teacher Self-Efficacy and Changes in Students' Attitudes Toward Science
Evaluation Strand
James Room (4th floor)

An Opportunity for Your SEPA to Conduct CBPR
SEPA DOC and Collaboration Strands
Marion Room (4th floor)

21st Century Professional Development for Teachers
Teacher Professional Development Strand
Seneca Room (4th floor)

From Cells to Atoms: Helping Your Project Participants Comprehend Size, Scale and the Dynamic Processes of Cell Communication
Sharing Materials Strand
East Room (3rd floor)

Why Us? The Curriculum: Broadening Access and Use
Sharing Materials Strand
Madison Ballroom

10:45 - 11:00 Break

11:00 - 12:00 **Reflections on the Conference and Looking Forward**
L. Tony Beck, NIH NCRR Program Officer
Bruce A. Fuchs, Director, NIH Office of Science Education

12:00 - 1:00 Lunch

Please complete the conference evaluation at https://www.research.net/sepa2011
You may return to the evaluation throughout the conference, as long as you use the same computer.

SEPA 2011: Annual NCRR Science Education Partnership Award Conference
Science Education: The Changing Landscape
Renaissance Seattle Hotel, Seattle, WA
May 8-11, 2011
Breakout Sessions

Tuesday, May 10 – 2:45 - 4:00pm

Mixed Data Design and Analysis--What's Right for Your Project?

This session will provide a step-by-step guide for selecting and applying the appropriate quantitative, qualitative, or mixed data analytic techniques for your evaluation project. Focusing on mixed method designs, this interactive session will provide examples of the entire research and evaluation process, including selecting an appropriate research/evaluation question, designing a mixed method research/evaluation study, collecting data and analyzing, interpreting, and reporting the results. Presenters will also briefly describe analysis software used in behavioral science for quantitative (e.g., SPSS, SAS), text-based (qualitative) (e.g., NVivo), and mixed method data (e.g., QDA Miner).

Intended Outcomes: An understanding of the appropriate research design and analysis techniques for your project(s), with a focus on conducting mixed data evaluations.

Level: Intermediate, Advanced

Facilitator: Dina Drits, University of Utah

Panelist: Kristin Bass, Rockman Et Al

Room: Marion (4th floor)

Personalized Museum Exhibits: Education and Research Considerations

Heart Smart serves as the centerpiece for two research projects: a museum visitor study and a high school health education study. The exhibit interactive components educate visitors about cardiovascular health by inviting them to take simple personal measurements (e.g., height, weight, waist size, blood pressure, and self-reported habits). The influence of the museum-based exhibit and its related materials is being examined in a randomized controlled trial of public high school students. Tailored personalized health feedback is provided at each health interactive station in the form of brief health risk appraisals. Personal health risk appraisals make results salient for visitors and may prompt a decision to reduce risk and improve health. Using algorithms based on gender and age, personalized results and feedback are given and can be privately read on the computer interactive screens. Access to personal data is also available through the project's website.

Intended Outcomes: Experience on how to personalize an exhibit. ...insight on how to do RCT in a museum setting ...insight to an university-museum collaboration …share best practices, challenges and lessons learned

Level: Intermediate

Facilitator: Judy A. Brown, Miami Science Museum

Panelists: Patrice Saab, University of Miami
Lúcia E. Williams, Miami Science Museum

Room: Spring (4th floor)

SEPA Diabetes, Obesity, Cardiovascular (DOC) Working Group: Developing a Strategic Plan

The vision of the Diabetes, Obesity, and Cardiovascular Disease Working Group (DOC) is to leverage the resources of SEPA projects to not only to promote mathematics and scientific literacy for all United States citizens but also to improve health-related behaviors – specifically eating and physical activity – that will promote energy balance and decrease risk of chronic diseases. The purpose of the proposed session is to provide DOC SEPAs an opportunity to meet face-to-face to discuss the working group's mission and develop of a strategic plan for future initiatives. DOC WG members, new and old, will be encouraged to recharge their enthusiasm for working together and make concrete action plans to continue to work together throughout the coming year.

Intended Outcomes: 1. An understanding of the DOC WG mission. 2. Partnership with other DOC SEPAs. 3. An understanding of the DOC WG future initiatives as it relates to the discussed strategic plan.

Level: All Levels

Facilitator: Melani W. Duffrin, East Carolina University

Panelists: Virginia Carraway-Stage, East Carolina University
Wendy Huebner, Montclair State University
Pam Koch, Teachers College Columbia University

Room: Seneca (4th Floor)

Effective Recruitment and Retention: Reaching your Target Group and Keeping Them Engaged

Recruiting and retaining program participants can be challenging. Finding and communicating with the right target group for recruitment is essential and, once selected, attrition can impact program management and evaluation as well as overall program impact. In this session, participants will learn strategies and tools for finding and keeping student or teacher participants who will benefit from their SEPA programs. Examples of specific challenges, lessons learned, evaluation implications, and best practices will be shared by a panel of program administrators for both short- and long-term program activities, including online programs, summer research experiences, workshops, curriculum development projects, and conference travels. Participants will be encouraged to discuss the needs specific to their programs.

Intended Outcomes: Strategies and tools for recruiting and retaining participants in your programs; an understanding of the challenges and issues that can potentially arise with respect to full participation and engagement in programs; and knowledge of the best practices in preventing participant attrition. Potential for setting up a "best practices" wiki page for SEPA programs.

Level: All Levels

Facilitator: Mel Limson, American Physiological Society

Panelists: Marsha Lakes Matyas, American Physiological Society
Nancy Moreno, Baylor College of Medicine
Margaret Shain, American Physiological Society

Room: East (3rd floor)

Commercializing Products from SEPA Projects

The focus of this breakout session will be on how the commercialization of SEPA "products" can be used for dissemination and sustainability of SEPA projects. Panelists will discuss their experiences and share "lessons learned" regarding the commercialization process, such as: Working with universities' technology transfer offices (copyrights, patents and licensing); collaborating with existing companies to commercialize (and/or market) products; issues related to starting and operating a small business (legal, paperwork, taxes and accounting); identifying sources of funding (including SBIR/STTR and other sources), and; use of small business "incubators" and other resources.

Intended Outcomes: A better understanding of how SEPA products can be commercialized for dissemination and/or sustainability of your SEPA project.

Level: All Levels

Facilitator: Dina Markowitz, University of Rochester

Panelists: Beth Anderson, Arkitek Studios
Laura Lynn Gonzalez, Green-Eye Visualization
John Pollock, Duquesne University

Room: James (4th floor)

Partnering with Native American Communities

This session will bring people who have established partnerships with schools and communities that serve Native American populations. They will discuss issues related to trust, culture, native language and science that help to forge strong and sustainable bonds. They will also share some of the curricula or programs that have been implemented within their partnerships.

Intended Outcomes: Knowledge and perspective of how to best engage a Native audience and build a sustainable partnership.

Level: All Levels

Facilitator: Maurice Godfrey, University of Nebraska Medical Center

Panelists: Glenn Drapeau, Marty Indian School
Chola Moll, University of Alaska
Kim Soper, University of Nebraska Medical Center
Tony Ward, University of Montana
Kelley Withy, University of Hawaii

Room: Columbia (4th floor)

Teaching About Clinical Trials: Jigsaws and Structured Academic Controversies - Classroom Strategies for Exploring Challenging Concepts

This interactive session will begin with a brief overview of the clinical trials process as it is presented in the Biomedicine Works project. This field-tested curriculum uses a jigsaw strategy to explore challenging content (the fifty year history of clinical trials around retinopathy of prematurity). Participants will receive the jigsaw curriculum materials that are appropriate for high school classrooms or as a professional development activity for high school teachers. Attendees will then engage in a Structured Academic Controversy (SAC) that explores some of the bioethical challenges faced by participants in breast cancer clinical trials. The SAC has been developed through collaboration between NWABR and FBR. Participants will be asked to critique this approach to teaching about the ethical issues inherent in the clinical trials process. The feedback will be used to revise the lesson plan, and this SAC will be made available to SEPA PIs through the NWABR and FBR websites.

Intended Outcomes: An understanding of the bioethical challenges confronted by participants in clinical trials. Participants will also learn a lesson strategy that promotes student discussion of complex socio-scientific issues.

Level: All Levels

Facilitator: Walter Allan, Foundation for Blood Research

Panelists: Jeanne Chowning, Northwest Association for Biomedical Research
Jeri Erickson, Foundation for Blood Research

Room: Madison Ballroom

Wednesday, May 11 – 8:00-9:15am

Work in Progress: Developing an Instrument to Assess Scientific Literacy in Middle School Students

At last year's SEPA meeting we held a session to pool our knowledge about available instruments to measure generic scientific literacy in middle and high school students. The group identified barriers and gaps and discussed constructive steps and strategies to fill those gaps. A year has made a difference – thanks to a SEPA Administrative Supplement, we now have the opportunity to develop such an instrument. The goal is to develop a tool to measure general science literacy among middle school students. As such, it will not require knowledge of any specific science discipline and should have broad utility. During this session we will tell you about the team assembled for this task, describe the constructs we intend to test, and share with participants the draft instrument. We want your feedback about the work so far and your thoughts about if, and how, an instrument to test general science literacy could be used in evaluations of other SEPA projects.

Intended Outcomes: Understanding constructs of general science literacy that are feasible to test in young people; opportunity for input into development of an instrument to test general science literacy.

Level: All Levels

Facilitator: Wendy Huebner, Montclair State University

Panelists: Lisa Abrams, Virginia Commonwealth University
Kristin Bass, Rockman Et Al

Room: Seneca (4th floor)

Evaluation Designs

In this session several SEPA projects will present their evaluation designs as well as what has worked well, challenges and lessons learned. A range of designs will be presented for evaluation of student programs, teacher professional development and curriculum development projects. There also will be time for discussion and contribution from all participants.

Intended Outcomes: Participants will gain insights into the appropriateness of several evaluation designs as well as challenges, issues and lessons learned.

Level: Intermediate, Advanced

Facilitator: Ann Chester, West Virginia University Robert C. Byrd Health Science Center

Panelists: Dina Drits, University of Utah
Amy Nisselle, Cold Spring Harbor Laboratory
Gillian Roehrig, University of Minnesota
J. Michael Wyss, University of Alabama at Birmingham

Room: East (3rd floor)

Communicating Complex Ideas in a General Public Exhibition and Building Strategic SEPA ISE Connections

There is a constant tension between the desire and need to communicate complex scientific ideas and biomedical research, and the appetite of the general public, especially in a leisure situation such as a family trip and school field trip to a museum or a science center. Concomitantly there is a need across the SEPA community to share and leverage resources and best practices across the SEPA ISE landscape. This session will present one ISE science center exhibit and touring exhibition that has tried to do just that, through a partnership with the science advisors who know the content, the regional initiative tasked with communicating that, the local science center with expertise in developing interactive exhibitions on a range of topics and collaboration with other NCRR SEPA projects with expertise in the development of web-based resources spanning interactive gaming and curriculum dissemination.

Intended Outcomes: As a result of participating in this session, attendees will gain: an understanding of the complexities – and benefits – of a collaborative process in creating a science center exhibit to disseminate research. An attendant outcome as result of interactive discussion will be how to best share and connect SEPA ISE resources and best practices.

Level: Beginner, Intermediate

Facilitator: Joan F. Schanck, Pittsburgh Tissue Engineering Initiative

Panelists: John Pollock, Duquesne University
Dennis Bateman, Carnegie Science Center

Room: Marion (4th floor)

Science in the Context of Healthy Living: SEPA as Part of the National Movement

From the First Lady's Let's Move initiative on down in government and in schools across the country people are talking about educating children about healthful eating and active living. Science education, through the process of inquiry-based investigations, is a wonderful way to teach students evidence for why healthful choices are important — making science personally meaningful through the context of healthful living. Additionally, psychosocial behavior change theory can help students effectively make positive health behavior changes. Thus, when we use science evidence to teach "why-to" and behavior change theory to teach "how-to" we have a powerful combination to change what students know, their values, and their every day food and physical activity choices. SEPA DOC (Diabetes, Obesity, and Cardiovascular Disease) members and other interested parties are encouraged to attend and participate by engaging in discussion of current trends and how SEPA can be at the forefront of this important movement.

Intended Outcomes: 1. An understanding of the current national trends relating to science education in the context of healthy living. 2. Partnerships with other SEPAs interested in science education in the context of healthy living. 3. An understanding of the role related-SEPA projects might play in the overall national movement.

Level: All Levels

Facilitator: Pam Koch, Teachers College Columbia University

Panelists: Melani Duffrin, East Carolina University
Virginia Carraway-Stage, East Carolina University

Room: Spring (4th floor)

The Role of SEPA PI's in Building Students' Success in STEM Careers

Innumerable publications decry that current student science, technology, engineering and mathematics (STEM) interests and proficiencies foretell of a future lacking the vital talent needed to face health, energy and climactic hurdles facing mankind. In this session, participants will engage in a discussion of current or planned practices conducted by SEPA PIs that are supporting national efforts to advance STEM achievement (inside and outside the classroom). Panelists hope to capture best practices within SEPA communities and brainstorm creative opportunities for PIs to positively contribute to national endeavors that support both individual student success as well as America's knowledge-based, entrepreneurial industry sectors in the 21st century.

Intended Outcomes: Discuss and share best practices within the SEPA community in supporting the national STEM education movement.

Level: All Levels

Facilitator: Theresa Britschgi, Seattle Biomedical Research Institute

Panelists: Beth Anderson, Arkitek Studios
Bruce Fuchs, NIH Office of Science Education
Marco Molinaro, University of California Davis
Meena Selvakumar, Pacific Science Center

Room: Madison Ballroom

Using "Critical Friends" Discussion Protocols – Responsible Conduct of Research Example

"Critical Friends" discussion protocols provide a structured format for feedback. NWABR has used these discussion protocols with a variety of groups related to our SEPA grant. For example, we have used them with teachers in our online course and in our professional development workshops to gather feedback on final assignments, with our curriculum writers to help refine lessons, and with students who have created project proposals. In this session, participants will engage in a discussion using content that NWABR would like feedback on: the Responsible Conduct of Research, especially as it relates to the nature and processes of science. This session serves two purposes; participants will learn about the Critical Friends protocols while simultaneously providing important guidance to a new SEPA curriculum unit in development. The facilitator has received Critical Friends Group Coaches' training and will share a variety of protocols.

Intended Outcomes: Experience in using a Critical Friends Group protocol and understanding of how it might be used in your own work.

Level: All Levels

Facilitator: Jeanne Chowning, Northwest Association for Biomedical Research

Panelist: Joan Griswold, Northwest Association for Biomedical Research

Room: Columbia (4th floor)

Think Twice – Applying Critical Appraisal Methods to Transformed Peer-Reviewed Scientific Literature

When we hear "research says…," do we ask, "does it really?" In this session we will share our peer-reviewed journal transformations and the processing out activities that help students evaluate the quality of "what research says." Participants will receive information on the 'transformational process,' 'a fair use checklist,' color copies of a lesson exemplar entitled, "Dopamine May Affect Thrill-Seeking Behavior in Humans," including a journal and lay media component, compare/contrast diagram, a variable finder, and a hypothesis generator, along with data analysis modules. Each lesson element applies aspects of critical appraisal and higher order thinking and challenges students as they increase their scientific literacy. This lesson and others like it are available at our project website, http://www.teachhealthk-12.uthscsa.edu. Participants will also receive our "Hierarchy of Study Design" poster, aligned with the scientific investigation strand of the Texas education standards.

Intended Outcomes: As a result of participating in this session, participants will acquire and use new learning materials that help teach about aspects of scientific investigations, and the reporting and evaluating of scientific literature (e.g., study design and bias; identifying variables; creating grade level-appropriate data displays; analyzing results; generating hypotheses; and comparing/contrasting journal literature with lay media reports). From the group discussion and our experiences, it is anticipated that participants will be armed with tools to apply aspects of critical appraisal strategies in their classrooms.

Level: All Levels

Facilitator: Linda Pruski, UT Health Science Center at San Antonio

Panelists: Sharon Blanco, UT Health Science Center at San Antonio
Diana Natividad, Longfellow Middle School; San Antonio ISD
Debra Stark, UT Health Science Center at San Antonio

Room: James (4th floor)

Wednesday, May 11 – 9:30 - 10:45am

Using Cognitive Interviews to Assess Assessment Quality

Crafting the perfect assessment item isn't easy. It can be challenging enough identifying exactly what you want to measure, and more challenging still to make your items are written in a way that students can easily understand. After you've drafted your items, how can you be sure they're valid for the population you'll be measuring? This session will introduce the "cognitive interview" technique, in which a researcher asks an individual to think out loud while answering an item. In this session, you'll learn how to use cognitive interviews to see if an item is working as expected and captures the type of information needed to make informed decisions. The technique will be modeled for participants who will then conduct their own cognitive interviews in pairs or small groups. We'll conclude with a large-group discussion to reflect on the interviews and decide whether or not the particular items being tested were measuring what they were intended to measure.

Intended Outcomes: (a) An understanding the purpose of the cognitive interview technique and its value in evaluating items; (b) the opportunity to practice the cognitive interview technique in a group setting.

Level: Intermediate

Facilitator: Kristin Bass, Rockman Et Al

Panelist: Dina Drits, University of Utah

Room: Spring (4th floor)

Evaluation Instruments for Measuring Teacher Self-Efficacy and Changes in Students Attitudes Toward Science

In this session we will share two scales used as outcome measures in our Teacher Professional Development programs. We will share our experiences in collecting teacher responses to self-efficacy surveys at a science teacher conference. In particular we will discuss our validation study of the SETAKIST-R, and its correlations with general teacher self-efficacy scales. Further, the session will explore the development and validation of the STAQ-R and its use in our programs.

Intended Outcomes: As a result of participating in this session, attendees will gain access to five teacher self-efficacy scales used in a validation and correlation study at the UT Health Science Center at San Antonio, as well as a reference list for each scale. From the group discussion and our experiences, it is anticipated that participants will also receive insights through lessons learned on administering and using these scales as evaluation instruments.

Level: All Levels

Facilitator: Linda Pruski, UT Health Science Center at San Antonio

Panelists: Sharon Blanco, UT Health Science Center at San Antonio
Diana Natividad, Longfellow Middle School; San Antonio ISD
Debra Stark, UT Health Science Center at San Antonio

Room: James (4th floor)

An Opportunity for Your SEPA to Conduct CBPR

At the request of Dr. Beck and the SEPA-DOC working group, the Community Appalachian Investigation and Research Network (CAIRN), comprised of investigators at the Center for Clinical Pharmacology, University of Pittsburgh and collaborators at the Health Science and Technology Academy (HSTA), have developed an electronic, self-reporting questionnaire called the "Science Education Partnership Award-Diabetes, Obesity and Cardiovascular Disease (SEPA-DOC)" questionnaire. This web-based questionnaire is designed to determine local prevalence of obesity and its complications, as well as attitudes and behavior towards lifestyle choices. It is designed to collect information from all members of SEPA-participating families, including adults and children, and will provide data back to participating SEPAs in de-identified units of both individuals and families. The protocol for the collection of research data is currently pending approval at the University of Pittsburgh, Institutional Review Board (IRB) (PI: Robert A. Branch, MD) for exempt approval for informed consent. This implies full informed consent conveyed electronically without the need to collect individual written consent. A demonstration will be provided for any SEPA group interested in having their members participate. Local expertise in information technology and local IRB review are not needed for participation.

Intended Outcomes: This is an opportunity to engage students and teachers in a nation-wide SEPA community-based participatory science project assessing health risk factors and attitudes. Participants will learn how to use an IRB-approved survey to measure the impact of lifestyle interventions with focus on families. They will also share ideas on how to compare across regions and engage students and teachers in inquiry that results in real research.

Level: All Levels

Facilitator: Ann Chester, West Virginia University Robert C. Byrd Health Sciences Center

Panelists: Robert Branch, University of Pittsburgh
Cathy Morton McSwain, West Virginia University
Sara Hanks, West Virginia University

Room: Marion (4th floor)

21st Century Professional Development for Teachers

The integration of Professional Learning Communities has become a common practice in school districts pressured to provide professional development activities but lacking resources to support traditional models. In the current economic climate, teachers have less flexibility and less support for how they participate in professional development activities. Professional Learning Communities may be leveraged to: integrate teacher professional development activities into the school day • enhance teacher networks to support change in classroom practices within schools • create an applied learning environment for supported change in instructional practices This session describes a year long model of teacher professional development delivery through the school-based Professional Learning Community and the outcomes to date. The discussion will include adapting support resources to 21st Century Skills standards.

Intended Outcomes: Information to influence the design of teacher professional development delivery to increase changes in classroom practice.

Level: All Levels

Facilitator: Ann Lambros, Wake Forest University School of Medicine

Panelists: Adrienne Loffredo, Wake Forest University School of Medicine
William Abbott, Winston Salem/Forsyth County Schools

Room: Seneca (4th floor)

From Cells to Atoms: Helping Your Project Participants Comprehend Size, Scale and the Dynamic Processes of Cell Communication

Visualizing relative size and scale in the sub-visible world is difficult for everyone to comprehend. Two components of the "Amazing Cells" curriculum supplement materials effectively address this issue. The "Cell Size and Scale" interactive animation allows users to zoom from a coffee bean down through cells, organelles, and molecules, to a carbon atom. The hands-on, print-based "Coffee to Carbon" activity engages students in a more minds-on approach to this topic. Other materials in this curriculum supplement module demonstrate how organelles work together in processes relevant to students' lives and the dynamic processes taking place between and within cells as they communicate and carry out their functions. Online materials include interactive animations and a 3-D movie; print-based activities support and extend the online learning. Participants will have the opportunity to experience the materials in this curriculum supplement module, which can be used in classrooms as well as informal science education settings. Mr. Godoy-Gonzalez also will share how he has used these materials with his ESL classes of Spanish-speaking students from migrant families.

Intended Outcomes: Participants will (a) learn about and experience curriculum materials that address relative sizes in the sub-visible world, cell communication, and the dynamic nature of cells, and (b) gain an understanding of how print activities can be integrated with online learning experiences to round out and reinforce targeted concepts and learning objectives.

Level: All Levels

Facilitator: Molly Malone, University of Utah

Panelist: Mario Godoy-Gonzalez, Royal High School, WA

Room: East (3rd floor)

Why Us? The Curriculum: Broadening Access and Use

A high school student inquiry-based documentary film/research project becomes an adaptable curriculum with brief video modules and accompanying exercises. The curriculum is designed to help students apply what they discover about HIV in the African-American community to every other population. The video modules explore HIV transmission from scientific, socioeconomic, and cultural perspectives.

Intended Outcomes: Attendees will gain greater knowledge of how to discuss sensitive issues around HIV/AIDS with both minority and white students. The curriculum can be used in a variety of instructional settings, from classrooms to community programs.

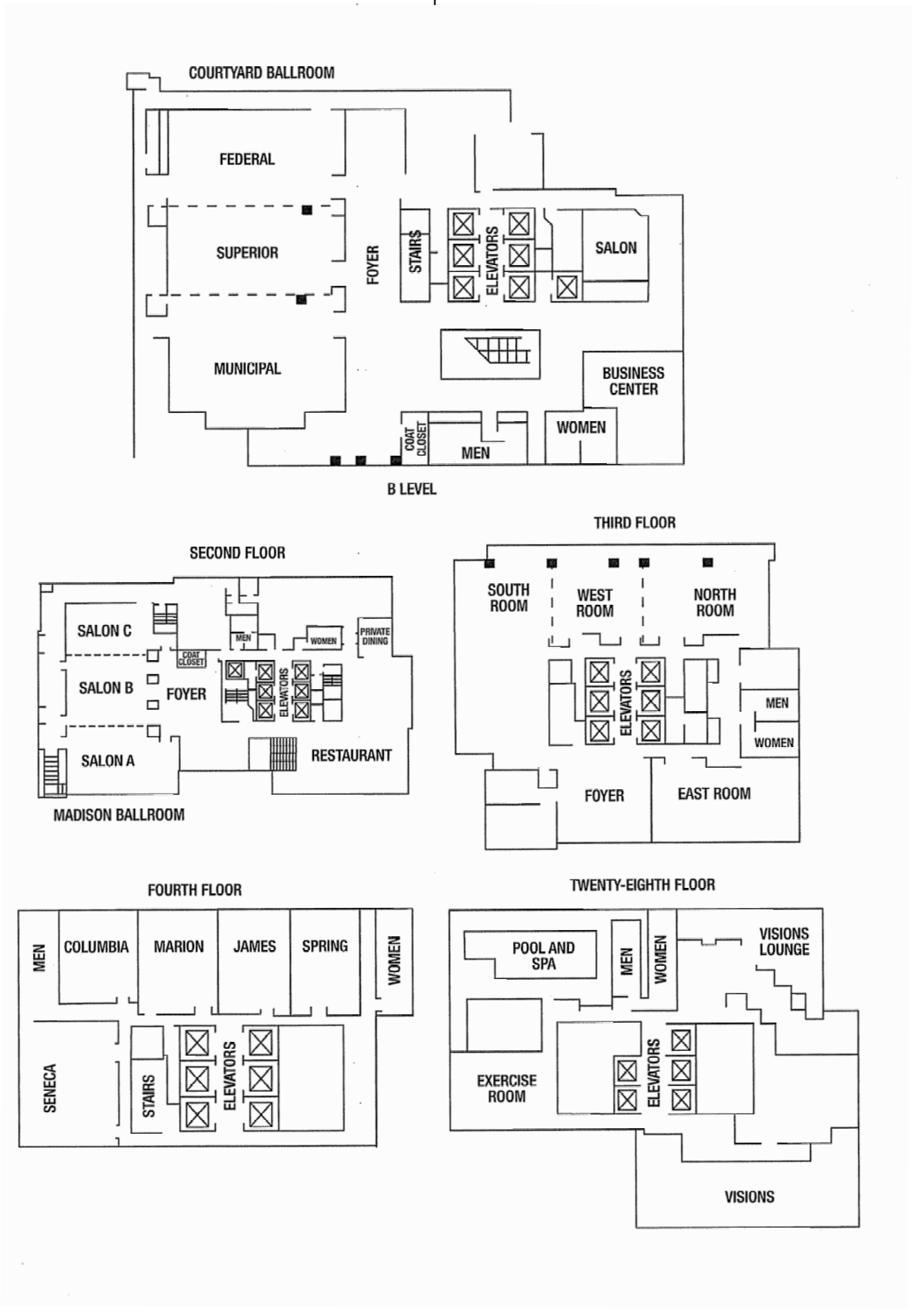
Level: All Levels

Facilitator: Claudia Pryor, Diversity Films

Panelists: Kathryn Kailikole, Drexel University
Rosetta Lee, Seattle Girls School

Room: Madison Ballroom

Renaissance Seattle Hotel Floor-plan



Monday, May 9 8:30am-9:30am

Plenary Presentation: Representative Jay Inslee

Congressman Jay Inslee (D-WA)
Reported by Louisa A. Stark - University of Utah

Congressman Inslee began by noting that his father was a biology teacher and that Jimi Hendrix was his most-famous student. Inslee said that we need to give teachers better tools for science education and inspire more students to go into teaching. We also need to talk about increased pay for teachers so that more talented students pursue teaching careers.

The Congressman talked about the importance of federal funding for STEM research. This funding is supporting Seattle-area companies in making great strides in the development of new technologies. However, some challenges must be overcome. China is investing twice as much money as the US in developing clean energy. In the Puget Sound, oyster larvae are not growing due to changes in the pH of the water. Members of the US House of Representatives do not believe in investing in research or in the reality of climate change; they want to cut the research budgets of federal agencies such as the NIH, NOAA, and NSF.

Congressman Inslee said, "I have come to recruit you in an effort to use your talents. I've come to ask you to help educate our elected members of democracy. Find one elected official to educate about what you know about science." He estimated that only two dozen of the 535 members of Congress could tell you what ocean acidification is. Inslee gave the following information about how to talk to your congressional representatives: call your congressperson and ask to speak to their scheduler. Ask for 15 minutes of your congressperson's time. Keep calling back until you get an appointment. Go with friends.

Educating congressional staff is important, but do not stop there. This is the anniversary of the freedom riders. A problem is that members of the scientific community have looked at themselves as educators —not as change agents. They have not assumed the role of the freedom riders, confronting congressional representatives with the ramifications of their ignorance and inaction. Ask them to explain their understanding of an issue such as climate change, and then correct their misunderstandings. Say, "I'm not leaving until you understand this and can explain it to me." This is important. For example, 90% of the world's coral will be gone by the time the Congressman's? grandson is 80 years old. There's a calculated strategy to create doubt about scientific consensus. The same strategy was used by the tobacco industry. Self-delusion requires change.

In response to a question about how to balance scientists' and science educators' fears of not being funded if they confront a congressperson, Inslee said, "Go visit them with 8–9 people, each of whom represents a stakeholder. Say that you're interested in what the congressperson thinks about this issue. Then, share the science with them. Congresspeople want votes; they do not want to antagonize voters.

9:45am-10:30am

SEPA Program Overview and Update

L. Tony Beck - NIH NCRR SEPA Program Officer
Reported by Ann Chester - West Virginia University

Dr. Beck introduced the NIH staff members who were present at this SEPA conference:

- Lisa Gough, National Center for Research Resources (NCRR)/Office of Science Policy
- Carla Easter, National Human Genome Research Institute (NHGRI)
- Diane Adger-Johnson, National Institute of Allergy and Infectious Diseases (NIAID)
- Bruce Fuchs, Office of Science Education/ Office of Science Policy/Office of the Director
- Dave Vannier, Office of Science Education/ Office of Science Policy/Office of the Director

This talk covered an overview of where SEPA is going, as well as an overview of NIH and NCRR.
This year marks SEPA's 20th birthday. The Association of Science-Technology Centers (ASTC) resurrected the SEPA budget in the mid-1990s. Dr. Judith Vaitukaitis increased the budget from $12,000,000 to $16,000,000; Dr. Barbara Alving then moved it from $16,000,000 to $19,000,000, where it remains today. There have been 234 awards to date. NIH SEPAs are peer-reviewed awards. As a result, receiving an award of this type provides instant status for the recipient. Careers have been launched through SEPA awards.

This past year, three SEPAs won AAAS Science Prize for Online Resources in Education (SPORE) awards: Louisa Stark, University of Utah; Nancy Moreno, Baylor College of Medicine; and Eric Chudler, University of Washington.

The fiscal year (FY) 2011 budget for the SEPA program was $18.3 million. Eighteen new SEPA awards were made in FY 2011. Dr. Beck would like to see expansion of the SEPA program to 200+ projects.

There is also a new SEPA website.

The SEPA process evaluation is on hold until a home for the SEPA program is determined. Joy Frechtling from Westat will report on the current status of the program evaluation later in this meeting. Evaluation of the SEPA program overall and all SEPA projects is critical.

The new leadership in Washington is demanding attention and funding for science education. When the federal agencies were asked to report their actions in science education, the NIH received most of the credit; SEPA is most of that science education.

SEPA PIs should set up at least one new partnership each year!
Networking is important to what we do! Dr. Beck encouraged SEPA projects to partner with Institutional Development Awards (IDeA), Centers of Biomedical Research Excellence (COBRE), and Clinical and Translational Science Awards (CTSA). Approximately thirty SEPAs are collaborating with or close geographically to fifty-five CTSA sites. Twenty-three SEPAs are in IDeA states. Dr. Beck highly recommended that new SEPA projects invite their assigned mentors to visit their projects.
Dr. Beck warned SEPA projects to be aware that after a five-year grant ends, there is no guaranteed re-funding. Don't rest on your laurels. Prepare for the next round early.
Dr. Beck would like to support a Peer Cluster Evaluation model for SEPA. The Howard Hughes Medical Institute initiated this model, in which four SEPA projects were assigned as partners. Each project is visited in turn by the PIs of the other three projects, who provide input on the focal SEPAs evaluation plan.
Dr. Beck would like to support regional SEPA consortia. The consortia would keep their individual foci but interconnect across their region. SEPAs with three years remaining in their grant would be able to apply for a grant to support their respective regions' activities.
Dr. Beck provided an update on potential changes in the NIH institute structure and how these changes might affect where the SEPA program is housed.

The action items we were given encompass the following:

- Form partnerships
- Fill out a survey for the website
- Fill out a survey of current/existing and potential partnerships

Questions & Answers

Can we have themed SEPA partnerships? *Yes, hopefully. Current mechanisms to fund this are R13 conference grants or supplements to an existing SEPA.*

Did you consider program-type collaborative networks? *Folks who do curriculum-development, for example? Yes, however regional models cost less. Email Dr. Beck your ideas.*

What is your vision for regional teams? *Utilizing resources to expand on existing programs, putting x-program evaluations together, creating partnerships across institutions, and leveraging relationships within institutions. Another benefit of regional alliances is to touch people who do not have access to a SEPA.*

Can we get a skill bank of public relations information and techniques? *Most scientists are dissuaded from telling our story at the institutional level. How do we get the word out locally, state, regionally? We need a strategic plan for sharing the value of our work. This came up at the Director's Council of Public Representatives (COPR) meeting last week—how best to market NIH. We need to consider what SEPA can contribute to this effort, such as looking at a brighter future through SEPA.*

Additional Thoughts from Participants

*As a group, we need to promote what we do.

*The science-festival movement at the national and local levels is a way to promote and disseminate the work that SEPAs are doing.

*If anyone wants to disseminate information in Spanish, talk to Bob Russell.

*We need to educate our own communities. Social media is an important vector we need to capture. An example is the Baylor Space Station project with spiders where all project recruitment was done online. We should create a SEPA page on Facebook.

* We need to build alliances with biomedical societies.
* We all have lots of professional affiliations. We need to use our contacts to help us educate our congresspeople about the value of the SEPA program.

10:30am–11:00am

SEPA Website Update

Bill Sanns and Nancy Place - University of Texas Health Science Center at San Antonio
Reported by Ann Chester - West Virginia University

This session unveiled the new SEPA website, which was designed to be more mobile-friendly. The website can be accessed at http://www.nihSEPA.org. One of the biggest improvements that has been made to the new site is the search engine, which is now much more powerful than it had been previously. Another helpful tool found on the site is the list of project grants, which are listed with resources labeled for the target audience. During the session, participants generated ideas regarding using the website to provide PI resources to teachers and students. It was also brought up that the site could be used as a major marketing tool.

11:00am-12:15pm

A Five-Year Federal Strategic Plan for STEM Education: Implications for SEPA

Bruce Fuchs - Director, NIH Office of Science Education
Reported by Jeanne Chowning - Northwest Association for Biomedical Research

Dr. Fuchs has been a long-standing supporter of SEPA. He acknowledged the important role that L. Tony Beck, the SEPA Program Officer, has had in the success of the program.

The Office of Science Education (OSE) at the National Institutes of Health (NIH) was founded in 1991 as the Office of Science Education Policy. Originally, this institution had two employees and its job was to advise the NIH Director about education programs. Under the leadership of Harold Varmus in the 1990s, the OSE gained its own programs:

Website

OSE reaches a national audience through its website, which can be found at http://science.education.nih.gov

Some features of the site include the following:

- Lists the top 2,000 NIH resources
- Tags materials across topics, grades, formats (i.e., genetics, middle school, video)
- Supports 300,000 visitors per month
- Indicates 2 million page-views per month
- Permits teacher feedback
- Automates ordering

Supplement Series

The OSE Supplement Series supports inquiry-based science teaching:

- Targets K–12
- Supports 17 teaching units to date
- Brings NIH research to teachers across the nation, but also helps teachers meet their educational goals
- Provides over 380,000 supplements requested by 90,000 unique teachers
- Reaches a cross-institute audience; 12 institutes have participated so far
- Offers two new supplements
  - Evolution and Medicine. Evolution is an important idea across NIH in all health research that goes on!
  - Rare Diseases; for middle school

NIH and Education

In fiscal year (FY) 2010, the NIH provided the following grants and educational resources:

- Education grants, usually R25 grants (~$24.2M)

SEPA, SEDAPA, NIEHS, NIAAA, NIAID, NIDDK, NCI

- Education research grants (~$10.4M)
  - NICHD math and science cognition programs
  - Based on a reading research program that is over 40 years old
- Instructional materials for classrooms (~$2.5M)
  - In partnership with various NIH Institutes and Centers, the NIH OSE has developed its popular Curriculum Supplement series
- Outreach programs (~$5.9M)
  - Examples include museums, science centers, National Lab Day
  - The NIH OSE also provides programs for local audiences

However, decreases are projected in FY2011 and 2012.

Careers: LifeWorks® — http://science.education.nih.gov/LifeWorks

LifeWorks is a career-exploration website for middle- and high-school students.

- Profiles over 120 careers, describing education required, average salary
- Ranges from technical/associate careers up to MD/PhD
- Covers medical artists and a variety of unique health-related careers
- Includes interviews, videos
- Supports approximately 100,000 visitors per month

Policy

The OSE has a role in policy. Dr. Fuchs discussed how OSE links to other countries using the US-China Science Education Exchange (Beijing, November 10–13, 2009) as an example. He noted that Lu Wen Shan, Beijing Normal University (and the individual who wrote science standards for China), has translated eight OSE supplements. Dr. Shan thinks that the Chinese should be doing more inquiry-based science.

Present Science Education Situation

How do US K–12 students perform compared with their international peers? Dr. Fuchs referenced the Programme for International Student Assessment (PISA), which focuses on literacy and the ability of kids to use knowledge to solve problems (www. pisa.oecd.org).

In science and math we tend to score near the bottom of the OECD nations (Organisation for Economic Co-operation and Development). Some people criticize the PISA data, saying that our best kids are the best in the world; some other kids pull the numbers down. To examine this claim, Dr. Fuchs extracted from the data the number of kids scoring at the 95% percentile level. With this analysis, we only moved to 18th place from 29th. PISA has rich data about correlations: we spend more on our school system than any other nation in the world (~ $9,000 per student, per year)! Finland spends less money on its students but outperforms us.

Americans know that jobs are beginning to move abroad. They understand that wages are lower there. But they don't understand that the kids there are better educated than our own. Americans don't understand that these trends are connected to their local schools. In PISA 2009, US students moved up 1/10th of a standard deviation compared to three years earlier. This was the first time the People's Republic of China was allowed to participate in PISA and the Shanghai schools did the best out of everyone.

Education and the Economy

The correlation between education and the economy is unclear. Dr. Fuchs referenced Education Quality and Economic Growth, E. Hanushek & L. Woessman, World Bank, 2007. Educational attainment (years of schooling) is directly proportional to Annual Growth Rate (%) of GDP/Capital—but a measure of quality was missing. With attainment and quality figured in ("conditional test score"), there is a stronger correlation between education and the economy with Annual Growth Rate of GDP. Dr. Fuchs noted that we need to give our kids the opportunity to develop both types of skills: "rocket scientists" (high skills for a few individuals) as well as "education for all" (basic skills).

Dr. Fuchs recommended Race Between Education and Technology, Claudia Goldin and Lawrence Katz, 2008. The authors, both economists from Harvard, studied the role of our education system in relation to our economic power. In the early years of the US, the "Common School Movement" developed into an ideal for universal free public education decades before similar movements in Europe and elsewhere. By 1850, we had the best-educated workforce in the world. This early US emphasis on education has now been lost.

GDP and Household Income

Between 1947 and 1973, the GDP more than doubled, and household income almost doubled (79%). Between 1973 and 2008, GDP more than doubled, but median household income increased by only 10%. Wealth is concentrated at the top. Education is probably one of the leading factors: we stagnated on a few measures in the 70s. For example, we used to be first in the number of students who graduated from high school and college, but we no longer are.

In 1973, the median earning of males was higher than it was in 2008–2009 ($48,000 vs. $46,000, adjusted). Earnings for females during the same time periods rose (from $27,000 to $35,745), which has offset some of the changes to the median earning overall.

Why aren't Americans upset?

Dr. Fuchs noted that it is hard to find out how your particular local school is doing. Most students get A's, B's, and a few C's. With No Child Left Behind, there was a mandate for national testing and reporting test results to parents. States, however, could set their own scoring protocols. Dr. Fuchs presented the results from a comparative study of how students do on their state exams vs. on the National Assessment of Educational Progress (NAEP). Fourth grade was found to be a critical time to develop reading ability.

Arne Duncan says, "states lie to parents" and to their teachers. These sorts of political maneuverings are not in anybody's interest.

Fourth-Grade Reading Proficiency

% proficient	State Test	NAEP
Mississippi	88	18%
Maryland	82	32%
Massachusetts	48	44%

Federal Government Initiatives

Dr. Fuchs reported on several initiatives by the federal government related to science education. He discussed the blueprint for reauthorization of NCLB, which is returning to its historic name of Elementary and Secondary Education Act (ESEA). It is not clear what this bill will look like under a new Congress—it may be reauthorized. However, to a large extent, science has still been "left behind."

Dr. Fuchs also reported on the President's Council of Advisors on Science and Technology (PCAST) and the K–12 STEM Education report. PCAST criticized science agencies for poor coordination and collaboration. The recommendations of the Council include the following:

- Support the Common Core Standards
- Recruit and train 100,000 great STEM teachers
- Reward the top 5% of the nation's STEM teachers
- Use educational technology to drive innovation
- Develop 1,000 new STEM schools
- Provide strong national leadership

Common Core Standards

Dr. Fuchs described the impetus for the development of the Common Core Standards. The National Governors Association and the Council of Chief State School Officers collaborated to develop the standards. The original goal was to establish standards for English/Language Arts and Mathematics. Most states did not have standards, even in the 90s! Forty-eight states eventually signed on to participate in the Common Core Standards.

In No Child Left Behind (NCLB), the endpoint was 100% proficiency in math and reading by 2014. Now the endpoint is college and career-readiness standards. About 50% of our incoming college freshmen need remedial coursework in college. Forty-five states have adopted the Common Core Standards for math and English-language arts. (Alaska, Minnesota, Nebraska, Texas, and Virginia have not.) Two consortia of states are creating assessments. However, this is not a national curriculum! The Gates Foundation and Pearson are writing curricula aligned to the Common Core Standards. This orientation towards Common Core Standards has implications for textbook publishers, who may no longer cater to larger states, but must instead cater to the national Core Standards.

The standards for science will be developed next (probably over the course of the next 1–2 years). The National Academy of Sciences is preparing the framework that will guide the development of the science standards. Achieve, a nonprofit education-reform organization, will develop the standards.

Dr. Fuchs discussed the role of the Government Accountability Office, which was mandated to conduct surveys across the federal government by the America Competes Act of 2010. The surveys provide opportunities to reduce potential duplication in government programs, save tax dollars, and increase revenue. NIH OSE is also creating an inventory of all STEM education programs to look at clusters of professional development for teachers as well as duplication of effort ("STEM Education Survey").

The National Science and Technology Council (NSTC), under the America Competes Act, has assembled various committees and subcommittees to oversee STEM education initiatives, conduct strategic planning, and develop a STEM Inventory/Education Survey. The survey will review literature, identify best practices, and add those practices into the requirements for future funding opportunities. The Survey will also help shape the research agenda for future topics.

Dr. Fuchs concluded with a quote. When he saw massive problems confronting education problems, Gregory Canada said, "Who is the architect of this failure? There is none." Dr. Fuchs noted that many aspects of our system were not rationally built; now it's up to us to effect change within the system. SEPA programs must be part of that change, in part by conducting rigorous research on science education.

2:45pm–3:15pm

SEPA Regional Alliances: Why, How, and For Whom?

Mid-Atlantic Regional SEPA Alliance: The Why's and Wherefore's

Michael Chorney - Penn State University College of Medicine
Reported by Dina Drits - University of Utah

The talk began with slides of students engaged in different science-based learning activities.
Researchers have found some problems with regional alliances:

- SEPAs know little about one another, even when located in close proximity
- Deliverables collect dust following the completion of a grant
- Resubmissions fail; investigators fall by the wayside
- Grants come and go; outreach coverage is often lost
- Application pools may overwhelm a summer program
- Lack of expertise may impede potential SEPA applicants
- School districts are approached but uninterested in the science-educational interventions!

Dr. Chorney's hypothesis: Promoting collaboration among regional SEPA Projects will improve the effectiveness of the SEPA program by establishing continuity, increasing sustainability, and facilitating fresh thinking in these difficult times. The difficulty herein refers to reduced funding, lack of student interest in science, decreased teacher science competency, focus on the 3 "Rs" (reading, writing, arithmetic), enhanced rate of science advance, globalization, and so on.
Enter the Mid-Atlantic Regional SEPA Alliance. The SEPA Projects participating in the Alliance include the following institutions:

- University of Rochester Medical Center
- Cornell ASSET Program
- Cornell Institute for Biology Teachers
- Flying Dreams, Inc.
- Great Lakes Science Center
- New York Hall of Science
- American Museum of Natural History
- University of Medicine and Dentistry of New Jersey
- Penn State College of Medicine
- University of Pittsburgh
- Duquesne University
- Pittsburgh Tissue Engineering Institute
- Montclair State University
- Wheeling Jesuit University
- West Virginia University
- American Physiological Society
- Walter Reed Army Institute of Research
- Children's Research Institute
- Koshland Science Museum
- Virginia Commonwealth University
- Virginia Polytechnic Institute and State University

First gathering, February 18–19, 2011 in Hershey, PA. Telephone conference call, March 18, 2011. Second meeting, April 28–29, 2011 in State College, PA.

There are many benefits to be gleaned by working together:

- Share (and use) resources, expertise, and best practices
- Broaden regional awareness and nurture additional SEPA applications while building the alliance.
- Support those SEPAs which have failed resubmission
- Broaden student inclusion and promote diversity
- Tackle larger grant applications, foundations and approach benefactors; incorporate the business world
- Promote grant dovetailing (SEPAs and CTSAs)
- Promote uniform standards of practice and excellence (evaluation, dissemination, etc.)
- Attempt novel (and even risky) approaches by fostering brainstorming
- Facilitate inter-regional alliance interactions, and others

The Outcomes Thus Far

- Mission statement
- White papers regarding the alliance's raison d'etat (reason for action)
- Publication near completion on academic culture and recognition of science-outreach activity
- Website and listserv to be launched 5/13/11
- Planned video documentation of summer programs
- Resource cataloguing (continuing)
- Resource sharing and planned visits (underway)
- Newsletters
- Support of potentially new SEPA applicants
- Refinement and homogeneity of a new evaluation tool
- Broaching granting opportunities
- 6–12 science-elective curriculum
- Creation of a group that enjoys working together

Obstacles and Caveats of Creating an Alliance

- May not be for everyone
- Needs a champion or champions
- Will suffer from conference fever (boom and bust)
- Requires consistent visibility/ interaction/cheerleading/whip-cracking
- Will experience incremental developmental stages
- Will confront ambiguity: "what is our direction, what will we be doing, when will we figure this out?"
- Must not forget the audience

Summary and Conclusion

- Collaborations/teams are urgently needed in order to meet a societal problem and to increase the efficiency of the SEPA Projects and their output.
- Enthusiasm will spring forth. Great opportunities will result; good-to-great results will come to fruition. Be patient but diligent.
- There is no greater vehicle than strong alliances for developing ideas and taking daring intellectual leaps.
- Regionals must build in durability and adopt a vision of nationality.
- Independent of models, history, enthusiasm, etc., let's communicate, collaborate, advocate, and raise awareness of our science-education outreach!

3:30pm–4:30pm

SEPA REGIONAL MEETINGS (BREAKOUT SESSIONS)

Northeast Regional Meeting

Facilitator - Carla Romney - Boston University

- **Types of Collaborations**
  - Common community outreach
  - Possible mobile lab community
  - Public relations (joint effort)
  - Common metrics for evaluation
- **Annual meeting possibilities**
  - Commonality
  - Different sites

- **Creating a science group modeled after the Peace Corps**
  - Visit rural, urban, and diverse communities
  - Consist of retired professors, pre-service teachers, science and education majors
- **Reach out to other communities**
  - Use developed material to reach other locations
- **Different types of evaluation**
  - More narrative
  - More qualitative data
  - Capturing the experiences
- **Private Funding**
  - Kellogg
  - Local companies

Participants
Carl Franzblau, Boston University School of Medicine
Berri Jacque, Tufts University School of Medicine
Karina Meiri, Tufts University School of Medicine
Ishara Mills-Henry, Massachusetts Institute of Technology
David Potter, Harvard Medical School
Jennifer Jamison, University of Southern Maine
S. Monroe Duboise, University of Southern Maine
Brian King, Harvard Medical School
Don DeRosa, Boston University
Carla Romney, Boston University
Mike Fenzel, Montshire Museum of Science
Greg DeFrancis, Montshire Museum of Science
Gail Fletcher, University of Southern Maine
Walter Allan, Foundation for Blood Research
Jeri Erickson, Foundation for Blood Research
Leonard Munstermann, Yale School of Public Health

Mid-Atlantic Regional Meeting

Facilitator - Michael Chorney - Penn State University College of Medicine
Reported by Brinley Kantorski - Duquesne University

This breakout session of MAR-SEPA (Mid Atlantic Region) was not the first meeting of the MAR-SEPA group. In fact, MAR-SEPA members had attended 2 previous meetings, the first on February 17–18 and the second on April 28–30, 2011. These meetings were held in Hershey, PA and State College, PA, respectively. Because of these meetings, many of those who attended the MAR-SEPA breakout session were well acquainted and had an understanding of what MAR-SEPA is and what goals the group hopes to accomplish.

The major undertakings of the breakout session entailed making introductions and distributing newsletters to get members up to speed with the progress the group had made at previous meetings. Many partnerships were formed and visits to campuses and labs were planned between many of the members in attendance.

Many members lauded the idea of regional meetings for several reasons:
- Meetings happen more frequently
- The meetings are more intimate and friendly
- Travel time/costs are lessened
- Translating resources across state lines is made easier

Many members offered to share resources, such as data-gathering techniques and evaluation methods, among members of the group.

Several goals were established during the session:
- Visit and exchange resources among members
- Create a museum resource-sharing network
- Collaborate with professional societies like NSTA, APS, and CTSA
- Poll members for dates/locations for a Fall 2011 meeting.

In addition, a contact list was compiled and a meeting was tentatively planned for Fall 2011. Additional information about MAR-SEPA is hosted at http://marSEPA.org/

Southeast Regional Meeting

Facilitator - Virginia Shepard - Vanderbilt University
Reported by J. Steve Oliver - University of Georgia

The session began with introductions. The group was then asked whether the SEPA projects of the southeast wanted to have or saw benefit in having a regional organization; there are a variety of issues that come to mind, and cost is on the top of the list. In thinking about other issues around which collaborations might be fostered, a short list includes: target populations (teachers or students), locations (urban/rural), multicultural focus, formal or informal education, and others.

The organizing question becomes whether there is an advantage to all of us getting together for a common purpose.

There are people within the group who believe that many of the materials that are developed by projects around the nation will not work in the south.

One example that was posed was this: how might we reach out to people who don't trust physicians? The author of this question believed that the residents of the south were over-represented among those persons who would not trust a physician and as a result, avoided healthcare options that might otherwise have improved their lives.

One participant in this session felt that the most-important first step would be to define the landscape of the southeast population and map out "who we are." He felt that we must really drill deep into that issue in order to discover how to move a regional affiliation forward.

Four outcomes that might result from a regional affiliation were identified:

- Sharing deliverables
- Sharing expertise (e.g., how to partner with a school district)
- Sharing strategies for acquiring support from the university (e.g., creating business plans or finding other forms of support, such as other grants)
- Jointly identifying resources for a high-risk project.

Some of the participants felt strongly that we needed to leverage technology to optimize the efficiency of the regional affiliation.

There is a great deal of discussion about the benefits of a regional affiliation, but there were many people in the room who clearly do not feel this affiliation would be beneficial. It was suggested that we might alternate years; the national SEPA PI meeting would happen one year and a regional SEPA PI meeting would be held in the next, and so on. This might allow for more participation in the PI meetings by teachers and students associated with projects. The question was also raised as to what PIs get out of the national PI meeting. If the benefits of the national PI meeting were better understood, it might be easier to figure out what benefits would result from regional meetings.

It was ultimately recognized that for this effort to succeed, someone would have to step forward as a champion. No one was able/willing to take on this role, but someone was able to be the technology champion and willing to send emails to the members of the group present. An examination of interested subgroups related to the topics below will continue.

There were strong feelings that the southeast has some unique problems that other regions do not have. These regional issues were identified as follows:

- Racial disparity (ongoing segregation of students in schools by race)
- Science vs. faith
- Interest in healthcare delivery and the racial disparities that result from differential access to health care
- Lack of quality science teachers
- Commitment to the importance of education to communities
- Education as an economic driver

In the end, the participants in this session felt that "if it is worth doing, it is worth setting aside money to support it." However, in general, it does not appear that there is a great deal of enthusiasm for a southeastern regional group.

Participants:

Barbara Baumstark, Georgia State University
Michelle Ventura, Georgia State University
Brian Mooney, Johnson & Wales University
Bert Ely, University of South Carolina
James Perkins, Jackson State University
Jay Fletcher, Faces of Science, Inc.
Ginger Cross, Mississippi State University
William Abbott, Julian Gibson Elementary School
Melani Duffrin, East Carolina University
Deniz Peker, Virginia Tech
Erin Dolan, Virginia Tech
Susan Kuner, Vanderbilt University
Jennifer Ufnar, Vanderbilt University
Neil Lamb, Hudson Alpha Institute for Biotechnology
Susan Bonk, EdVenture Children's Museum
Kathie Williams, EdVenture Children's Museum
Gussie Fuller, Meharry Medical College
Judy Brown, Miami Science Museum
Maggie DeBon, University of Tennessee
Megan Moore, Louisiana State University Health Science Center-Shreveport
Heather Kleiner-Hancock, Louisiana State University Health Science Center-Shreveport
Tom Robertson, University of Georgia
Adam Hott, Hudson Alpha Institute for Biotechnology
Julie Bokor, University of Florida
Mary Jo Koroly, University of Florida
Houda Darwiche, University of Florida
Patrice Saab, University of Miami
Mike Wyss, University of Alabama-Birmingham
Susan DeRiemer, Meharry Medical College
Adrienne Loffredo, Wake Forest University School of Medicine
Jim Moore, University of Georgia
Steve Oliver, University of Georgia
Ann Lambros, Wake Forest University School of Medicine
Cathy Ennis, University of North Carolina-Greensboro

Midwest Regional Meeting

Facilitator and Reporter - Barbara Hug - University of Illinois at Urbana-Champaign

While there are no collaborations within the current mid-west SEPA projects at the present time, people do know each other through having initial discussions and beginning to plan possible connections. Collaborations did exist in previous SEPAs: regional work where people were already collaborating lead to a project. Interactions currently seem to be limited to e-mails and discussions.

The overarching themes for possible ways of working together are:

- A content area (neuroscience).
- A practice (i.e., videogames, teacher professional development).

Themes of different SEPA projects include the following:

- Use of technology — Videogames; modeling software/simulations, virtual labs
- Mentor-based programs — Working with boys' and girls' clubs, using graduate students as mentors
- Museum-based projects that partner with schools to develop programs that target community-health groups
- Multiple SEPAs with a content focus of neuroscience
- Multiple teacher professional-development programs (content includes cancer, obesity, asthma, environmental health, toxicity, biomedical health, neuroscience)
- Community-engagement activities that link to a curriculum-development effort — Work with teachers and community on a curriculum focused on genetics and genomics
- Curriculum-development projects — Multiple groups making connections to things that interest children

Questions that people were interested in answering include the items below:

- There was a question about how we can learn from others' project experiences. For example, multiple people talked about wanting to know more about distance education.
- There was a question about continuing professional-development credits across states.
- There was a question about evaluation and collaborations: even though the content is different, people are looking at affective changes (attitudes, interest in science, etc.). Is it possible to collaborate beyond sharing of instruments?

Some offered ideas on how to make connections: an online social-networking site where we could talk to each other; take the ideas that we started at the meeting and continue to develop them. This might lead to people developing collaborations.

Three social-networking sites were suggested: FaceBook, Wiki page, VoiceThread.
People felt that it was important that we get together in a face-to-face meeting, but there is a question about what sort of planning activities need to happen.

- Planning a face-to-face collaboration startup through a regional one- or two-day meeting:
- There is the question of how to organize this and how to pay for it (we need to think about Tony's suggestions for applying for funds).
- We might consider a pre-meeting meeting so the face-to-face meeting is productive.
- A webinar might be an inexpensive way of having this pre-meeting, though it shouldn't just be a get-together; we need to have an agenda. Perhaps we should have this type of session after we launch the actual collaboration?
- Other sites that allow for chat through protected sites might be another option.

Ideas for working together:

- Iowa State: possible center for 3D discussion
- Site visits between groups
- Opportunities for leveraging materials: ISU suggested getting a grant for assessing online instruction. Possible project to evaluate the teaching and learning of similar content but in different ways. Need to think about how this would be evaluated. The construction of curriculum is done but now there is a need to evaluate it. Interested in undergraduate and K–12 evaluation. Possible collaborations could develop out of SEPA.
- Multiple projects at elementary, middle and high school have pipeline issues. Is it possible to collaborate through the grade bands (not content focused but rather look at the grades—one possible strategy)? Thinking about impact as combined projects focused on similar grades.
- Potential theme across multiple SEPA projects: personal change—individuals are in control of their own future; students need to understand that they are in charge of changing their own behavior (changing brain structure).

The discussion turned to thinking about how to organize the grants across the mid-west and match up projects across the grades and content areas. An idea was tossed out that we should fill out a matching sheet so that we all know more about each other's projects.

- Google document: get information from each of the groups and share it.
- A survey was developed to facilitate collaboration: http://tinyurl.com/SEPAmidwest

A key question was raised: "What is compelling about this collaboration? Why work together regionally and not nationally?"

- Possible role in developing STEM education at the regional level.
- Could we go to a foundation to request funds?
- Could we be a voice at the regional level? State politics?
- We need to think more about this.

Land-grant colleges signed an agreement that said they would take the lead on STEM education at the university level. Could STEM education also be a focus of SEPA collaborations?

Possible work with focused STEM schools:

- Important to keep people already in the SEPA pipeline connected. Can extend beyond the students to graduate students or faculty.
- Think about a network for high school students as they move to the university level.
- Pursue a topical interest through electronic ways and getting together based on individual interests.

Continue to think about the extent to which we can all collaborate across geographic and grade-level boundaries with our fellow SEPAs.

An idea for future poster sessions: put posters together regionally so that people can talk to one another more easily.

At the end of the session, the question of how to integrate and involve the SEPA materials in a general sense to pre-service teachers. We need to think about this issue and promote the SEPA website to pre-service and in-service teachers.

Participants

Rebecca Daugherty, Northwestern University
Jennifer Koerner, Chicago Public Schools
Mike Kennedy, Northwestern University
Athena Samaras, Northwestern University
Bernhard Hennig, University of Kentucky
Amy Sebeson, Northwestern University
Sally Meyer, University of Kentucky
Al Cook, The Classical Academy IB School
Lynne Haeffele, Illinois State University
Karen Bovenmyer, Iowa State University
David Anderson, Illinois State University
Christina Boelter, University of Kentucky
Jan Dubinsky, University of Minnesota
Susan Hershberger, Miami University, Oxford, OH
Donna Karol, University of Illinois, Urbana-Champaign
Barbara Hug, University of Illinois, Urbana-Champaign
Tim Ratliff, Center for Cancer Research, Purdue University
Craig Berg, University of Wisconsin, Milwaukee
Jenny Sundberg, St. Paul Public Schools/University of Minnesota
Nicole Kowrach, Museum of Science and Industry, Chicago
Patty Ward, Museum of Science and Industry, Chicago
Rabiah Mayas, Museum of Science and Industry, Chicago
George Reese, University of Illinois, Urbana-Champaign

Great Plains Regional Meeting

Participating SEPA projects

- Nebraska Med: outreach Indian reservation
- Nebraska Lincoln: Book, radio documentaries, comics, apps
- Children's Museum of Houston: Power Play—5.12
- UT: Medical—infectious disease
- Rice University
- UT MD Anderson Cancer Center: Rural students, teacher PD
- Texas A&M: Veterinary medicine (learn about animals, teacher PD
- PEER)
- University of Kansas: Underserved high-school students, clinical and translational research
- UTHSC-San Antonio: curriculum development, Positively Aging
- Baylor College of Medicine: Epigenetics

Existing collaborations

- RICE/UT-Houston: Video
- Texas A&M/UTHSC-San Antonio (primate center/in research)—unit-Houston Children's Museum: vet students visit exhibit
- Nebraska interested in collaboration in curriculum development.
- MDACC-Environmental Health Science (EHS) Summer Institute: presenters from SEPA are always welcome (K12summerinstitute.mdanderson.org)

Is there a benefit to keeping this group together?

- Nebraska/Kansas: collaborate with people on coast
  - Curriculum development: EHS Summer Institute (National Group)
  - Dr. Johnson: GK–12: Conference Grant: Regional meetings
  - Website, strategies, resources for evaluation, applications, sharing of "best practices"
- How many people are distributing nationally?
  - Some local (model)→ distributing nationally/ international radio stations.
  - Local modules—distribute via SEPA website
- Regional Forum on website
- Curricula "conversation"
  - Webinars as a way to highlight researchers: small groups, interaction with teachers, teachers bring back "feedback"
  - Regional webinar/real-time: hands-on, SEPA website
- Feedback
- Online modules: HD camera—stream live Professional media quality
- "EHS-SI" with materials, linked to certain curricula units

Question and Answer:

Q: Is there value for keeping this together?
A: Yes, we agree that there is value.
Q: Would you rather be investing in national and/or regional projects?
A: both, depends on topic
Q: What does it take to get from the first meeting to true collaboration, or how can we be more effective to get this started?
A: SEPA project directors are willing to share from beginning
A: Trust, interaction, discussion on SEPA website

Concrete steps to take next:
Set up a regional forum on the SEPA website
EHS Summer Institute July 18–22?
Q: Are you interested in National interaction/ discussion?
A: Yes, there are 6 SEPA projects in the region

Rocky Mountain Regional Meeting

Facilitator - Laura Martin - Arizona Science Center
Reported by Tony Ward - University of Montana

The Rocky Mountain Region session was composed of SEPA projects from Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming. At this session, there were representatives from the following states: Arizona (Arizona Science Center and University of Arizona College of Medicine), Montana (Montana State University and The University of Montana), and Utah (University of Utah).

Sharing and Dissemination of Materials

There was some discussion about the fact that there are already a lot of curriculum materials out there, and that we don't need to reinvent the wheel in developing new products. This then generated a discussion on what the best strategies are for disseminating materials. Potential strategies include using the new SEPA website, as well as other SEPA project websites. Another option could be to develop regional SEPA collaborations for the dissemination of materials and products.

Challenges

One of the major challenges for the Rocky Mountain Region is our rural population. Compared to other regions of the country, we do not have many large urban centers. Traveling to these rural communities takes a lot of time and resources, making it difficult to do so. We need to rely more on remote learning technologies and strategies.

Key Points

The group talked about forming a regional SEPA consortium, much like the COBRE and INBRE programs. This group could share experiences about project-sustainability strategies, resources, challenges for our region, information on what other regional SEPA projects are doing, evaluation strategies, etc. Though the group was open to the idea, they were less enthusiastic about attending another annual meeting or conference.

2012 SEPA Conference Suggestions

The group talked about wanting to hear more about what other regional SEPA projects are doing. This could generate discussion on future regional collaborations. Perhaps the 2012 Conference could be broken down into themes, or regional sessions?

Participants

Laura Martin, Arizona Science Center
Deron Ash, Arizona Science Center
Randy Knoth, University of Montana
Tony Ward, University of Montana
Diana Vanek, University of Montana
Andrij Holian, University of Montana
Louisa Stark, University of Utah
Martha Sellers, Montana State University
Peter Crown, University of Arizona
Kim Obbink, Montana State University
Molly Stuhlsatz, BSCS
Gwen Jacobs, Montana State University

West Regional Meeting

Facilitator - Kelley Withy - University of Hawaii
Reported by Maureen Munn - University of Washington

Wide range of interests and topics represented: 10 universities, 3 science centers, Biomedical Science Institute, Girl Scouts yearlong programs, immersion programs for students, teacher training, informal science.

Tony Beck on collaborations/networks: Putting programs in circles is impossible; we could collaborate by topic/audience/region. It's the concept that has potential; it's up to us to figure out if it's a good idea. Focus on resources that can be exploited if you can collaborate.

Discussion

- Chad and Deborah C. (LA) — Established the model: Virtual Sprouts. This program teaches science using a computer game and was modeled after Mrs. Obama's garden (grades 4–7)
- Bill Cameron — In the Pacific Northwest, topical and regional collaborations like these are already in place, with mutual members on external advisory. Seattle is a neutral location between Oregon and Alaska.
- Sonsoles de Lacalle — Standards/expertise. West Coast Advocacy Initiative
- Amanda Meyer — Regional or topical? Why not do both? Subdivisions, but also have larger group do global issues such as marketing. This would increase capacity (number of students, teachers reached and involved).
  - Propose a small grant to fund a program in the regions that have students, e.g., a multiyear high-school project:
    - Freshmen — Alaska, molecular Biology
    - Sophomores — California, atmospheric science
    - Juniors — Washington, BioQuest
  - Exposure to science is really important for students in Alaska.
- Marissa Vignali — How many students can we serve this way?
- Kelly W. — Categorize type of program/target audience; travel; numbers; grade; teachers.
- Marco Molinari — To keep costs down, partner a group of students in Alaska to students in Sacramento. When going on a field trip, use technology; bring an iPad with 3G to follow along. Then, the subset can go physically. Students get to know each other before the field trip. This also serves a large number of students.
- Teacher from Sacramento (name unknown) Beyond field trip; Potential: informal learning, families learning about science without sitting them down.
- Kelley Withy — What are the challenges?
- Bill Cameron — mid-stream funding vs. supplement; writing grants together; redirecting funding.
- Marilyn Winkleby — 25 years' worth of experience at Stanford. This is a program with a residence component. Program faces the challenge of fingerprinting, immunizing undocumented students, and the university considering not allowing high school students in the hospital. The first step is running a pilot program.
- Jackie Shannon — Go to schools vs. bringing students to a location. In rural communities, in-person visits to schools are brief, but fun and exciting; they are also less expensive than the alternative.
- SaVina Haywood — Some communities depend on their kids bringing in money during the summer. Also, sometimes iBooks do not come back to school.
- Susan Adler — challenges in evaluation/tracking students
- Kelley Withy — Resource: National Student Clearing House. Created to qualify students for academic grants; 93% of universities participate; for $400 you can have access to database to follow up on/track students. Universities have access to this database as well.
- Theresa Britschgi —FaceBook pitch
- Giselle — LinkedIn pitch
- Maureen Munn — Authentic research projects you can do across programs; share topic areas; no need to see each other in person.
- Jeannie Chowning —Scale and marketing. Each project contributes a little money and ime that is put towards marketing the various projects.

Participants

Marco Molinaro, University of California, Davis
Sonsoles de LaCalle, Charles Drew University
Toby Spencer, Encina High School
Amanda Meyer, University of Alaska Fairbanks
Mario Godoy-Gonzalez, Royal High School
Thomas Scarlett, University of Hawaii
Kelley Withy, University of Hawaii
Gisele Ragusa, University of Southern California
Chohla Moll, Mt. Edgecumbe High School
H. Chad Lane, University of Southern California
Meena Selvakumar, Pacific Science Center
Sue Hills, University of Alaska
Marissa Vignali, Seattle BioMed
Theresa Britschgi, Seattle BioMed
Wendy Hansen, Pacific Science Center
Deborah Colbern, Charles Drew University
Ben Koo, University of California, San Francisco
Susan Adler, Northwest Association for Biomedical Research
Jeanne Chowning, Northwest Association for Biomedical Research
Phyllis Harvey-Buschel, University of Washington
Katherine Nielsen, University of California, San Francisco
Marilyn Winkleby, Stanford University School of Medicine
Maureen Munn, University of Washington, Seattle
Rafael Diaz, California State University, Sacramento
Lisa Marriott, Oregon Health Science University
Veronika Nunez, Oregon Museum of Science and Industry
Kimberly Tanner, San Francisco State University
Laura Lynn Gonzalez, Duquesne University/Green-Eye Visualization
SaVina Haywood, Anchorage Museum-Imaginarium Discovery Center
Laura Collins, Center for Research & Learning
Jackilen Shannon, Oregon Health and Science University
Hever Velazquez, Oregon Museum of Science and Industry
Scott Ewing, Oregon Museum of Science and Industry
Vicki Coats, Oregon Museum of Science and Industry
Bill Cameron, Oregon Health and Science University
Pam Lund, Girl Scouts of E. Washington and N. Idaho

4:45pm–5:15pm

Evolution of the Let's Get Healthy Exhibit: Portland Model for Collaboration

Jackie Shannon, Lisa Marriott, and Bill Cameron - Oregon Health & Science University
Reported by Dina Drits - University of Utah

The evolution of the exhibit is as follows:

- 2007 — Body Worlds; Requests from TIES teachers and community
- 2009 — ARRA Supplements; LET'S GET HEALTHY
- 2010 — Collaborations with Schools and Communities, New Fairs; collaborations with other SEPA programs (WVU, UC-Davis), USASEF, and other Fairs.
- 2011 — Continuing expansion and Reach—Body Worlds 4

In the Beginning: Body Worlds 3 How-To:

- Inform the public about research.
- Provide personalized health information in a fun and accessible manner.
- The answer was in the wristband as an introduction to research.

Nutrition World:

- The goal was to provide the public with personalized health information while giving them the opportunity to become research participants and learn how research is conducted.
- People loved it!
- In the end, there were almost 3,000 "Nutrition World" research participants.

What Next?: Ongoing Requests

- Schools
- TIES Teachers (they want a school fair)
- Communities
- African American Health Coalition Wellness Fair
- Hispanic Health Fair
- National Public Health Week
- Additional OMSI requests
- ARRA Supplements (a new opportunity)

SEPA — Opportunity to include teachers in middle-school education

- Recruit teachers as stakeholders
- Modify the Nutrition World program for school settings
- CTSA Community — Opportunity to partner with OMSI for community education
- Develop partnership with OMSI and ties with Oregon Rural Practice Research Network
- Enhance education opportunities, expand our reach to rural communities

Revised Goals:

- Provide the public with personalized information on their diet, body composition, blood chemistry, and other health measures, while providing interactive education and the opportunity to become research participants and learn about research.
- Provide an interactive database that can be queried.
- Redesign the Nutrition World program to be web-based, easily implemented, and transportable.
- A new name for the program: Let's Get Healthy!

What did we learn from running Body Worlds/Nutrition World?

The value of volunteers

- Open volunteer opportunities to the community, parents
- Create a volunteer database and online registration
- Standardize training for RCRs and stations
- Survey volunteers following the program to evaluate their experience

Friendlier, fun ways to learn

- Targeted, interactive exhibits

Age-appropriate materials

- Modify and update the "event"
- Use feedback from our advisory boards

Opportunities for partnership

- Expand and formalize
- Leverage resources through partnerships
- State and NIH-funded Centers
- Scientists with specific research projects
- SEPA and Educational programs

Data-sharing

- Share data beyond scientists, share with public
- Manage data requests and usage

Building in flexibility

- Venue
- Size of program and content
- Language and tailoring to audience

Flexibility defined: USA Science and Engineering Fair

- 2,000 people visited the exhibit
- 575 took the 10-minute surveys

What a difference a year makes: location, stations included, scope of project, employees, collaborators, volunteers, and research participants.

Tuesday, May 10 8:00am–9:00am

Evaluating the SEPA Program and Projects

Update on the SEPA Evaluation Feasibility Study

Joy Frechtling - Westat
Reported by Sonsoles de LaCalle - Charles R. Drew University of Medicine and Science

When this task was initiated, a number of work projects were proposed. The proposed tasks have now been completed and are listed below:

- Developed logic model
- Identified program-evaluation questions
- Performed a literature review
- Interviewed stakeholders
- Developed a final plan, including both process goals and outcome goals
  - Long-term program outcome goals include things like creating sustainable partnerships and other long-term goals that exceed the lifespan of a single grant.
  - Process goals are those addressed by individual grants in both the short and intermediate term.

Interviews with PIs were instructive for a number of different reasons:

- Project evaluation — they need help
- Program evaluation — evaluation of program management, particularly the review process; interested in learning what works and what does not
- They are discovering how to create new partnerships.

The literature review showed that

- Finding a comparison group is impossible because of the heterogeneity of the programs.
- Some targeted, strategic, primary data collection may be needed.
- Classic comparison will not work. A descriptive study would, if we assume the following:
  - Evaluation is not just feasibility study
  - The program would be examined at multiple levels
  - The program must be studied within the NCRR context
  - We should draw from a variety of sources
  - We keep the burden on PIs as low as possible

Questions to Guide Evaluation (with a number of sub-questions)

- Is the SEPA portfolio aligned with program goals?
- Has the SEPA program contributed to developing partnerships that are sustainable beyond the life of the grant?
- Is SEPA generating rigorous evidence that supports the positive impact of the project?
- Has SEPA been successful in achieving its goals?

Data collection from projects funded the last 10 years in the following areas:

- Portfolio review
- Interviews with NCRR staff, PIs, and partners
- Surveys, review of evaluation rigor, meta-analysis of rigorous evaluation, case studies

An application has been submitted to allow this work to continue, but it is currently on hold pending the reorganization of the NIH/NCRR.

Panel Discussion

- Maybe some specific outcomes could be encouraged by incorporating those in future RFAs, as the heterogeneity of projects is a problem when trying to provide a common evaluation for the program.
  - Multiple sources of funding for a project is a reality of life.
- Agencies must work together. In the end, what matters is whether your intervention works, and evaluation must be there with clear assessment of outcomes or there will be no funding.
- Where is innovation and discovery in evaluation? Where is it in science education?
  - The idea of "value-added" includes innovation.
  - There is both an absolute and a relative component to innovation.
- Power analysis, appropriate N for study; study sections need to discuss the evaluation plan of the application, as the ultimate question is whether we are going to know anything new at the end of the project (something we didn't know going in).
- SEPA needs to show improvement and success with its programs, at least in some measurements.
- The issue of RCT in the evaluation: is it doable with 10% of the budget? The SEPA program needs input on this and may need a bigger budget.
- Is it a help or a hindrance to specify an amount of improvement? What about the requirement for external evaluation?
- Long-term strategic planning must be used to align processes and outcomes.
- Describing the use of a progress report to follow up on how the evaluation is being done.
- We need to have a SEPA study section. Some input needs to be sent in to the program.
- The problems with being required to include logic models in grant proposals (reviewers do not understand logic models either).

9:15am–10:30am

Trends in Science Education: Learning Pathways, Disciplinary Practices, & Educational Equity

Philip Bell, PhD - University of Washington
Reported by Theresa Britschgi - Seattle Biomedical Research Institute

What is framing the movement in science-education reform?

- A desire to get innovative programs to needy populations
- Only ~30 minutes a week in K–8 classrooms is dedicated to science education
- Congress is listening to both schools and businesses (so call them!)

How does the LIFE Center work?

The Life Center studies the many forms of support and resources that inform student confidence and literacy through observations and filming. The documentation is done around science-related topics. Moments of identity-formation are key. We are in our seventh year of documenting all the inputs that contribute to a child's science literacy.

Case Vignette #1

A family discusses fears of daddy long legs at home. The child goes to the Burke Natural History Museum at the University of Washington. The child holds a tarantula at the museum after great reflection. This is a "signature experience and conversation." The family visits the Seattle Aquarium where the child frequents the "touch tank." Two years pass. The child cares for animals. Later in life, when the child is afraid of new learning experiences, the family discusses how she developed the courage to face spiders. These past experiences increase her interest in the new learning experience. There are multiple supports and uses of resources and activities occurring in this situation.
Brigid Barron has looked at how to increase student interest. Her research on the parents' role in a child's learning can be found at http://www.mitpressjournals.org/doi/abs/10.1162/ijlm.2009.0021?journalCode=ijlm.

Children have a lot of interest in the natural world that diminishes over time—unless it is tended to with multiple, diverse supports. How do we keep giving kids resources so that they thrive? Early elementary evidence might under-represent the cognitive capacities of young children (e.g., Piaget's findings in the 70s). They come to kindergarten ready to learn and build new theories; they can reason. How do we best guide their development?

It's important to look at longitudinal impact. A study published by Tai et al. predicts that students who have received mentoring by the 8th grade can significantly predict STEM college majors—better than grades and scores. (See http://128.32.86.250/rea/bayareastudy/pdf/science_magazine_article.pdf.) Early exposure to science in middle and elementary school is important! Are there equitable opportunities for all?

A transition is happening. We need to attend to relevance and identity when we think of learning and cognition. What students learn should be relevant to them. Science education should orient cultural practices and tools. How do we scale up education research to advance the vision and activities of the classroom? What do we need to know to contribute to future NRC publications and focus volumes/consensus volumes? The NRC is currently developing practitioner's volumes that are filled with case studies (e.g., "Ready, Set, Science"). All volumes are available here: http://www.nationalacademies.org/publications/

History of the Life Center

The Life Center collects data about the spaces within which children learn. Kids spend 21% of their lives in formal learning spaces, and our literature does not look at how people learn across their environments. What kinds of impact do the environments and settings have on their learning? The Center is trying to learn from practices in and outside of the school in diverse communities, and to disseminate its findings. How can we focus on kids' supports? What do we know so far?

- American society is increasingly diverse. Learning across settings is contextualized to this diversity. And education is behind in understanding this.
- Life-long, life-wide, life-deep learning (mostly before 12th grade) is intimately tied to value systems active in a given moment.
- 2009 report: STEM learning is achieved in a variety of spaces, throughout life. It spans young and old.
- Cultural diversity needs to be attended to in learning spaces.
- Informal science education (venues include family life, in museums, out of school, in classroom environments) can help support STEM workforce-development goals.

Six strands of science proficiency:

- Developing an interest in and excitement about science.
- Developing and using knowledge and scientific concepts.
- Generating scientific evidence. Reasoning.
- Reflecting on the scientific enterprise.
- Engaging in scientific practice.
- Identifying with the scientific enterprise.

Bell gave a working example of the 6 strands from the "Ready, Set, Science" volume that had to do with 4th graders looking at biodiversity prior to asking small table-groups to discuss the strands loosely and as they pertain to peoples' projects. An audience discussion followed:

- How do we construct a culture of science—inclusion of religion, culture, as a way of knowing? Philip Bell drew connections to identity trajectories shaped by curriculum. How do you resource youth by networking and mentoring "shifting identities"?
- Some were concerned that teachers are unaware of these 6 strands. Teachers seem most familiar with items 2 & 3 and they are getting more exposure in pre-service training. Marly's paper on "Authentic Inquiry" might be another useful resource.

Science is a cultural endeavor:

Diverse knowledge and ways of knowing needs to be endorsed. The Center has worked with elders in the Hopi community in Montana to serve as science educators, using the Blackfoot language when teaching science. This Blackfoot language credits inquiry as a way of knowing. The Center encourages researchers to consider these recommendations when building up evaluation in their studies:

- Do not violate participants' expectations about learning.
- Focus on the six strands.
- Provide evidence of impact across topics and venues.
- Remember that compulsory school assessment tests are not appropriate tools to collect evidence in education research.

Case #2, Learning in Singular and Non-informal Settings

The "Brenda learning case" looks at children's everyday expertise in science captured by video-camera teams in the home. This is a video ethnography that can influence education and is related to the natural world. 13 youths in 4–5th grade were filmed over thousands of hours. Now these kids are in high school. 114 other people in the kids' lives are being observed as well.

Looking at networks, experience, and sequence on literacy, researchers tried to infer connections. One student in particular who was discussed at length was an adoptee from Haiti who has a mother who works in a health organization. In her fourth-grade classroom, the child is not engaged. She is not participating in the coursework. Every Saturday she does a similar practice in her home, making perfume, with her mom. She uses a mortar and pestle—a device found in Haitian homes—to crush and mix the ingredients for the perfume.

Our guess is that the factors influencing her underperformance at school include

- School science under-represents her practice and expertise.
- The study contradicts assumptions about predictors of chemistry interest.
- The child is not recognized at school as a future scientist.

Bell asked us to use the 6 strands to reflect upon this case study. In fact, what are the many pathways kids regularly use that would reinforce science practice? Engineering, going online, gaming, design, animal/pet husbandry, technology fluency.

Suzanne Reeve has made a tally of kids' conceptual accounting of what they believe "health" to be. There is a considerable range of answers. What is this social construct and how can we leverage this to produce better science kits? Reed's work is informing a change in the future, e.g., a reframed STC microbiology kit. Visit this site for details: http://life-slc.org/docs/reevebell-childrensselfdocunderstanding.pdf

Science Standards: The Common Cores

They are currently being revised. The 1990s benchmarks are a framework to guide the next generation of K–12 standards. The revision is being funded by the Carnegie Corporation and ACHIEVE and will be a two-step process.

An understanding of science is more than knowing educational terms. The new standards will seek to deepen students' understanding of core ideas over multiple years of school. The NRC had a committee doing consensus work to collect core ideas that informed the framework. The culminating report will be released, after review, in June 2011.

The ACHIEVE group will take the framework, and over the course of a year, will define the standards (the performances that relate to concepts and practice over K–12). Steve Pruitt of ACHIEVE is leading this work, but hundreds of people in various disciplinary areas will contribute. The Committee's guiding principles, from consensus reports, informed the framework:

- Children are born investigators.
- Understanding develops over longer periods of time.
- Science is more than a body of knowledge.
- Societal relevance is important; we need to connect science to student interest and experience.
- We need to promote equity and broaden participation in our activities.

Specific Standards documents can be found at two sites: http://nas.edu/BOSE and http://achieve.org/next-generation-science-standards. Broadly speaking, the framework operationalizes a three-dimensional structure that includes

- Core disciplinary ideas.
- Cross-cutting concepts.
- Scientific and engineering practice.

There was a Committee decision made to sharpen the process of scientific inquiry, advance the field's ability to enhance inquiry (with better definitions), and to turn towards the cultural practice of science.

Conclusion

STEM education is a civil rights issue. (See Robert Moses.) Learning STEM knowledge and practices leads to more financially rewarding outcomes and careers and a more literate society.

10:45am–12:00pm

Community Conversations

Facilitator - Jeanne Chowning - Northwest Association for Biomedical Research

Each table group of participants was assigned a question to discuss. The following reports were submitted by table reporters from each group.

Reflecting on Phil Bell's talk, what is one area where you saw a connection to your work?
(Table 2)
Reported by Mel Limson, American Physiological Society

- Projects are more intentionally aligning to the six strands of learning.
- Projects are becoming more contextual and cultural so they have greater relevance to student learning.
- Projects are giving attention to accessibility for supports and opportunities that allow learning to take place.

Reflecting on Phil Bell's talk, what is one area where you saw connection to your work?
(Table 1)
Reported by Shaw-Ree Chen, University of Rochester
The report organizes points that came up in the sharing session into themes. The themes that we felt emerged during the session (and that were further clarified as themes when another table reported similar findings) included the following:

Ways in which the talk catalyzed people into thinking about their work and projects differently

- Specific methods of contextualizing science for students.
  - A person who works at a children's museum mentioned that historically, he/she would ask children general questions about science, and now he/she is motivated to ask specific questions that seek out how the science can be placed in the context of the student's life.
- Moving into working with younger students.
  - The talk referred to pathways of learning that started at very young ages. A participant wondered whether he/she should move his/her program into a younger age group. (note-taker's addition: I think this may refer to starting to engage kids in science at younger ages being more effective than trying to do so at the high-school level)

- Program planning using the 6 strands (and others) as a framework.
  - Some participants are already using the 6 strands without explicitly stating that they are. This may be a framework that ISE and other outreach programs can use to structure outcomes as well as evaluation.
  - While the 6 strands are a good framework for thinking about ISE as well as outreach, another framework that was mentioned was social marketing. Social marketing uses the benefits of doing social good to secure and maintain customer engagement. (Wikipedia says, in part, that in social marketing the distinguishing feature is, therefore, its "primary focus on social good, and it is not a secondary outcome." In social marketing, the focus is on achieving specific behavioral goals with specific audiences in relation to different topics relevant to social good, e.g., health, sustainability, recycling, etc. For example, a three-month-long marketing campaign to encourage people to get an H1N1 vaccination is more tactical in nature and should not be considered social marketing. In contrast, a campaign that promotes preventative care and reminds people to get regular checkups and all of their vaccinations when they're supposed to encourages a long-term change in behavior that benefits society. It can therefore be considered social marketing.) Social marketing does address engagement. As such, it was mentioned as a potential framework for thinking about student engagement in science.

- Using ethnographic methods in evaluation.
  - The talk described how ethnographic methods were used to develop greater understanding of how young people learned scientifically in their daily lives. Ethnographic methods, videography, and Photovoice are established qualitative methods that can be rigorously used to generate rich data for other SEPA projects.
- Spurring people into "thinking outside of the box."
  - By demonstrating the importance of out-of-school experiences to long-term science learning and engagement, the talk encouraged/emphasized the need for connecting a school-based project to other outreach programs that occurred outside of school. Connections and collaborations like these would then have a synergistic effect on the student.

Some challenges to points brought up in the talk

- One participant pointed out that "diversity" should not equate to "minorities." For example, he/she pointed out that we should not ignore disadvantaged white males, that everyone should be involved in enriched pathways to learning that include in-school and out-of-school interventions. There was agreement around the discussion table on this point.
- One participant cited an example of a school that was highly measurement driven. Teachers developed curriculum with a test in mind and there was very little project-based learning going on. Yet graduation rates were high, and many of the school's participants continued on to college. This was cited as a challenge to the idea that project-based learning is the best path to success.

Reflecting on Phil Bell's talk, what is one area where you saw connection to your work?

(Table 2)
Reported by David Vannier, NIH Office of Science Education

Nearly all of the SEPA participants at our table found direct connections and inspiration from Philip Bell's talk that will enhance their projects. It was also agreed that implementing many of Bell's ideas in K–12 settings would be worthwhile, but challenging. One participant reported that Bell's ideas seemed to apply only to secondary-school projects that include a career component. The rest of the table disagreed with this assertion and saw his ideas as widely applicable.

The concept of "life-long, life-wide, and life-deep learning" resonated with folks and will be in their minds as they improve their projects.

The six strands Bell described were also seen as a useful tool/model for improving projects. Participants wondered how they could be sure their individual projects incorporated all six areas in a meaningful way, given the constraints of each project and the classroom environments. It was agreed that some of the strands, such as thinking like a scientist, were more difficult to approach than others. There was also concern that the structured lives of most of today's children made it hard for students to thrive (be creative) in unstructured experiential environments. The environment and restrictions of the classroom (state standards and assessments) were also seen as challenges to implementing the six strands. A few participants noted that the six strands sounded a lot like learning progressions in curriculum design.

Other aspects of Bell's talk that were discussed are:

- The idea of leveraging resources outside the classroom for low-income kids, and the importance of getting sustainable funding.
- The challenge of getting students to explore and discover when they are focused on coming to the "right" answer. It was agreed that younger kids are more able to explore, while middle- and high-school students focused on being right.
- The importance of making science relevant and unscripted to students, allowing them to explore topics of interest, such as the shampoos and hair-test example Bell described.
- The importance of adapting learning experiences to cultural perspectives, using community and family values in designing effective learning experiences.

What is one of the biggest challenges your project has faced in its evaluation, and how have you tried to address that challenge? (Table 1)
Reported by Jim Moore - University of Georgia

While our group's discussions covered many challenges, there were four primary themes, listed in no particular order: commitment, retention, communication, and design.

Commitment — Several participating investigators mentioned the difficulties they encountered trying to get teachers to fully commit to the project. For example, some investigators reported problems associated with teachers having too little time available to participate fully in the project, especially when it came to completing the evaluation forms. Some investigators also reported difficulties with getting parents to return consent forms, which then delayed the start of the project. Other investigators struggled to keep the teachers involved, specifically if they were in the "control" group, or getting the teachers to use all of the materials they had been provided. As a result, some of the investigators reported having fewer teachers involved in the project than they had originally expected, or having data regarding only a few of the materials they had developed. Consequently, they were concerned about the impact this would have on the outcomes of the project. The most commonly reported approach to addressing these issues was to increase the number of visits to the schools and interactions with the teachers (through email, text) in an effort to promote "buy-in."

Retention — Several participating investigators reported that teacher-retention issues adversely affected their projects. As a result of economic problems in the country, several teachers had changed jobs or had their positions eliminated. These changes occurred quickly, often with little time available to seek replacements. As a result, the investigators were left scrambling to find replacements or, more often, to work with fewer teacher partners. At least one investigator shared a concern about the potential longitudinal effects that loss of teachers and/or the effects of replacing them midstream might have on the outcome of the project. While teacher-retention issues clearly are outside of the control of the participating investigators, the best way to address this challenge appeared to be to include more than the minimum number of teacher partners in the original experimental design and maintain constant contact with the teacher partners during the project.

Communication — A few participating investigators reported that they had experienced difficulties communicating with the evaluators on the project. Specifically, some reported that they had difficulty finding the appropriate evaluator for the project or agreeing on the tasks to be completed during the project, and by whom (investigators assuming something would be done by the evaluators, while the evaluators assumed it would be done by the investigators). At least one investigator reported that the evaluation plan proposed by the evaluator was inappropriate for the student group (e.g., the project involved preschool students, while the evaluation plan was appropriate for older students and/or was not linguistically appropriate for the target audience). Finally, several participating investigators discussed problems that arose because the evaluators had not been involved in the development of the curriculum materials, and, therefore, had an inadequate understanding of what had been developed. The best approach for addressing these problems appears to be to give the evaluation component of the project additional consideration at several stages of the project. This should be done when the proposal is initially being written, when potential evaluators are being interviewed for the project, and during the earliest stages of the project. The evaluators should be included in discussions regarding progress being made and/or changes that occur in the design of the project. A preventative approach such as this should help reduce the number of difficulties that might arise during data analysis.

Design — A few of the participating investigators reported problems that might best be included under the term design. For example, they reported difficulty in designing effective, open-ended questions that would allow them to assess the depth of the students' knowledge about a particular topic and in creating effective pre- and post-test questions that would allow them to identify significant gains in student understanding of a particular topic as a result of the intervention. Similarly, at least one investigator was concerned about attributing long-term gains in student performance to a specific intervention when there was no way to control for other learning opportunities that might have occurred in the intervening time (i.e., before the final post-test). Finally, a few investigators wondered whether the teacher professional-development activities they were providing were adequate, whether more-prolonged or repeated activities might be more beneficial than intensive training periods, and whether such workshops actually translated into changes in the classroom. While our discussions did not provide answers to these questions, they did point out the need to communicate effectively with the teacher partners and to be willing to test, revise, and retest questions and materials early in the development process.

What is one of the biggest challenges your project faced in its evaluation, and how have you tried to address that challenge? (Table 2)

Reported by George Reese - University of Illinois Urbana-Champaign

A remarkable number of projects have switched their evaluators or had poor evaluators at the beginning. It seems that the best evaluators come into the project and learn about it early, helping the PIs refine the questions, which are often naïve at the beginning of the project. If the initial questions don't fit, the evaluation process becomes difficult. Letting the evaluation change as the project grows is important. It is also essential that the evaluator be able to spend a significant amount of time with the project in its natural environment in order to fully understand what is happening.

What has been one of your most memorable collaborations (either negative or positive)? What made it memorable? (Table 1)
Reported by Joan Griswold - Northwest Association for Biomedical Research

Lessons learned from *positive* collaboration experiences include the following:

- The importance of having aligned goals and aspirations between partners can't be overstated.
- Emphasis must be placed on making personal connections between collaborators; repeated engagement leads to deeper relationships.
- Financial interconnectivity fosters bonds.
- Finding and offering the right incentives to university and high school teachers is key.
- It is essential to create a clear, step-by-step plan with partners and to have a clear understanding of the purpose of the project.
- Working professionally led to a valuable, well-used curriculum.
- Be open to working with unexpected partners when or if the collaboration is "set up" by others.
- Pay attention to serendipitous connections, as these can lead to positive outcomes.

Lessons learned from *negative* collaboration experiences include the following:

- Having too many collaborators can make individual partners too far removed from each other.
- Sometimes "contrived" collaborations are too broad—group participants based on shared responsibilities.
- Having buy-in from all parties is necessary for project success (i.e., a top-down implementation from the school principal did not engage teachers).
- Mandated collaboration does not equal "partnership."
- It is important to convince administrators that the time spent working out a good collaboration is worthwhile.

General Insights

If potential collaborators (i.e., individuals who meet at conferences such as this one) haven't connected in a week, they won't.
Ways to make a collaboration work if it is "pre-ordained":

- Clearly delineate responsibilities.
  - Who is responsible for interacting with the audience?
  - Who is responsible for interacting with the parties funding the projects?
- Set reasonable timelines.
- Try to attain buy-in from the bottom up.
- If working with a school's administration, ask teachers to buy into the project rather than telling them to support it.

Group Collaboration Process

1) Forming (group meets together)
2) Storming (brainstorming)
3) Norming (setting behavioral expectations)
4) Performing (getting it done!)

What has been one of your most-memorable collaborations (either negative or positive)? What made it memorable? (Table 2)
Reported by Barbara Hug - University of Illinois Urbana-Champaign

Lessons Learned About Collaborations

- Start small and build trust; this type of collaboration will lead to pairing throughout the community or communities.
- Recognize the expertise of the collaborators. With new expertise will come new insights and new perspectives that might allow you to go beyond what you were initially thinking (going outside the box).
- Be humble about what you don't know.
- Understand the need to get out in the field (the PI and other project members need to experience what is happening with the "real" schools or other field sites).
- Be involved in the collaborative relationship for the right reasons.
- Be flexible. You may need to draft and make changes to the materials on the basis of both the teachers' and the scientists' perspectives.
- Think about all of the participants involved in the project. Others will also benefit from the collaboration. For example, the use of student ambassadors allowed the students to develop skills that they might not have discovered otherwise.
- Take care to represent multiple perspectives. One example given was the inclusion of a science writer. One of the benefits of collaboration and collaborative writing is the creativity and ideas that come out as a result.

Possible Concerns About Collaborations

- Don't force collaborations that are too large.
- You need to know what is happening, where you're going. While collaboration is great, you still need to have leadership in a project.
- Having too many collaborators might cause a lack of true collaboration. The downside of getting too big is that you lose that initial creative spark and personal touch.
- It's important to have someone (a single point of contact) who calls the shots; you can't have 50 people calling the shots.

Ways of Building Collaborations

- Remember the importance of time and space.
- Have meetings to build trust.
- Emphasize a personal touch.
- Be sensitive to cultural differences (understand the culture of native communities, school culture, science, etc. There are many different communities to consider).

Various Professional Development Activities that Lead to Stronger Collaborations

- For the teachers — The activities need to align with the needs of the teachers. They also need to be culturally relevant in terms of the teacher's culture and community.
- For the scientists — Scientists need to have the opportunity to practice putting scientific terms into layman's terms, speaking in public, and understanding the public environment (formal or informal) and the constraints of the settings and how to work within them.

Collaborations at the SEPA Meeting

The benefits of having the pre-grant people at the SEPA meeting are the opportunity to network (and seeing its importance), see what people are doing, share ideas, and think about how the talking is influencing what is happening with the projects.

Please share on of the successes of your program. What worked really well that you think other SEPA projects might benefit from hearing about?

Reported by Michele Ward - Texas A&M University

- Teachers understood that intelligence can be changed through exercises; intelligence is not pre-determined at birth.
- Students are more engaged when they are given the opportunity to present their knowledge in unconventional ways (i.e., with food).
- Taking a genetics course in high school helped a student get into a university when he/she listed it on the application. The course was a SEPA project.
- Used a high-school teacher to lead professional-development activities rather than using a professor. Teachers relate better to other teachers; teachers know the needs of teachers better than professors do.
- Individual research projects done by high-school students culminated in a symposium that benefited all students.
- Enlist community input and involvement to empower students in their interest area and give students and community volunteers a say in issues.
- Pairing scientists with teachers to develop curriculum for middle school showed the importance of racial perceptions in the materials presented. Students related to teachers in different ways based on their background and racial perceptions.
- Teacher professional development using films of medical interns were used successfully. A very high interest and motivation was shown.
- Scientific community engaged in outreach.
- Track kids over 15 years to see how they mature and the impact of projects on the career choices they make.
- Communication between the scientific community and the education community. A "hierarchy" exists in which professors don't consider themselves to be equal to teachers. Much progress can be made if scientists and public educators can be brought together to better understand one another's viewpoints, needs, and expertise.

Participants

Marilyn Winkleby, Stanford University School of Medicine
Bob Russell, National Center for Interactive Learning/SSI
Tara Chudoba, New York Hall of Science
James Perkins, Jackson State University
Dennis Bateman, Carnegie Science Center
Tom Robertson, University of Georgia, College of Veterinary Medicine
Bill Cameron, Oregon Health and Science University
Mel Limson, American Physiological Society

12:00pm–1:15pm

What Constitutes "Rigor"? Discussion on balancing needs and interests of stakeholders with need to document learning

Facilitator and Reporter - Erin Dolan - Virginia Polytechnic Institute and State University

The aim for this session was to facilitate open discussion regarding what constitutes rigor in health- and science-education research/evaluation. Specifically, the definition of experimental and quasi-experimental designs, or any single research design, as inherently "rigorous" was questioned. The discussion also aimed to consider the extent to which experimental and quasi-experimental designs might jeopardize the relationship between SEPA investigators and SEPA project stakeholders, including students, teachers, and other public audiences.

As a foundation for discussion, the following guidelines about rigor from the SEPA Request for Applications were shared with the group:

- "Innovative and rigorous evaluation methodology to assess the effectiveness of PreK–12 or ISE/media projects that may include randomized controlled trials or well-matched comparison-group study designs."
- "At least one component of the evaluation plan for formal Pre-K–12 projects, i.e., classroom-based projects, must assess the impact of the project using rigorous methods, such as randomized controlled trial (RCT) or well-matched comparison-group study design."

Several relevant quotes were also shared:

- "What is the most-rigorous evaluation that can be done for a certain project, keeping in mind that RCTs are still the gold standard?" – Joy Frechtling (5/10/2011)
- "Evaluation methods should match the question. It's not always necessary or appropriate to use a quasi-experimental design." – Bruce Fuchs (5/10/11)
- "Are we going to know something at the end of the project that we didn't know going in, and how well will we know it? Need to show steady improvement on some measures." – Bruce Fuchs (5/10/11)

Conferees noted many concerns regarding whether it is reasonable or appropriate to define rigorous evaluation in terms of adherence to a single research/evaluation design and experimental or quasi-experimental design in particular. The most prevalent concerns included the following:

- The evaluation methods assume that the participant population being studied is uniform. It is very likely that there are subpopulations within the populations being studied and that particular interventions may yield differing outcomes for different subpopulations. It is necessary to better understand teaching and learning of different subpopulations before embarking on experimental or quasi-experimental studies. An analogy was made to personalized medicine.
- The evaluation methods assume that variance due to the variables of interest (e.g., the educational intervention) will be larger than variance due to other factors (e.g., student characteristics, teacher characteristics, school/community characteristics, etc.). This assumption does not often bear out in the classrooms.
- When little knowledge is available about the teaching and learning of particular individuals in particular contexts and with particular instructional materials, other research/evaluation designs, such as careful and systematic observation, are more appropriate and rigorous. Analogies were drawn to discovery-driven science (e.g., Human Genome Project) and model-based research (e.g., ecology, evolutionary biology, and systems biology).
- Setting this definition for rigor has not resulted in consistently strong research/evaluation. Concerns were raised about the quality of existing measures and challenges of identifying appropriate and meaningful control or comparison groups. Concerns were also raised that the emphasis on experimental or quasi-experimental design is prompting measurement of what is most easily measured, rather than what is most salient or meaningful to measure. "We don't want to measure something that is unimportant very well." In addition, these designs may yield insights into what is happening and to what extent it is happening, but not into why particular outcomes are happening.
- Participants (teachers, scientists, students, general public) should not be alienated in the process of conducting research/evaluation.

In general, the group was interested in redefining rigor as selecting research/evaluation designs and methodologies that are appropriate to the question or problem being addressed and to the population being studied. Several conferees also noted the importance of using a variety of methods and perspectives from disciplines such as anthropology, sociology, and psychology for understanding teaching and learning as human behavior and for identifying the socio-cultural factors that influence education.

Recommendations for Next Steps

Although the discussion clearly needs to continue, conferees had some excellent recommendations:

- Developing a common language regarding what constitutes rigorous research/evaluation, especially with respect to project timelines (e.g., during pilot phase, efficacy phase, dissemination phase). A suggestion was made to substitute the term "rigor" with the phrase "appropriate and effective," and a question was raised about how to accomplish this.
- Developing a plan to communicate this language and corresponding definitions broadly and apply them consistently.
- Providing feedback to NIH and other stakeholders regarding meaningful, substantive, and realistic ways to demonstrate impact.

2:45pm–4:00pm

BREAKOUT SESSIONS

Mixed-Data Design & Analysis: What's Right for Your Project?

Facilitator - Dina Drits - University of Utah
Panelist - Kristin Bass - Rockman Et Al
Reported by Susan Kuner - Topaz Canyon Group, LLC

Topics Discussed/Presented

- Differences between quantitative and qualitative methods
- Strengths and shortcomings of each method
- Why and how to use a mixed-method approach
- Tools and resources for mixed-method research
- Hands-on activity with worksheet to identify SEPA project research questions (evaluationspringboard.org/science)

Key Points

- Both qualitative and quantitative approaches have accepted and rigorous best practices.
- Quantitative Approach — Strengths: straightforward, descriptive, statistical analysis. Limitations: difference between statistical and practical significant, overlooks important variables.
- Qualitative Approach — Strengths: answers the "why," explains people's experiences. Limitations: replicability and generalizability, takes too much time/too many resources.
- Mixed-method design takes advantages of both methods.

Best Practices

- Start with your research questions and then select the methods that are most appropriate for them.
- Let each method inform the other.

Challenges and How They Are Addressed

- Where to publish mixed-method results? More journals are now accepting these studies (for example, JRST).
- History of quantitative methods as superior to qualitative. Theses continue to demonstrate value of mixed-method studies.

Software Tools for Data Analysis

- Quantitative analysis: SPSS, SAS, the R project, STATA (HLM embedded in STATA), Mplus (for latent-variable modeling)
- Statistical Power: GPower (single-level research designs), Optimal Design (multi-level research designs)
- Qualitative analysis: NVivo, ATLASti, Transana, HyperRESEARCH
- Mixed-method analysis: QDA Miner, WordStat
- Measurement: Winsteps, WinBUGS
- GIS data: ARCview

For a copy of this session's PowerPoint slides that include examples of research questions that were answered about mixed-method designs and a mixed-method resource list, please email dina.drits@utah.edu.

Participants

Amy Nisselle, Dolan DNA Learning Center
Brian Mooney, Johnson and Wales University
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Barbara Baumstark, Georgia State University
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Adrienne Loffredo, Wake Forest University School of Medicine
Deborah L Colbern, Charles R. Drew University
Nancy Twillman, Resource Development Institute
Kim Schuenke, University of Texas Medical Branch

Personalized Museum Exhibits: Education and Research Considerations

Facilitator - Judy A. Brown - Miami Science Museum
Panelists - Patrice Saab, University of Miami; Lucia E. Williams - Miami Science Museum
Reported by Kelli Johnson - Texas A&M University

Judy and Pat felt that the museum and research collaboration was a marriage made in heaven. This session discussed how Pat and Judy decided to collaborate and how this relationship has benefited both parties.

Why did you collaborate?

Pat (Researcher)

- This was a way to translate the kind of research that was being done in the lab with a broader community and a way to reach more people. Reaching a much larger audience that could benefit from the research that had/was being done in the laboratory.
- The idea for the collaboration would serve as a community-intervention/prevention opportunity to reach a larger, more-diverse population and a more-diverse audience that doesn't usually volunteer for university-based studies.
- Getting an opportunity to gain access to incorporate self-management, taking the psychological principals we use in the lab in making behavioral changes and thinking about how to incorporate them into the exhibit, thinking about things like self-management techniques, goal-setting, modeling, and skill acquisition. It was an unbelievable opportunity to translate the lab work to the big setting.

Judy (Miami Museum)

Museums don't always get the opportunity to work with the university researchers, so this was a great opportunity to do that.

- We have a well-developed youth-development program and have been in the community for a long time.
- The museum's new President had passed a $2M bond for the museum. While in Finland, she visited a museum that had a sleep laboratory as an exhibit and they were actually conducting research on the visiting patrons. Judy wondered if our museum could do something like that for our visitors and wondered if they would be interested.
- Looking hard at our evidence of success, it was obvious we did not have the research expertise to house such an exhibit. So, if we really want to have the rigor in our programs, we need to collaborate with researchers.

What do we want to learn?

Pat (Researcher)

Using our health-educational approach, would visitors really be interested in participating in research?
Would visitors be engaged in the research and contribute their research to an actual database?
Could we do cardiovascular research in a museum setting that would be done differently than they had done it in the past?

How do we personalize the museum experience?

Judy/Lucia (Miami Museum)

Components of the exhibit:

- Walk up to a computer screen.
- The instructions are written in three languages: English, Spanish, and Haitian/Creole.
- It asks for age/gender/ethnicity.
- Visitors do not enter their given names. They can choose a nickname that is printed on the card in case they set it down. People like to take their time choosing their nicknames.
- There is a bar code on the card. The patrons scan the code to enter the system and begin recording data that is taken during the exhibit.

Pat (Researcher)
This is an anonymous form of data collection and the people are allowed to choose if they want to contribute their data or not for the purpose of research. The exhibit still works and the patrons see their own data whether they choose to contribute it to the pool or not. The data is only submitted to the researchers if the patron clicks "yes" at the beginning of the exhibit and agrees to contribute.

If the patron agrees to contribute by clicking "yes," their data is recorded and they cannot opt out at a later point. But the patron can stop participating in the exhibit at any time and the data is no longer recorded.

Lucia (Miami Museum)
Most users go through the exhibit in English and are comfortable using English even though the majority of the population is Hispanic. The computer screens are written in the three languages, but at any time the patron can click on a word and go back to their native language to gain a better understanding of what is being asked. This offers some assistance to the various generations that visit the museum.

When the text is written in languages on top and bottom of the screen, it is much more difficult to find the word you are looking for, whereas if the texts are written (side by side) next to one another, it is easier for the user to find the word. Most people use both languages as opposed to one or another.

We spend the time to offer the various languages because it helps make visitors of all races feel included. It makes it feel like the museum is a place for them. We got a lot of positive feedback about this, even though most patrons of Haitian/Creole background cannot read in that language. The fact that it was offered made them feel included and like the museum was a place for them.

Where is the museum located in regards to racial diversity?
Lucia (Museum)
The museum is located south of the downtown area and the target group is Title-1 schools where most of the children qualify to receive free or reduced-cost lunches. But there is a diverse population that enters the museum.

Pat (Researcher)
We did an outreach to the Haitian/Creole population to talk about the exhibit and offered free admission. What we found was that for the older (adult) population, this was the first time they had been in a science museum. So, it became a way to involve a group of people that had not been able to have that experience before. Language barriers can limit access and negatively impact health. We felt it was important to provide linguistically/culturally appropriate information to the visitors.

What is your approach to developing your bilingual material? Is it developed in English and then translated? Or is the material developed at the same time?
Lucia (Museum)
We develop it in English first, but when we translate it, that informs the English, so we go back and edit the English so that it makes sense in all languages.

We made sure that the exhibit names made sense in all languages. For example, the exhibit in English is called Heart Smart. However, a literal translation in Spanish would not make sense, so they had to slightly change the name to make sense culturally to the various populations.

The population we serve is very comfortable using the various parts of the exhibit. It gives the visitor personalized feedback immediately. We developed a specific algorithm that would give specific data according to age and gender. This immediately gives the visitor an idea if their BMI is in a healthy range or how much they need to lose/gain to reach a healthy range. The people want to know exactly what they need to do to make changes. People who are very large would opt out of the BMI portion because it didn't matter to them what the feedback would be; they already know they need to lose weight, which means the researchers are not getting their data. But most people are just slightly overweight and willing to submit their data.

How long does the information about the visitor's personal BMI information remain on the screen?

Lucia (Museum)

They have to click out of it, so if they decide to walk away, then the screen has a little time where the information is left up. But if they want to hide it, they can click on it and it becomes a blank screen.

There is a number under the bar code on the card that the visitors are given at the beginning of the exhibit. The visitor can go home and pull up their personal information from that exhibit and review it at home.

Pat (Researcher)

During the high-school study, we limited the number of visitors that were allowed into the exhibit so there weren't as many people standing around waiting to potentially see someone's personal information on the screen. Fifteen students were allowed into the exhibit at a time.

We wanted people to get the correct feedback and ensure that the research collected was accurate. We did several sessions with machines versus researchers conducting the tests on the visitors. The machines were as accurate as the researchers but offered a more-individualized experience for anyone who was timid of other people taking or recording their data.

Lucia (Museum)

Lifestyle quest: Visitors enter information about their eating habits and the visitors are given immediate feedback according to the information the patron gives based on age/gender.

Pat (Researcher)

The idea behind the two stations (the "relaxation station" has a chair and the "activity station" has a hula hoop) was that we wanted visitors to understand that activity doesn't cost a lot of money and can improve your overall health. Simple, inexpensive methods are available to assist everybody in adopting a healthy lifestyle.

Lucia (Museum)

A follow-up activity is on a website that will allow you to enter your bar code to retrieve your data from the exhibit. A list of resources can provide information to the visitor to assist in learning more about healthy lifestyles. The museum plans on developing this website further.

The exhibit has been open since October 2009 — 53,000 people take a card and put in their data, 80% consent to submitting their data. So we know people will participate, but researchers do not have a way to see how many of these people have returned to the exhibit. The analyses are focused on the cleanest data.

How much science-related information does the visitor get during their session in the exhibit, as you don't want to overwhelm the visitor with text?

Lucia (Museum)

This was a lesson for the researchers: figuring out how to communicate in 100 words, learning how to communicate effectively and in a friendly way, finding an interesting way to communicate key concepts.

Lucia (Museum)

Patrons spend, on average, 15–23 minutes in the exhibit, which is a longer time than other exhibits, but it is an exhibit about "me," and people are always interested in learning more about themselves. The feedback they receive is also immediate and relatable to them.

Pat (Researcher)

We've conducted two kinds of studies:

- 1. A museum-visitors study, which is an avenue to study variations in health disparity.
- 2. A random high-school visitors study/health-education study.

Researchers have been very conservative, including only correct and verified data. One important finding is that the minority groups have higher health disparity. The other thing we think is an opportunity to be used as a randomized control trial for health education, 10th graders, who are 98% Hispanic. A discussion activity was developed as an assessment for the museum exhibit.

Lucia (Museum)

Is it enough? Did they learn anything?
In the discussion activity, some comments included things like, "I don't have to worry about my health because I'm young." The kids then vote for whether they agree or disagree with the quote.
Does the exhibit impact the student knowledge?
They did find that health knowledge was enhanced with the field trip and discussion activity. It increased self-efficacy.

Things that didn't work out as well

Lucia (Museum)

We have to limit the number of people who enter the exhibit. Interpreters (assistants) help limit the numbers and they assist the visitors in understanding where to take their measurements or how to use the machines.

There are age limits for using the machines. For example, a two-year-old cannot use the BMI and patrons must be at least eight years old to participate in taking their blood pressure. The museum mostly caters to families/schools. The original target audience was for high school and above, but an audience is an audience, so they needed to try and make the exhibit relevant for all ages.

The Lesson Learned

Lucia (Museum)

We would collaborate again. The museum perspective and personalization is important to visitors. They originally wanted to travel with this exhibit but the machines were more maintenance than originally thought.

Participants

Mark Thorne, National Children's Museum
James Perkins, Jackson State University
Jay Fletcher, Faces of Science, Inc.
Kelli Johnson, Texas A&M University
Sharon Phillips, Federal Hocking Schools
Brinley Kantorski, Duquesne University
Meena Selvakumar, Pacific Science Center
Tara Chudoba, New York Hall of Science
Abbey Lemesany, Denver Museum of Nature and Science
Lynnsey Dohmen, Children's Museum of Houston
Hever Velazquez, Oregon Museum of Science and Industry
Donna Korol, University of Illinois, Urbana-Champaign
Lisa Marriott, Oregon Health and Science University
Veronica Nuñez, Oregon Museum of Science and Industry
H. Chad Lane, University of Southern California
Toby Spencer, Encina High School
Chase Fordtran, University of Texas Health Science Center at San Antonio

SEPA Diabetes, Obesity, Cardiovascular (DOC) Working Group: Developing a Strategic Plan

Facilitator - Melani W. Duffrin - East Carolina University
Panelists - Virginia Carraway-Stage - East Carolina University
Wendy Huebner - Montclair State University
Pam Koch - Teachers College Columbia University
Reported by Jim Moore - University of Georgia

One of the purposes of this breakout session was to highlight the value of SEPA groups sharing information obtained from surveys that are distributed outside their specific locale. By doing so, time spent developing tools could be decreased, the questions being addressed could be extended, and additional data could be generated and made available to students to analyze. Because this approach focuses on distributing surveys to students (and families), the current approach of having individual IRB approval for each SEPA site is cumbersome and inefficient. The investigators leading this breakout session have worked through the regulatory requirements so that it is now possible for the surveys to originate from and return to a single PI, and for all the requirements for consent and assent handled in the process. After completing these requirements, the participants then have access to a 44-question survey that gathers data about demographics, weight, blood pressure, diabetes, blood glucose, diet, exercise, kidney disease, other complications of obesity, and use of mobile media/social networks. As soon as the participant completes the questionnaire, he/she gets immediate access to his/her BMI.

One of the main goals of the project is to collect data from family members, and when this occurs, each family member gets access to his/her BMI and the overall BMI of the family. Furthermore, each participating SEPA gets access to their participants' de-identified data as well as information regarding distribution (Google Earth). The aims of this approach are to stimulate interest among SEPAs, foster collaborations, and seek information regarding trends in nutrition, behavior, activities, etc. that are associated with the development of diabetes, obesity, and cardiovascular disease.

Participants

Ginger Cross, Mississippi State University
Athena Samaras, Northwestern University Feinberg School of Medicine
Lisa Marriott, Oregon Health and Science University
Valence Davillier, Great Lakes Science Center
Carolee Francis, University of Nevada Las Vegas
Melani Duffrin, East Carolina University
Cathy Morton-McSwain, West Virginia University
Ann Chester, West Virginia University
Sara Hanks, West Virginia University
Mike Fenzel, Montshire Museum of Science
Greg DeFrancis, Montshire Museum of Science
Jim Moore, University of Georgia
Isobel Contento, Teachers College Columbia University
Wendy Huebner, Montclair State University
Diana Vanek, University of Montana
Maureen Munn, University of Washington
Karina Meiri, Tufts University School of Medicine
Cathy Ennis, University of North Carolina - Greensboro
Houda Darwiche, University of Florida
Bob Branch, University of Pittsburgh

Effective Recruitment and Retention: Reaching Your Target Group and Keeping Them Engaged

Facilitator - Mel Limson - American Physiological Society
Panelists - Marsha Lakes Matyas - American Physiological Society
Nancy Moreno - Baylor College of Medicine
Margaret Shain - American Physiological Society
Reported by Robert Manriquez - Stanley High School

The following topics were discussed during this breakout session:

- BCM – Center for Educational Outreach and APS – Frontiers in Physiology Programs
- Categories of challenges
- Recruitment
- Making the commitment
- Retention
- Costs and benefits

Representatives of the Baylor College of Medicine and the American Physiological Society (APS) provided descriptions of their teacher professional-development programs.

- Nancy Moreno, Ph.D. provided a description of the Baylor College of Medicine Center for Educational Outreach. This is an intensive, year-round (live/online) teacher professional-development program. It focuses on developing/helping teachers develop K–16 curriculum materials that contain accurate science and discovery. This includes science-teaching resources that include research-based, peer-reviewed, online learning models for undergraduates and teachers. The BCM Design Process is followed to develop a product (a teacher's guide). The process begins with a goal for learners and continues with an outline, a draft, field-testing, data analysis, and product revision. It ends with a final product. Expert review is provided throughout the process.
- Marsha Lakes-Matyas, Ph.D.; Margaret Shain, and Mel Limson, Ph.D. provided a description of the American Physiological Society's Frontiers in Physiology Programs. There are two different programs offered by the Society: a summer research program (RTs) and an online professional-development program (OTs). The summer research program has been in existence since 1990. In the 21 years since its inception, there have been 369 teachers from 46 states (plus the US Virgin Islands, Puerto Rico, and the District of Columbia) that have participated as research teachers. The research teachers participate in summer research on a full-time basis for 7–8 weeks. The RTs also participate in a weeklong Science Teaching Forum. There are online components that include readings and group discussions, as well as the transformation of a cookbook lab to a six-star science lesson. The RTs attend the APS annual meeting. The online professional-development program is in its second year of existence. There have been 51 teachers that have participated as an online teacher. Online program components include the following: readings and group discussions, personal written reflections, online projects with a poster session, transformation of personal lessons. The online teachers also attend the APS annual meeting and participate in Physiology Understanding Week.

The following list of challenges/issues regarding teacher professional-development programs was compiled by the session's attendees:

- Application/commitment (for an extended period of time)
- Evaluation/study design/project proposal
- Collaborations/commitments
- Teacher mobility
  - Administrative limits
- Appropriate incentives
  - Stipends
  - Credit
- Teacher resistance to professional development
- Creating "buy-in"
- Implementation
  - Non-compliance with program's protocol

Best Practices

- Recruitment — Provide professional treatment from Day 1. Remember why the teachers are participating. Determine your target audience, and be specific. Put the information in the participant's path, and utilize online recruiting. Recruit through partners. Use technology effectively and build networks and communities for future recruitment. Describe the program clearly and plan for attrition. Establish a clear timeline and explanations of protocol.
- Making the Commitment: Provide as much detail as possible to fully describe the program. Establish special considerations for curriculum-development projects that engage teachers in data collection. Provide an explanation of why data is being collected and how it will be protected and reported. Also establish procedures for collecting and reporting student work and scores. Coach teachers on the common pitfalls of implementation. Provide careful monitoring and individual follow-up.
- Retention — You must communicate with the teachers. Monitor assignments, discussions, and reflections throughout the program. Establish regular email communication and engage participants in group projects. Be prepared for emergencies and for participants to drop out.
- Costs and Benefits — The program costs include the following: planning time, establishing an example bad guy, and remembering you cannot anticipate every possible problem. The program's benefits include the following: better retention of teachers, improved program information, improved launch in future years, more-consistent treatment of participants, and better evaluation results.

How People have Addressed [these Challenges]

- The following advice and suggestions were provided by the breakout-session leaders:
  - Determine your specific target audience.
  - Provide full disclosure on your program (e.g., expectations, timeline, schedule).
  - Utilize the internet to recruit participants (e.g., state science association's e-newsletters).
  - Be in constant communication.

Participants

Shaw-Ree Chen, University of Rochester
Sue Hills, University of Alaska
Sue Kirk, Virginia Commonwealth University
Mario Godoy-Gonzalez, Royal High School
Martha Sellers, Montana State University
Laura Fawcett, Yale Peabody Museum
Ben Koo, University of California, San Francisco
Gail Fletcher, University of Southern Maine
Vince Hardy, Texas A&M University
Julianne Hatfield, Northwestern University
Kathleen Bateman, Boston Latin School
Robert Manriquez, Stanley High School
Marietta Calinger, Wheeling Jesuit University
Michele Ward, Texas A&M University Veterinary School
Malrie Shelton, University of Tennessee Health Science Center
Chandan Robbins, Georgia State University/BioBus
Sandra McKell, University of Alabama Birmingham
Neil Lamb, Hudson Alpha Institute for Biotechnology
Maxine Freund, George Washington University
Athena Samaras, Northwestern University Feinberg School of Medicine
Nicole Kowrach, Museum of Science and Industry Chicago
Jera Niewoehner, Metropolitan Nashville Public Schools
Sharon Blanco, University of Texas Health Science Center
Bill Cameron, Oregon Health & Science University
Phyllis Harvey-Buschel, University of Washington

Commercializing Products from SEPA Projects

Facilitator and Reporter - Dina Markowitz - University of Rochester and Science Take-Out, LLC
Panelists - Beth Anderson - CEO and founder of Arkitek Studios
John Pollock - Duquesne University
Laura Lynn Gonzalez - Co-owner of Green-Eye Visualization

This breakout session provided examples of how SEPA products have been commercialized in order to disseminate and sustain them.

Dina Markowitz presented her experiences as a SEPA PI and small-business owner and shared "lessons learned" regarding the commercialization process, some of which can be found below:

- The relationship between her SEPA-funded curriculum and Science Take-Out kits
- Details on how Science Take-Out was created (legal issues, taxes, and accounting)
- Working with the University of Rochester's technology-transfer office to license the copyright of her SEPA lessons
- Requirements for applying for SBIR grants and a description of her SBIR grant projects

Beth Anderson presented details of her collaboration with the Northwest Association of Biomedical Research (NWABR) on the ETHOS project funded by a Phase I SBIR grant. This project took a text-based, real-life bioethics scenario (created by NWABR) and developed it into an interactive, computer-based game. Beth summarized the details of their project, which can be found in the following list:

- Pre-production — finding actors, writing scripts, and developing the game's concepts.
- Production — building the Adobe Flash template
- Pilot testing in middle-school classrooms and evaluation (formative, i.e., survey, data was collected from students)
- Working with NAWBR — they provided the initial curriculum as well as contacts with schools (teachers, students)

Beth also discussed preliminary plans for a Phase II SBIR proposal, which will include creating a rigorous plan for testing and evaluating the software and developing a commercialization plan. She also discussed the importance of creating a trusted relationship with a for-profit collaborator.

Laura Lynn Gonzalez described her work with John Pollock to commercialize his SEPA products, which include DVDs (and associated lesson plans) of planetarium shows on biomedical topics.

- Green-Eye Visualization is was hired as a subcontractor to create, package, and sell DVDs (on their website) that were based on John's SEPA curriculum materials. Teachers prefer having DVDs to downloading the movies.
- They also sell posters, movies, iPad apps, and customizable lessons.
- Licensing use of the SEPA-funded curriculum from Duquesne University was an issue that took several years to resolve.

John and Laura also discussed issues related to protecting e-downloads from unauthorized distribution.

The audience members asked numerous questions regarding profit margins, applying for SBIR grants, creating solid business plans, building commercial websites, and hiring IRBs. Panelists also discussed potential ideas for combining products from SEPA projects and increasing exposure in the marketplace by, for example, displaying commercialized SEPA products together at NSTA and NABT exhibitor booths.

Participants

John Pollock, Duquesne University
Dennis Bateman, Carnegie Science Center
Chuck Wood, Wheeling Jesuit University
Jackie Shia, Wheeling Jesuit University
Laura Gonzalez, Duquesne University/Green-Eye Visualization
Susan Adler, Northwest Association for Biomedical Research
Kathyann Duncan, New Jersey Medical School
Ted Clark, Cornell University
Michelle Ventura, Georgia State University
Sally Mayer, University of Michigan
Laura Martin, Arizona Science Center
Dana Riley Black, Institute for Systems Biology
Craig Berg, University of Wisconsin
Louisa Stark, University of Utah
Beth Anderson, Arkitek Studios

Partnering with Native American Communities

Facilitator - Maurice Godfrey - University of Nebraska Medical Center
Panelists - Chohla Moll - Mt Edgecumbe High School
Kim Soper - University of Nebraska Medical Center
Tony Ward - University of Montana
Kelley Withy - University of Hawaii
Reported by Chola Moll - University of Alaska

The panelists were asked to speak about the easiest and the most-difficult aspects of working with Native American communities.

Chohla Moll, a Native American science teacher who was born into the Cherokee tribe but was adopted by the Tlilingit tribe, called working with her students in Alaska a "daily joy." Her students are from rural Alaska and are deeply connected to their culture. They live at a subsistence level. They often go whaling and are quite familiar with the inside of whales.

Ms. Moll said her biggest challenge is that her students come from all over the state (she teaches at a boarding school). What that means is that the students can't stay as connected to their communities and they can't bring other peers and community partners into the classroom due to the distance between the communities and the school.

She was asked whether her students feel "less Indian" being at a boarding school. She answered that the school "tries hard to keep the keep the students connected to traditional values." She often tells stories of how their Indian ancestors were actually scientists (one example is brining fish). This also validates their ancestors' achievements.

Kim Soper, another panelist, said that it is important to practice "code-switching," to get students to become culturally bilingual. Students will receive a Western education, but that education must create a bridge between cultures.

Tony Beck asked the panelists whether they talk to their students about the possible carcinogenic impact of smoking fish. He wondered if this was a "good thing to do" or if it would be viewed as an assault on native culture.

Panelists answered that people should be informed, but that there needs to be a Native response to that problem, not one dictated by the West.

The Native American science teacher, Ms. Moll, said she shows her students the fish-and-game website in order to discuss contamination in halibut. She tells her students not to eat halibut that weigh over 50 pounds. She said her students don't take this advice as an affront; instead, they go home and tell their parents about it.

Ms. Moll described the communication skills of students from the Yupik tribe. They often "speak" with their eyebrows. For example, among the Yupik, eyebrows up equals "yes" and eyebrows down equals "no."

A panelist from the University of Montana described long-standing historical/cultural feuds among Native American tribes that still resonate today. He told a story about one of his students from the Crow tribe. The student, a young man, became very silent when a young Cheyenne girl entered the room. After she left, he told the teacher, "100 years ago, I would have had to kill her."

The panelists talked at length about the high turnover among Western teachers working with Native American students. They spoke somewhat disparagingly of Teach for America teachers who arrive unprepared for the Spartan and lonely lives they will lead in rural Alaska. They ultimately become so frustrated that they leave. Institutions hire Teach for America teachers because they are cheap—half the cost of a regular teacher—but according to the panelists, they are also much less effective.

Ms Moll said the only solution to that problem is to convince more Native Americans to come back to their home communities to teach. Unfortunately, this is difficult because Native American teachers are often lured away from their native communities by higher-paying jobs and faster-paced lifestyles in the West.

Participants

Victoria Coats, Oregon Museum of Science and Industry
Ishara Mills-Henry, Massachusetts Institute of Technology
Claudia L. Pryor, Diversity Films
George Reese, University of Illinois at Urbana-Champaign
Briar Kina, Harvard Medical School
Deron Ash, Arizona Science Center
Tony Ward, University of Montana
Kelley Withy, University of Hawaii
Tony Beck, NIH
Martha Sellers, Montana State University
Kim Obbink, Montana State University
Molly Stuhlsatz, BSCS
Pam Lund, Girl Scouts of E. Washington and N. Idaho
Amanda Meyer, University of Alaska Fairbanks
Chohla Moll, Mt Edgecumbe High School
Kim Soper, University of Nebraska Medical Center

Teaching About Clinical Trials: Jigsaws and Structured Academic Controversies—Classroom Strategies for Exploring Challenging Concepts

Facilitator - Walter Allen - Foundation for Blood Research
Panelists - Jeanne Chowning - Northwest Association for Biomedical Research
Jeri Erickson - Foundation for Blood Research
Reported by Jeanne Chowning - Walter Allen - Jeri Erickson

Our objectives were for attendees to gain an understanding of the bioethical challenges confronted by participants in clinical trials, and to learn a lesson strategy that promotes student discussion of complex socio-scientific issues.

This interactive session began with a brief overview of the clinical-trials process as it is presented in the BiomedicineWorks project. This field-tested curriculum uses a jigsaw strategy to explore challenging content (the fifty-year history of clinical trials around retinopathy of prematurity). Participants received the jigsaw curriculum materials that are appropriate for high-school classrooms or used as a professional-development activity for high-school teachers.

Attendees then engaged in a Structured Academic Controversy (SAC) that explored some of the bioethical challenges faced by participants in clinical trials for breast cancer treatment. The discussion centered on the controversy surrounding the use of drugs that lack FDA approval outside of clinical trials. In small groups, participants were divided into "Pro" and "Con" sides and read background information relevant to their assigned position.

The "Con" side read an excerpt from Mayer M. (2005) *When clinical trials are compromised: A perspective from a patient advocate.* PLoS Med 2(11): e358. A small sample portion is included below:

"Founded by surviving family members of patients with cancer who had been unable to get access to experimental treatments under development, with support by antiregulatory forces in Washington, D.C., Abigail Alliance first brought a citizen's petition and then a lawsuit against the United States Food and Drug Administration (FDA). They claimed that current restrictions on experimental treatments represented an infringement on the civil rights of dying patients. They proposed a regulation permitting the marketing of experimental treatments after Phase I trials to patients who had no other treatment alternatives, claiming that this would in no way interfere with the conduct of confirmatory trials.

They were firmly convinced that their loved ones could have been saved, if only they had been permitted access. To them—as to me a decade earlier, before I understood what was at stake—the benefit from these cutting-edge treatments was obvious. The need was urgent. People they loved were dying. New treatments had been developed. How could anyone be cruel enough to deny a patient the next new treatment that might save or extend life? Randomized trials were seen as not only unnecessary but ethically indefensible. To them, the notion of equipoise was simply an absurdity. Strong perceptions of drug efficacy, nurtured by pharmaceutical industry advertising, kept hope alive. At first, the Abigail Alliance initiative to market drugs after Phase I trials seemed so absurd that many of us advocates didn't take it seriously, and took no action. But the alliance was very serious and very determined."

The "Pro" side read the published response to the article above and also portions of the Abigail Alliance web site. A sample of each is included below:

"Ms. Mayer makes several good points about the importance of enrolling people with life-threatening conditions in clinical trials in order to identify new treatments and speed the pipeline along for the greater good. However, the idea that clinical trial enrollment suffers when seriously ill individuals are provided compassionate use of treatments is myopic; one does not negate the other. In many cases, persons who seek compassionate use of medications are ineligible for the clinical trials Ms. Mayer would want them to enroll in, and will likely die or suffer considerably before the experimental treatment they are seeking is approved for the public. In a world of limited resources, the question then becomes how do we encourage enrollment in clinical trials to develop treatments and cures which will benefit people in the future, while humanely treating those who are ineligible for these trials and suffer right now? The first step is to understand that clinical trial enrollment and compassionate use programs are not competing interests today, as they perhaps were in the 80s and 90s." (From the rebuttal to Mayer, 2005).

"Some have issued misinformation to the public saying that the Abigail Alliance is pushing for a 'free-for-all' by incorrectly saying that all drugs would be available right after Phase I clinical trials begin. This too is incorrect. The Abigail Alliance is saying there needs to be early access to promising new cancer drugs and other drugs for serious life-threatening illnesses as early as the completion of Phase I trials, when there is compelling evidence of efficacy, as was the case with the gripping efficacy of Gleevec for CML leukemia and Erbitux for head and neck cancer by the end of these two Phase I trials" (From Abigail's Alliance website).

In an SAC, each side takes turns presenting to the other side. The listening side repeats and paraphrases what they have heard, to ensure their correct understanding. Once both sides have spoken, the participants drop their formal "Pro" and "Con" roles and discuss the ideas in the texts as individuals, without respect to the positions they were assigned prior. The groups try to identify areas of agreement and disagreement. This structured discussion format promotes an understanding of different positions and provides a way to engage participants in conversations around difficult issues. In our session, several groups continued to engage in discussion past our allotted time.

Participants

Naomi Luban, Children's National
Diana Natividad, University of Texas Health Science Center at San Antonio
Linda Pruski, University of Texas Health Science Center at San Antonio
Sherry Rosedahl, Texas A&M University Veterinary School
Mary Jo Koroly, University of Florida
Heather Reddick, University of Texas MD Anderson Cancer Center
Toby Spencer, Encina High School
Jennifer Jamison, University of Southern Maine
Joan Griswold, Northwestern Association for Biomedical Research
Kathy Kailikole, Drexel University
Harmony Starr, University of Utah
Marianne Garcia, University of Texas MD Anderson Cancer Center
Lisa Abrams, Virginia Commonwealth University
Carl Franzblau, Boston University Medical Campus
Susan DeRiemer, Meharry Medical College
Christina Boelter, University of Kentucky
Jennifer Koerner, Chicago Public Schools
Kristi Bowling, Rice University
Leonard Munstermann, Yale School of Public Health

4:15pm–5:15pm

Sharing Best Practices and Challenges: Evaluators

Facilitator and Reporter - **Molly Stuhlsatz** - BSCS

This breakout session was intended to provide evaluators from SEPA projects time to discuss issues and concerns and to share experiences with one another. Most of the people in attendance were evaluators, but there were also a few project PIs and project staff members.

The discussion started with a brief introduction from each person and a short description of their work. Following the introductions, participants were asked to bring up topics of their choosing. The conversation quickly moved into one that focused on finding an appropriate evaluator for a project and the requirements of evaluation from SEPA.

One project PI was interested in hearing about how one would go about beginning a "rigorous" evaluation of his project, one that had been going on for quite some time. The evaluators in the room talked to him about the need for finding a resource (an evaluator) that would have the knowledge of educational interventions as well as research design. There was some confusion from the PI about the role that evaluation professionals take in SEPA projects.

Interestingly, the next topic was brought up by another PI who was dissatisfied with the work that her evaluator had done so far on her SEPA project. The evaluators in the room gave meaningful advice to the PI about clarifying rolls and encouraging a good working relationship with the current evaluator. We then talked through how to find a new evaluator, if it became necessary.

The meeting ended with a discussion of several other topics:

- Data-collection issues
- Working with highly mobile, at-risk populations
- Working in rural areas
- Collecting meaningful data from project participants

Participants

Lynne Haeffele, Illinois State University
Rafael Diaz, University of California Davis
Laura Collins, Center for Research and Learning
Kristin Bass, Rockman et al
Diane Adger-Johnson, NIH/NIAID
Nancy Twillman, Resource Development Institute
Brinley Kantorski, Duquesne University
Susan Kuner, Vanderbilt University
Hever Velazquez, Oregon Museum of Science and Industry
Maxine Freund, George Washington University
Naomi Luban, Children's National
Mary Jo Koroly, University of Florida

Sharing Best Practices and Challenges: Informal Science Education (ISE)

Facilitator - Bridget Coughlin - Denver Museum of Nature and Science

- 3 themes — audience segmentation, evaluation, front-end evaluation→overall evaluation
- ISEs are very aware of what learners find interesting, and how to spark interest
- Learning does take place in science centers through exhibits
- ISEs are very good at focusing on Strand I and Strand VI (National Academy of Science informal science-learning strands)
- Evaluation — when does program evaluation equal research?

Sharing Best Practices and Challenges: Project Managers

Facilitators — Mel Limson, American Physiological Society
Adrienne Loffredo, Wake Forest University School of Medicine

- Working with evaluators
- Collaborations with other university departments
  - Institutionalizing
- Which hat?: Teaching, research, SEPA, graduate work, T&P
- Co-PI/PI working relationships
- Expectations/training experience
- Recruiting and keeping participants and volunteers
  - Following through
  - Public
- Publishing
- New PI training, admin training
- Grant exploring/budget management, and sustainability
- Potential sources of funding
- Other funding opportunities
- Educational research in the literature/field
- Project-implementation scale
- Roles/administration
- Working relationships
- Sustaining projects

Participants

Bart Ely, University of South Carolina
Gussie Fuller, Meharry Medical College
Adam Hott, Hudson Alpha Institute for Biotechnology
Heather Kleiner-Hancock, Louisiana State University Health Sciences Center-Shreveport
Deron Ash, Arizona Science Center
Wendy Hansen, Pacific Science Center
Rebecca Daugherty, Northwestern University
Julie Bokor, University of Florida
Houda Darwiche, University of Florida
Chandan Robbins, Georgia State University/BioBus
Michelle Ventura, Georgia State University
Barbara Baumstark, Georgia State University
Charles Wood, Wheeling Jesuit University
Rabiah Mayas, Museum of Science & Industry Chicago
Fern Lan Siew, Cornell University
Heather Reddick, University of Texas MD Anderson Cancer Center
Sally Meyer, University of Michigan
Laura Fawcett, Yale Peabody Museum
Ben Koo, University of California San Francisco
Vince Hardy, Texas A&M University
Shaw-Ree Chen, University of Rochester
Patricia Ward, Museum of Science and Industry Chicago
Jim Moore, University of Georgia
Scott Ewing, Oregon Museum of Science and Industry
Karen Bovenmyer, Iowa State University
Marissa Vignali, Seattle BioMed
Lisa Marriott, Oregon Health & Science University

Sharing Best Practices and Challenges: Teachers

Facilitators - Mario Godoy-Gonzales - Royal High School
Margaret Shain - American Physiological Society

Reported by Sharon Phillips, Federal Hocking Local Schools and FoodMaster Initiative

The focus question that was asked for our session was "what makes programs attractive to teachers?" In answer to that question, participants suggested the following ideas:

- Programs that offer direct transfer to classroom practice
- Programs that are organized and easy for practitioners to use
- Programs that provide needed materials and compensation

Participants were also asked more-specific questions regarding their experience in partnerships and how those experiences could be improved to encourage more interest and ease the development of SEPA projects. In answer to that question, participants suggested the following ideas:

- Plan appropriate due dates, avoiding summer.
- Include a full-time or half-time teacher/partner in the grant to increase teacher input.
- Require professional development materials to be created by teachers for teachers.
- Require grant PIs to visit partnership classrooms at all phases of applying, planning, and implementing initiatives.
- Gear new initiatives towards areas that are already recognized by teacher practitioners as a need (starting with regional practitioner's perspective).

Participants expressed a need to feel more valued and respected by SEPA partners for what they already know and are doing in their classrooms. Practitioners discussed their need for a higher level of involvement from grant PIs at every phase of the partnership, acknowledging that communication with researchers is often difficult and inadequate to build needed rapport and true partnership. A general consensus was that both teacher-generated intellectual energy as well as intellectual property are often ignored or hijacked in favor of more "appropriately titled" consultants from the world of higher education, making the notion of "partnership" less than palatable for many experienced teachers.

Overall, session members were very dissatisfied with their experience at the 2011 SEPA conference. It was agreed that the event was frustrating to those who were looking for any kind of classroom application or practical methodology. Participants expressed huge disappointment that SEPA allocated only one session on the second day to teacher networking and connection and failed to recognize teachers adequately (a stand-up mention) for all the work and dedication put forth to make initiative partnerships work.
We, as a group, hope for better things.

Participants

Robert Manriquez, Stanley High School
Diana Natividad, University of Texas San Antonio
Marianne Garcia, University of Texas MD Anderson Cancer Center
Jennifer Koerner, Chicago Public Schools
Christopher Dose, Boston Latin School
Jera Niewoehner, Metropolitan Nashville Public Schools
Michele Ward, Texas A&M University
Maureen Munn, University of Washington
William Abbott, Julian Gibson Elementary School
Bart Hays, University of California San Diego
Sue Kirk, Virginia Commonwealth University
Ann Lambros, Wake Forest University School of Medicine
Sherry Rosedahl, Texas A&M University
Sandra McKell, University of Alabama Birmingham
Deborah Colbern, Charles R. Drew University

Wednesday, May 11 8:00am-9:15am

Work in Progress: Developing an Instrument to Assess General Science Literacy in Middle School Students

Facilitator - Wendy Huebner - Montclair State University
Panelists - Lisa Abrams - Virginia Commonwealth University
Kristin Bass - Rockman et al
Reported by Lisa Abrams - Virginia Commonwealth University

This session described the process used to develop a measure of general scientific literacy for middle-school students and was led by Wendy Huebner of the "Epidemiology and the Energy Balance Equation" project at Montclair State University.

Instrument-Development Process

Reviewed existing measures, literature, and science literacy standards.
The following research was included in the review: (1) 1996 National Research Council (NRC) definition of a scientifically literate person, (2) 1996 National Research Council's fundamental abilities in science as inquiry, (3) 2009 PISA 2009 Assessment Framework (Science Competencies + Knowledge), (4) 2009 Science Framework for the 2009 National Assessment of Educational Progress (NAEP) – Performance Expectations, (5) 2009 NAEP Nature of Science Concepts, (6) 2010 NRC – K–12 Science Education in U.S. Schools – A Framework for Science Education - Cross-Cutting Elements, (7) 2004 21st Century Skills, (8) 2011 NSTA Position Statement on Teaching Science and Technology in the Context of Societal and Person Issues, and (9) Other literature by Palinscar A. et al, 1993; Mitman et al, 1997; Wenning, 2007; Miller JD, 1983, 1998, 2006; Murcia K., 2005, 2007, 2008; Laugksch DC, 2000; DeBoer GE; Scearce C., 2007; and others.

Identified essential constructs measured by the assessment:

- Identifying questions that can be answered through scientific investigation
- "Doing" science
- Thinking scientifically/Applying science
- Questioning scientific findings and conclusions described in the public media
- Understanding science and society
- Understanding mathematics in science
  - Developed an initial item pool in collaboration with professionals with related expertise
  - Constructed a draft assessment
  - Assessment reviewed by various stakeholders: students, teachers, and professionals with expertise in measurement, epidemiology, and/or science education
  - Currently conducting cognitive interviews with middle-school students
  - Pilot instrument with middle-school students in May/June 2011 (two phases, with 125 and 200+ students, respectively)
  - Plan large validation test fall 2011

Instrument Review and Comments

Session participants reviewed different sections of the instrument and commented on the nature of specific items.

General Comments about the Next Steps in the Validation Process

- Session participants were interested in the alignment of the measure with the new science standards being developed by the National Academy associated with the common core.
- There was discussion about the broad utility of the measure and interest in learning how the assessment performed according to different student characteristics such as ethnicity, SES, reading level, ESL, and student-ability level.
- Session attendees described working with a range of different student populations and suggested that the validation process include statistical procedures that determine the difficulty level of the individual items. The validation process could involve item analysis according to various student characteristics to further enhance the validity of the assessment. There was a suggestion to increase the number of simple and less-complex questions at the beginning of the assessment to allow students to gain some confidence.
- Other comments on the assessment including ways to further increase the cultural relevance and general relevance of the questions to middle school students.
- A suggestion was made about potentially adding a confidence scale after each item for the validation process. The scale would allow students to indicate how confident they were that the answer they selected was correct.
- There was discussion of the assessment items that asked students to analyze data and to provide their opinions about which construct best captured the skill and cognitive process.

Concluding Points

The development of the measure has the potential for broad applicability and use across various SEPA projects. The development stage to date has been thoughtful, rigorous, and has adhered to best practices in instrument development. Session attendees appreciated the opportunity to review and provide input into the instrument-development process.

Participants

Lisa Abrams, Virginia Commonwealth University
Nicole Kowrach, Museum of Science and Industry Chicago
Mike Kennedy, Northwestern University
Cathy Ennis, University of North Carolina - Greensboro
Kim Schuenke, University of Texas Medical Branch
Kristi Bowling, Rice University
Lynne Haeffele, Illinois State University
Carolee Dodge Francis, University of Nevada Las Vegas
Nancy Twillman, Resource Development Institute
Chandan Robbins, Georgia State University/BioBus Program
Barabara Hug, University of Illinois at Urbana-Champaign
Susan Kuner, Vanderbilt University
Ben Koo, University of California, San Francisco
Deniz Peker, Virginia Tech
Molly Stuhlsatz, BSCS
Susan Hershberger, Miami University
Ishara Mills-Henry, Massachusetts Institute of Technology
Kristin Bass, Rockman et al
Sherry Rosedahl, Texas A&M University
Michele Ward, Texas A&M University
Greg DeFrancis, Montshire Museum of Science
Mike Fenzel, Montshire Museum of Science
Deb Stark, University of Texas Health Science Center at San Antonio

Evaluation Designs

Facilitator - Ann Chester - West Virginia University
Panelists - Dina Drits - University of Utah
Amy Nisselle - Cold Spring Harbor Laboratory
Andrew Sahalie - University of Hawaii at Manoa
J. Michael Wyss - University of Alabama at Birmingham
Reported by the facilitator and panelists.

The moderator, Ann Chester, encouraged each presenter to describe their main model of evaluation and talk about the problems and successes of that evaluation strategy.

Ann Chester illustrated the reasonable comparison-group approach through the studies the West Virginia University SEPA project has done with their Health Sciences & Technology Academy (HSTA) project. They compared HSTA students' college entrance and retention rates with the general population of college attendees in West Virginia and in the nation. They also compared HSTA students by race, socio-economic status, and gender with general populations in West Virginia and in the nation. In addition, they compared each HSTA student with themselves, assessing how close the student came to their own predictions of their future choices of going to college and choosing a health sciences or technology major. The shortcomings of these strategies as compared to randomized control trials were discussed during the session.

Dina Drits described an experimental study that used a randomized controlled trial (RCT) design to study the effectiveness of the University of Utah Genetic Science Learning Center's SEPA-funded Epigenetics module on student-learning gains. The research questions, research-design specifics, data collection, and procedure were described. Drits also described the challenges in conducting this RCT study, including finding appropriate lesson materials to use for control conditions (this is a significant challenge when materials go beyond what is commonly available, the kinds of materials the GSLC usually develops) and creating authentic learning conditions. The lessons learned were also discussed, including the following:

- RCT studies can be conducted to evaluate student learning from curricula in a time- and cost-effective manner.
- RCTs can be difficult to organize.
- RCTs don't answer all of the questions that are important in understanding the effectiveness of curricula or interventions.

Amy Nisselle described Cold Spring Harbor Laboratory's experimental study of student effects that was a component of the larger evaluation of a SEPA-funded website, Inside Cancer. The study employed a crossover, repeated-measures design, in which each student participated as both an experimental and a control subject. Teachers taught two topics to students separated into classes A and B. For the first topic, Class A used Inside Cancer for their class work and Class B used lectures, textbooks, or other websites. The two groups then switched conditions for the second topic, so each student learned one topic using Inside Cancer and one topic using another resource. Students completed a quiz after each topic, allowing comparison of learning gains for each student with and without using Inside Cancer. Benefits of this study design include controlling for differences between teachers, students, classrooms, and institutions; challenges include attrition due to non-compliance with the study design (such as skipping or combining quizzes). Questions from the audience focused on clarifying the crossover, repeated-measures study design plus how best to recruit teachers and ensure study compliance. Nisselle explained the study design in more detail and then discussed strategies for teacher recruitment and compliance, such as screening potential study participants, offering incentives (monetary, equipment, multimedia resources), maintaining constant communication, checking lesson plans ahead of time, and ensuring that data-collection tools (quizzes, pre- and post-intervention surveys) are included as set classroom tasks, or tasks that contribute to grades, rather than being used as homework or optional assessments.

Andrew Sahalie described the evaluation that has been conducted of the Pacific Resources for Education and Learning (PEARLS) project by the University of Hawaii at Manoa SEPA.
Mission: Train teachers (science instruction and inquiry)
Measurable outcomes: Satisfaction with training, teacher affect and behavior, and affect and behavior of students within teachers' classes (not directly served by PEARLS)
Measures: STEBI, SCIS, PSAS, focus group, program-side class observation
Regional challenges: Huge area, poor communication, low teacher attendance, teacher illiteracy, and unsuitable classrooms
Evaluation challenges: Self-selection bias (x2), low PSAS response rate, lower-than-expected reliability (ESL?), no on-site evaluation visits
Quantitative findings: Pre-post changes in teacher affect. Later, student pre-post changes (may be dubious)
Qualitative findings: (a) Low implementation by teachers who need basic teaching-skill development, (b) poor communication, and (c) barriers to classroom technology

Mike Wyss presented a description of the methods that the University of Alabama at Birmingham (UAB) SEPA has used to evaluate students (~3,000/y) and teachers (~100/y). The program includes middle-school students and teachers in several settings, including classroom interventions, summer science camps, and Science Museum full-day experiments with their classes during the school year. The assessment tools include pre-/post-tests of content knowledge, attitude surveys, tracking student classroom performance and standardized test scores (for target versus control schools), and performance of students in target vs. control teacher classrooms. Also, the UAB group is investigating whether summer camps increase retention of math and science via analyses of standardized end-of-year tests. The data was downloaded to the school system's servers and provided back to the UAB group by their IT administrators in de-personalized format. The greatest challenges to the assessment have been twofold and are indicative of the challenges that other urban school districts face. First, the school system has twice changed its IT software platform. Each time it has lost data, at least for a time. This requires re-entry of data and redoing analyses, all of which are relatively time-consuming tasks. Second, since the 2007 recession hit, students and teachers have switched school districts much more often than they did previously. Thus, whereas previously 80% of the students in Birmingham would stay in the same feeder school system from K–12, now only about 50% are in the same system from K–8. Further compounding the challenge is the recent move by the school district to create theme-oriented high schools/academies, thus decreasing the number of students who remain in target vs. control pipelines. The UAB group has worked closely with the district to meet these challenges.

Participants

Mel Limson, American Physiological Society
Marissa Vignali, Seattle Biomed
Thomas Scarlett, University of Hawaii
Bert Ely, University of South Carolina
Tom Robertson, University of Georgia
Louisa Stark, University of Utah
Margery Anderson, Walter Reed Army Institute of Research
Rebecca Daugherty, Northwestern University
Deb Stark, University of Texas Health Science Center at San Antonio
Scott Ewing, Oregon Museum of Science and Industry
Brian Mooney, Johnson & Wales University
David Anderson, Illinois State University
Laura Fawcett, Yale Peabody Museum
Berri Jacque, Tufts University School of Medicine
Leonard E Munstermann, Yale Peabody Museum
Michael Wyss, University of Alabama
Dina Drits, University of Utah
Andrew Sahalie, Pacific Resources for Education and Learning
Amy Nisselle, Dolan DNA Learning Center
Ann Chester, West Virginia University
Adrienne Loffredo, Wake Forest University School of Medicine
William Abbott, Julian Gibson Elementary School
Virginia Shepherd, Vanderbilt University
Jennifer Ufnar, Vanderbilt University

Communicating Complex Ideas in a General Public Exhibition and Building Strategic SEPA ISE Connections

Facilitator - Joan F. Schanck - Pittsburgh Tissue Engineering Initiative
Panelists - John Pollock - Duquesne University
Dennis Bateman - Carnegie Science Center

- Cross culture of scientists/exhibitors
- Attention/space constraints
- Varying levels of technology needed to make point
- Each station offers independent information
- Remote sites featured local experts
- Networking through science museums/ASSET
- Introduced animated character in interactive video planetarium show→ entertain tech group CMO
- ETG charged with audience testing → game paper survey failed→ observations
- 5th grade wanted challenging game
- Export experience to iPhone app
- Careful treatment of ethical issues
- Choice of language in ethics discussion
- Cooperative effort with ASSET in teacher professional development
- Other opportunities for dissemination
- Accuracy of scientific terminal scaffolding, stem cell, etc.

Participants
Susan Bonk, EdVenture Children's Museum
Gail Fletcher, University of Southern Maine
Marietta Calinger, Wheeling Jesuit University
Mark Thorne, National Children's Museum
Tara Chudoba, New York Hall of Science
Deron Ash, Arizona Science Center
Laura Martin, Arizona Science Center
Marcia Pomeroy, University of Kansas School of Medicine
Jennifer Jamison, University of Southern Maine
Bill Cameron, Oregon Health & Science University
Wendy Hansen, Pacific Science Center
Veronika Nunez, Oregon Museum of Science and Industry
John Pollock, Duquesne University
Dennis Bateman, Carnegie Science Center

Science in the Context of Healthy Living: SEPA as Part of the National Movement

Facilitator - Pam Koch - Teachers College Columbia University
Panelists - Melani Duffrin - East Carolina University
Virginia Carraway-Stage - East Carolina University
Reported by Pam Koch - Teachers College Columbia University

Over the past decade, there has been mounting concern over the increasing rate of obesity, and the related health conditions, among both children and adults in the United States. At the same time, there have been more and more SEPA projects related to this area. Hence the SEPA Diabetes, Obesity, and Cardiovascular Disease Working Group (DOC) has been active and growing. This session was a follow-up to the session SEPA Diabetes, Obesity, Cardiovascular (DOC) Working Group: Developing a Strategic Plan. In this session, we discussed how DOC members could put the DOC Strategic Plan into action and voted on tactics. The tactics that received the most votes were to develop a mechanism for SEPA DOC members to know about each other's programs and to develop a way to share evaluation tools related to DOC. Nancy Place, who works on the SEPA website, attended the session and gave suggestions for how the SEPA website could be used to allow DOC members to communicate and share information with one another. By enacting the DOC strategic plan, we hope to reach the DOC mission to "leverage the resources of SEPA projects not only to promote mathematics and scientific literacy for all United States citizens but also to improve health-related behaviors—specifically eating and physical activity—that will promote energy balance and decrease risk of chronic diseases."

The DOC Leadership consists of Pam Koch, Virginia Carraway-Stage, and Wendy Huebner.

Participants

Melani Duffrin, East Carolina University
Maureen Munn, University of Washington
Houda Darwiche, University of Florida
Ginger Cross, Mississippi State University
Bob Branch, University of Pittsburgh
Sara Hanks, West Virginia University
Bob Russell, National Center for Interactive Learning, Space Science Institute
Virginia Carraway-Stage, East Carolina University
Rene Contreras, University of Alaska-Anchorage
Cathy Morton-McSwain, West Virginia University
Sue Kier, Virginia Commonwealth University
Maurice Godfrey, University of Nebraska Medical Center
Valence Davillier, Great Lakes Science Center
Nancy Place, University of Texas San Antonio

The Role of SEPA PIs in Building Students' Success in STEM Careers

Facilitator - Theresa Britschgi - Seattle Biomedical Research Institute
Panelists - Beth Anderson - Arkitek Studios
Marco Molinaro - University of California Davis
Meena Selvakumar - Pacific Science Center
Reported by Theresa Britschgi - Seattle Biomedical Research Institute

What are the guiding documents and organizations in the national-reform dialogue?

- Assorted Phillip Bell references regarding the gap between student proficiency and industry needs
- PCAST Report, found at http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-stemed-report.pdf
- Partnership for Learning, found at http://www.partnership4learning.org/
- The Global Achievement Gap by Tony Wagner, found at http://www.tonywagner.com/7-survival-skills

Feedback from attendees on the intersection of the SSs-STEM & SEPA

Attendees were asked to respond to four main questions:

- • What about the "T" in STEM?
- •Do you include more "M" now?
- •Is "E" a future course at more high schools, or is it a tool or relevance chapter for an existing content area?
- Is "E" for education or entertainment in regards to illuminating STEM careers?

The attendees' answers included the following:

- STEM is too big.
- What about STEM?
- Many activities and topics.
- All interwoven.
- Growing access to infrastructure, very exciting.
- Are we creating a culture of innovation?
- Important, but actualization is rare. Needs support, especially in the schools.
- All stakeholders need to be represented in the support.
- Start STEM earlier. The number-one obstacle is teacher reticence, and a close second is lack of access to emerging content.
- School laptop programs are helpful.
- Younger curriculum could be more rigorous, include higher-level thinking.
- Impact of popular culture (e.g., forensic science) is cool; kids want it. How can we leverage interest in popular culture better in schools?
- Attitude is the driver in choosing a career from an early age. How can it be sustained into middle school?
- Show kids more careers. Give them a breadth of opportunities.
- Team teaching is strong in K–8. When they get to high school, their teachers operate in silos. Kids internalize that.
- Break the student stereotype of "scientists are soloists."
- Math-reform effort. Diminish calculus prep and move to statistics.
- STEM-anger at legislators' fondness for it. Is it a distraction?
- Blending of disciplines and skills is a sophisticated act and conception for students. Hard to see the integrated as a whole.
- We need the A into STEM—Diane is steamed! Get team as well.
- Relevance is a frequent theme. A motivator.
- Too much engagement leads to a circus. Fun time needs to include learning time.
- Get families involved.
- More interaction of "good" graduate students with kids.
- More home-based science with supportive and curious parents.
- Could feature "SCIENCE" in the activity?
- Engagement precedes education. It is important work and needs to be done well.
- It's a two-way street. Know your learner-educator partnership.
- Avenues for education: "Expo," science fairs, family science nights, etc.

Results of Breakout Survey

STEM Supportive Activity	Current	Planned/Future
Have played a role in your state's science standards	4	0
Have played a role in your state's math standards	0	0
Have reviewed curriculum as part of state science curriculum adoption scheme efforts	6	0
Have reviewed curriculum as part of state math curriculum adoption scheme efforts	0	0
Have served as an advisor on state science assessment tools	1	0
Have served as an advisor on state math assessment tools	0	0
Have served as an advisor on district science assessment tools	3	0
Have served as an advisor on district math assessment tools	1	0
Have served as an advisor on industry/development panels with regards to K–12 STEM education	5	0
Your SEPA program produces curriculum that aligns with state science standards	11	2
Your SEPA program produces curriculum that aligns with national science standards	12	3
Your SEPA program produces curriculum that aligns with draft common cores science framework	5	4
Your SEPA program produces curriculum that aligns with state math standards	4	1
Your SEPA program produces curriculum that aligns with national math standards	5	0
Your SEPA program produces curriculum that aligns with draft common cores for mathematics	2	2
What else	State technology standards, biotech curriculum development for state-led articulation effort (HS–college)	
Unique STEM tools you use to prepare students for STEM careers	Gapminder.org, sci.com, videoconferencing, career-awareness meeting events, FaceBook, career-awareness in focus of SEPA (the continuum of community college/workforce development in addition to advanced degrees), YouTube	
Obstacles	Schools, prohibition against mobile phones and YouTube, ethical concerns about use of FaceBook in schools	

Participants

Mary Jo Koroly, University of Florida
David Potter, Harvard Medical School
Kim Obbink, Montana State University
Athena Samaras, Northwestern University
Amy Sebeson, Northwestern University
Naomi Luben, Children's National
Charles Wood, Wheeling Jesuit University
Brian King, Harvard Medical School
Diane Adger Johnson, NIH/NIAID
Tabitha Thigpen, King-Drew Magnet High School of Medicine and Science
Marianne Garcia, University of Texas MD Anderson Cancer Center
Ann Lambros, Wake Forest University School of Medicine
Maggie DeBon, University of Tennessee Health Science Center
Patrician A. Thomas, University of Kansas School of Medicine
Monroe Duboise, University of Southern Maine
Laura Lynn Gonzalez, Green Eye Visualization
Barbara Baumstark, Georgia State University
Walter Allan, Foundation for Blood Research
Martha Sellers, Montana State University

Using "Critical Friends" Discussion Protocols:

Responsible Conduct of Research Example

Facilitator - Jeanne Chowning - Northwest Association for Biomedical Research
Panelist - Joan Griswold - Northwest Association for Biomedical Research
Reported by Joan Griswold - Northwest Association for Biomedical Research

In this session, Jeanne Chowning and Joan Griswold, both of the Northwest Association for Biomedical Research (NWABR), introduced a modified "Critical Friends" tuning protocol. The tuning protocol is a formalized way to get feedback on work in progress, to examine student work, or as a means to refine curriculum or practice. Jeanne and Joan were seeking feedback on yet-to-be-developed lessons on the Nature of Scientific Research. These lessons will be part of a broader curriculum on Translational Research, which includes modules on Animal Research, Humans in Research, and Bioethics.

Feedback on ideas to include in the Nature of Scientific Research curriculum unit

- Overview of the scientific-research process through interactive materials

  (Process of Research game)

  Feedback: A game would be engaging; interactive use of technology is always interesting to students. A concern was mentioned about evaluation.

- The importance of asking questions without knowing the answers

  (Stupidity in Science article)

  Feedback: Many positive comments about the importance of incorporating this.

- The importance of serendipity in science

- Communication in science
  - Developing shared meaning through dialogue — Data Analysis
  - Sharing results and validating them through repeated testing

  Feedback: These are both important, yet they may be difficult for high-school students. "Repeated testing" doesn't get much interest from students.
  One way to do this could be to give students data to interpret and present their findings to each other as a "lab meeting."

- Using the Appreciative Inquiry technique to encourage student interest in science. Appreciative Inquiry encourages students to think of a peak experience they've had with any sort of science endeavor, envision their own future in science, and then envision how they might get there. The importance of seeing the whole community (not just themselves as individuals) was brought up. This is a good place to tie in information about potential careers, too.

Additional Comments

The group appreciated that our approach is not strictly linear, as many other lessons about the scientific method are. There was a suggestion to include the topic of "Research Bias" (i.e., who is funding the research, how much stake the researcher has in the outcome, etc.).
It would also be helpful to incorporate information about how research gets translated to the public through mass media, with some focus on media literacy.

Modified "Critical Friends" Tuning Protocol

Purpose

The tuning protocol is a formalized way to get feedback on work in progress, to examine student work, or as a means to refine curriculum or practice. This is similar to a musical rehearsal, where the tuning of the instrument is vital to the quality of the music.

Time

Approximately 30 minutes

Introduction

The facilitator briefly introduces the protocol goals, guidelines, and schedule.
A person ("Tunee") brings any work in progress to a group of peers ("Tuners") for "tuning."

Presentation

The Tunee presents the work and the Tuners listen and take notes.
The Tuners may read or view the presented work. No interruptions are allowed!
The Tuner ends by asking for specific ("framed") feedback or may leave it open ("unframed").

Clarifying Questions

The Tuners have the opportunity to ask clarifying questions, but no discussion is allowed.

Feedback

The Tunee turns his/her back to the group and moves away from the circle.
The Tuners discuss the work together, giving three kinds of feedback each in SEPArate intervals.
The Tunee may only listen and take notes while the Tuners talk. Feedback is directly related to the work at hand and does not refer to the Tunee personally.

The first round of feedback is **WARM** and focuses on positive points associated with the work.
Examples might include, "I appreciate this work because…" or "This work is strong because…"

The second round of feedback is **COOL** and focuses on questions that arise, doubts, or gaps in the work.
Examples might include, "I wonder if this fits the goal?" or "'How can we be sure students have understood?"

Try to provide **PROBING QUESTIONS** rather than **GIVING SPECIFIC ADVICE**. This allows the Tunee to figure out the best solution, increasing ownership of the resolution and enhancing its value.

Experienced groups may also proceed with **HARD** feedback, challenges related to the work. Examples might include, "Whose interests are being served by this?" or "Does this reflect what we value?"

Reflection

The Tunee responds to the feedback given by Tuners. Responses are about changes that might be made, new insights they've developed, or clarifications they need. The response is not an opportunity to defend the work!

Debrief

The facilitator leads a brief conversation about the group's process once the exercise has been completed.

Protocol from A guide to Looking Collaboratively at Student Work (1999) by David Allen, Tina Blythe, Barbara Powell, modified from the Critical Friends Group Coaches Manual (2005).

Participants

Fern Lan Siew, Cornell University
Michelle Ventura, Georgia State University
Jim Moore, University of Georgia
Adam Hott, Hudson Alpha Institute for Biotechnology
Jackie Shia, Wheeling Jesuit University
Kathie Williams, EdVenture Children's Museum
Vince Hardy, Texas A&M University
Jeri Erickson, Foundation for Blood Research

Think Twice: Applying Critical Appraisal Methods to Transformed Peer-Reviewed Scientific Literature

Facilitator - Linda Pruski - University of Texas Health Science Center at San Antonio
Panelists - Sharon Blanco - University of Texas Health Science Center at San Antonio
Diana Natividad - Longfellow Middle School, San Antonio ISD
Debra Stark - University of Texas Health Science Center at San Antonio
Reported by Sherry Blanco - University of Texas Health Science Center at San Antonio

Diana Natividad, an eighth-grade science teacher at Longfellow Middle School, San Antonio ISD, from San Antonio, Texas, presented her strategy and experiences that apply to teaching critical appraisal in her classroom. Her presentation included the history of how she came to the program at the UT Health Science Center at San Antonio (UTHSCSA) and the demographics of her school, which is a Title I institution in an underserved community.

As a participant of the six-week summer intensive professional-development workshop at the HSC, she told of her journey of learning the process of transforming a peer-reviewed article to the reading level of her middle-school students and the curriculum-writing process involved in critical-appraisal lessons. She explained how what was taught at the HSC assisted with her teacher development in the areas of ethics, bias, science, and research. This enhanced her ability to teach this lesson to the students with an enriched perspective that, before the summer program, she previously had been unable to accomplish.

Ms. Natividad used a lesson exemplar entitled, "Dopamine May Affect Thrill-Seeking Behavior in Humans." The lesson includes transformed articles including a journal and lay-media component, a compare/contrast diagram, a variable finder, and a hypothesis generator, along with data-analysis modules. She chose particular parts of the lessons that aligned with the Texas Essential Knowledge and Skills (TEKS) standards for her grade level.

Using the lesson that is available on the TEI project website, http://www.teachhealthk-12.uthscsa.edu, she presented the ease of using the teacher pages to establish her lesson plan and talked about how she was able to use only the parts she needed without having to spend unnecessary time on unwanted material. The ease of the advanced planning with these materials was of great benefit to her. The students were excited about the "real" science they were learning and were easily engaged in the lesson. She was able to continue to remind the students of this lesson and how it connected to the new material they were experiencing throughout the school year.

The session ended with a TEI website review of other available lessons and a question-and-answer period that provided discussion time for the attendees. Ms. Natividad was able to answer questions that clarified how teacher- and student-friendly the lessons are designed to be. Color copies of the lesson were handouts at the meeting so that attendees were able to follow the presentation more easily.

9:30am–10:45am

Using Cognitive Interviews to Assess Assessment Quality

Facilitator - Kristin Bass - Rockman et al
Panelist - Dina Drits - University of Utah
Reported by Greg DeFrancis - Montshire Museum of Science

- Developing a quick, shared definition of "Cognitive Interviews" among participants.
  - Simple definition: An observational protocol to have learners talk out ("talk aloud") what and why they are doing what they are doing in a science task.
  - The premise is that it is best to go and listen directly to the "expert," the learners, and try to get a better understanding of what they are thinking when doing a science activity or assessment activity.

- Case study: We saw a mock Interview Protocol that was developed by Kristin and Dina as part of their SEPA project to help design assessment questions. The importance of reading instructions to each kid the same way was underscored.
  - Note: one participant noted that she often says, "Imagine, as you go through the test questions, that you are going to help your best friend know how to do well on the test" as a way to make students understand how to "think aloud."
  - There was a discussion about how to use this and who should administer this. Is it appropriate for project staff to do this? Don't they have a vested answer? The group felt it was perfectly fine for project staff to be involved in this aspect of the research, as the purpose of this protocol is to develop good questions that would later be used for evaluation and assessment. This is formative work.

- Questions based on the mock interview:
  - Can "think-alouds" be used for purposes other than evaluating assessment questions? Yes, these protocols can be used for a variety of reasons to help inform program development.
  - The University of Utah's basic design:
    - Interviewed 6 students for approximately 35 minutes each.
    - Asked each student to look at the same set of 10 students.
    - Interviewer actively asked clarifying questions to probe for issues with the questions, etc.
    - Students were selected based on their diversity in ethnic, socio-economic, academic, reading abilities, etc., by a teacher who knew them well.

- Discussion moved to role of assessment and evaluation in program design and implementation. Some quick, final thoughts:
  - Cognitive interviews can be used to investigate anything that needs to be investigated. They are very helpful for formative work, though they can also be quantified and used in summative work as a form of evaluation.

Participants

Laura Martin, Arizona Science Center
Wendy Huebner, Montclair State University
Cathy Ennis, University of North Carolina - Greensboro
Judy Brown, Miami Science Museum
Greg DeFrancis, Montshire Museum of Science
Mary Jo Koroly, University of Florida
Robin Fuchs-Young, University of Texas MD Anderson Cancer Center

Evaluation Instruments for Measuring Teacher Self-Efficacy and Changes in Students' Attitudes Toward Science

Facilitator - Linda Pruski - University of Texas Health Science Center at San Antonio
Panelists - Sharon Blanco - University of Texas Health Science Center at San Antonio
Diana Natividad - Longfellow Middle School, San Antonio ISD
Debra Stark - University of Texas Health Science Center at San Antonio
Reported by Sharon Blanco - University of Texas Health Science Center at San Antonio

Linda Pruski from the Teacher Enrichment Initiatives at UT Health Science Center at San Antonio (UTHSCSA) presented scales used in the baseline and outcome measures of the Positively Aging®: Maximizing the Healthspan project for teacher professional development. The instruments of evaluation are the Simpson-Troost Attitude Questionnaire (STAQ –R) for students and the Self-Efficacy Teaching and Knowledge Instrument for Science Teachers (SETAKIST).

The background information for the decision to use the STAQ-R as the best measurement tool for student attitudes was presented with research information and history of this scale. The need to find a tool to best measure the program's level of affective change in teachers and students is at the heart of presenting evidence that the practices are working. The presentation also included development and validation of the STAQ-R and its use in the TEI programs. This scale was administered in the fall and in the spring to 1,812 students in grades 6–8 in the San Antonio area in the 2009–2010 school year.

STAQ-R

- Owen, et al., 2008, "Finding Pearls…," Science Education 92, 6, 1076-1095
- 22 Items
- 5-point Likert scale
  - Strongly agree (1) to Strongly Disagree (5)
- 5 Factors
  - Influencing Constructs: "Classroom Environment" and "Family Models"
  - Outcome Constructs: "Science Is Fun for Me," "Self-Directed Effort," and "Peer Models"

A diagram of the STAQ-R Baseline Path Analysis 2010 was shown to visually describe the influences of the five factors that emerged from the data collected. One of the primary functions of a factor analysis is to help an investigator determine how many latent variables underlie a set of items. It assists in determining whether one broad or several more-specific constructs are needed to characterize an item set, which was in the case of how the STAQ-R data played out with five different factors that fell together in the data. The data was definitive in showing that the classroom environment is primary in "Motivating Science Class" over family and peers.

The findings indicate a potential for evaluating the effectiveness of teacher professional-development programs. These programs improve classroom activities in science and influencing student self-directed effort and science affect. This scale will continue to be administered throughout the project for the next three years to validate the findings from the first round of its use. However, it has been recommended by several districts that the scale be administered three times during the school year to learn whether the attitudes of the students change at various times of the year due to influences such as excitement at the beginning of the new school year, required standardized testing, and end-of-the-year fatigue, as this is what the district guesses are the reasons for the change in the attitudes of the students.

As a result of the presentation, a discussion emerged on the use of a scale, such as the STAQ-R, as opposed to scales written for specific programs by the program personnel. Many of the attendees were not familiar with these types of scales and were interested in the findings. Several attendees were curious about factor analysis and asked for it to be explained. The realization that each question or statement can be characterized similarly in an item set was important to the discussion. Many who attended were looking for a better understanding of data collection in order to provide evidence of their programs' success and tools that are being used successfully in the community. Each attendee was given a copy of the STAQ-R and articles pertaining to the origins and history of the tool.

Ms. Pruski gave an additional presentation on the SETAKIST efficacy scale and how it has been an effective instrument in measuring teacher self-efficacy in the science classroom.

SETAKIST

- Roberts & Henson, 2000, "Self-Efficacy Teaching and Knowledge Instrument for Science Teachers," Paper presented at Mid-South Educational Research Conference
  - 16 Items; reduced to 15
  - 5-point Likert scale
- Strongly agree (1) to Strongly Disagree (5)
- 2 Factors
  - Teaching Efficacy
  - Knowledge Efficacy

The SETAKIST was proposed in a paper presented in 2000 by two authors who were part of a team that evaluated the STEBI, another tool designed to measure self-efficacy, and reported on suggested length of teacher training to show increases in efficacy and target experience of teacher participants most likely to show improvement.

At the Conference for the Advancement of Science Teaching in Houston, Texas in November 2010, the SETAKIST was given to 344 science teachers from across the state of Texas. The instrument was given on a volunteer basis to teachers who came by the TEI booth in the exhibit hall. This survey will be repeated at a booth in the exhibit hall of the CAST conference, which will be held in Dallas, Texas in 2012.

The findings show that in Factor 1, Teaching Efficacy, teachers with many years of teaching experience are positively correlated, and teachers who had won awards for teaching tend to have a high factor-1 score in teaching self-efficacy, also.

Factor 2, Knowledge Efficacy, was plotted versus years of teaching experience and by awards. Teachers who had won awards tended to have significant low factor-2 scores. No significant association was found between Factor 2 and years of teaching experience. In other words, knowledge of subject matter does not correlate with years of teaching experience.

This instrument is also used with the teachers in TEI's professional-development programs; each teacher completes the assessment three times per year. Since the SETAKIST is only for science teachers, it is proving to be a positive way to analyze their self-efficacy, specifically in science. This instrument will continue to be used in their program. Attendees of this session were each given a copy of the SETAKIST instrument.

Participants

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Margaret E. Shain, American Physiological Society
Andrew Sahalie, Pacific Resources for Education and Learning
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Leonard E. Munstermann, Yale School of Public Health
Caroline Dodge Francis, University of Nevada Las Vegas
Chad Lane, University of Southern California
Nancy Twillman, Resource Development Institute
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Molly Stuhlsatz, BSCS
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Kelley Withy, University of Hawaii
David Anderson, Illinois State University
Kim Obbink, Montana State University
Bert Ely, University of South Carolina
Louisa Stark, University of Utah
Tom Robertson, University of Georgia
Amy Nisselle, Dolan DNA Learning Center
Susan DeRiemer, Meharry Medical College

An Opportunity for Your SEPA to Conduct CBPR

Facilitator - Ann Chester - West Virginia University
Panelists - Robert Branch - University of Pittsburgh
Cathy Morton McSwain - West Virginia University
Sara Hanks - West Virginia University
Reported by Sara Hanks - West Virginia University

The presenters posed the question, "What if SEPA groups could collaborate on a nationwide survey tool?" The discussion began with presenters explaining the current collaborative efforts between WV's Health Sciences and Technology Academy and the University of Pittsburgh's Center for Clinical Pharmacology that served as the background for the survey tool. The result of this collaborative effort is being extended to the entire SEPA community.

Presenters discussed the current model of collaboration with SEPArate IRBs for joint projects as cumbersome and an inefficient use of time. The proposed survey would work through the University of Pittsburgh as the coordinating hub with an exempt approval and a single PI. The 50-question, online survey has electronic assent and consent in place and has been approved by the University of Pittsburgh's IRB (#PRO10050445).

The survey tool includes the following components:

- Online signup for all members of a family, with responses to the survey remaining confidential from other family members
- Online consent and assent forms
- Questions on nutrition, physical activity, and anthropometric information, as well as diabetes and cardiovascular disease
- Survey-takers receive immediate feedback on their BMI, as well as healthy-living information based on the BMI.

There are a number of incentives for participating:

- Each participant gets immediate access to his/her own BMI
- Each family and SEPA gets immediate access to their BMI in context of their family and SEPA
- Each SEPA has access to all of their group's de-identified data
- Each SEPA can receive de-identified data across all other SEPAs

The Challenges

- Survey tool is imperfect but evolving
- IRB issues — How can each participating institution work through IRB issues?
- Alternative language translations
- The presenters discussed the challenges and concerns raised by session attendees and follow-up meetings were set with individual groups for further discussion of this topic.

Participants

Wendy Huebner, Montclair State University
Marcia Pomeroy, University of Kansas School of Medicine
Ginger Cross, Mississippi State University
Jim Moore, University of Georgia
Kathie Williams, EdVenture Children's Museum
Robert Branch, University of Pittsburgh
Ann Chester, West Virginia University
Joan Schanck, Pittsburgh Tissue Engineering Initiative

21st Century Professional Development for Teachers

Facilitator - Ann Lambros - Wake Forest University School of Medicine
Panelists - Adrienne Loffredo - Wake Forest University School of Medicine
William Abbott - Winston Salem/Forsyth County Schools
Reported by Marianne P. Garcia - MD Anderson Cancer Center

The question was posed, "What is meaningful for teachers?" A few moments were spent to share and refine a description of the definition of the skills that are important for success in the 21st century. The list included the following areas of competency:

- Technology
- The 3 Rs – reading, writing, and arithmetic (mathematical skills)
- Cross-curricular activities
- Flexibility and adaptability
- Problem-solving
- Communication/collaboration

There are many challenges that teachers face, including those listed below:

- Time — pressures to complete many additional assignments
- State-mandated curriculum
- Turnover — shifts in assignments as well as teachers leaving to go to other school districts
- District-level administrations and the demands of these entities
- District agendas
- Competing professional-development activities — which ones are most useful and applicable
- Changing standards
- Entry-level vs. experienced teachers — some are less experienced, others are set in their ways; some are comfortable with technology, others are not
- Teachers are supported in attending development outside of expertise
- Shift in economic climate —an increased demand on teachers' time outside of class
- Competing emphasis on what is of value to the students

So how can value be added to the professional development of teachers?

The 21st Century Professional Development Goals were designed to create professional learning communities. A shift was made from teachers going offsite to their professional-development activities to the activities coming to the teachers on their campuses.

- The PLC educators commit to working collaboratively in an ongoing process of collective inquiry.
- The PLC provides whole schools with learning communities and addresses what they need. They talk about lesson delivery, looking for ways to make new learning look easier.
    - Example: Science instructors from two schools work together. They have a 5-year approach with prepared kits, and there is infusion of content knowledge from the university.

There was discussion about virtual PLCs, where teachers have conversations remotely and then meet in person once a year. They use the blackboard program and guided instructions asynchronously.
Some teachers are afraid of the time commitment, that PLC is just one more item to be involved in. This fear is assuaged by the asynchronous nature of the PLC and by keeping it relevant.

The best practice of integrating PLCs, as verbalized by the presenters was:

- Acknowledging all of the pressures that teachers must balance.
- Finding ways to use technology to increase convenience — translate "boxes" into virtual, online conversations.

An example of a K-1st grade professional-development for teachers included

- Treating teachers with respect.
- Incorporating professional-development into the daily protocols rather than adding something extra.
- Listening to the teachers' recommendations at the end of each training session.
- Having good food and useful giveaways.
- Understanding that the little things make a big difference.
- Always listening to feedback.

For example, in trying to overcome the gap between research scientists and elementary-school teachers (Little critical friends),

- Ask the teacher questions about how to integrate the research scientist into the classroom.
- Develop a relationship based on the expectations that the teacher has established.
- Ask about the kinds of training graduate students have in teaching and what they need for training and resources.
- Help teachers share the content area with content experts.

Experts in Alaska wanted to know what the schools want and to get a sense from the teachers about what they wanted for content. This question is often too broad and almost no one responds to it.

- Meet first during the summer; then, the scientists will meet once per month thereafter.
- Went to the meeting for teachers and researchers that wanted to be involved in collaboration.

North Carolina — One model for professional development in the 21st century

- Collaborated with school leadership
- Found out goals and expectations of individual school districts
- Used the PLC framework
- Asked about what percentage of time in PLC is available

How is the professional development program evaluated?

- Implementation of professional development goals tracked with surveys about current classroom practices
- Surveys conducted before and after professional development
- Both teacher and student surveys conducted, targeted to each population: Ask teachers, "How easy was it to use?" Ask students, " How much fun was it?"
- Includes program going out to schools and interacting with students and teachers.
- Get CE credits for participation and can get graduate credit, if previously arranged.

Overall Message: We will have teachers who were educated in the 20th century teaching students with 21st century technology. We have to make sure they are prepared for this.

Participants

Michelle Ventura, Georgia State University
Laura Fawcett, Yale Peabody Museum
Deb Stark, University of Texas Health Science Center at San Antonio
Gail Fletcher, University of Southern Maine
Sandra McKell, University of Alabama-Birmingham
Susan Bonk, EdVenture Children's Museum
Marianne Garcia, University of Texas MD Anderson Cancer Center
Mike Fenzel, Montshire Museum of Science
Chuck Wood, Wheeling Jesuit University
Brian Mooney, Johnson & Wales University
David Potter, Harvard Medical School
Mel Limson, American Physiological Society
Fern Lan Sien, Cornell University
Barbara Baumstark, Georgia State University

From Cells to Atoms: Helping Your Project Participants Comprehend Size, Scale, and the Dynamic Processes of Communication

Facilitator - Molly Malone - University of Utah
Panelist - Mario Godoy-Gonzales - Royal High School, Washington

The session began with a brief orientation to the Learn.Genetics and Teach.Genetics websites that are produced by the Genetic Science Learning Center at the University of Utah. The presenter highlighted how to navigate to the SEPA-funded Amazing Cells materials on both websites that would be experienced during the session. The presenter then began demonstrating how to integrate the Amazing Cells interactive animations, paper-based activities, and kinesthetic activities by having participants experience them as students would.

We began with the Coffee to Carbon activity where the task is to place microscopic objects on cards in order from largest to smallest without knowledge of their actual size. We then used the Cell Size and Scale online activity to check our work. The group discussed how the Coffee to Carbon activity is useful in identifying common misconceptions about the size and scale of the cells, cell structures, and molecules depicted on the cards. Then we discussed the strengths of the Cell Size and Scale activity in conveying the idea of relative size and scale of the objects; users manipulate a slider to view the objects drawn to scale and placed next to each other so one can see how an amoeba compares to a grain of salt, or a red blood cell compares to a human egg cell, etc.

Next we experienced the activities designed to convey the molecular nature of cell communication. After watching the animated movie, An Example of Cell Communication: The Fight or Flight Response, we completed the Pathways With Friends activity. This activity teaches cell communication by providing simple instructions for groups of six to kinesthetically model the parts of a cell signaling pathway. The group debriefed the activities, discussing common misconceptions, tips on how facilitators can check for understanding, and modifications that can be made to highlight different problems that might arise in a cell signaling pathway. The presenter then showed the Dropping Signals interactive activity online and highlighted supporting worksheets and additional pieces of the learning module that could be found online.

Next, the group viewed the online, interactive Inside a Cell activity, where users can click on several parts of an active cell to gain a close-up view of cell organelles in action. The presenter highlighted supporting worksheets and other cell structure and function materials on the Learn.Genetics and Teach.Genetics websites, including a cut-and-tape paper model of a cell membrane (Build-A-Membrane). The group discussed the strengths of the activities in depicting a dynamic cell with organelles working together as opposed to using static illustrations (a far more common approach).

The session wrapped up with an overview of the process by which the materials were created: teachers from across the nation attended a week-long summer institute where they heard talks by scientists about cell structure and communication, identified important learning goals, and then drafted ideas for activities. The Genetic Science Learning Center team then developed these ideas and addressed any gaps in the curriculum. Participants asked questions regarding teacher recruitment and institute logistics. (Providing chocolate was identified as an important component of the summer institute.) Participants also commented that it was nice to see the products of other SEPA programs in this manner, as poster sessions and presentations don't always allow for enough detail about materials that might be useful to others.

Participants

Michael Toombs, Storytellers Inc.
Martha Sellers, Montana State University
Andrij Holian, Arizona Science Center
Deron Ash, Arizona Science Center
Jennifer Jamison, University of Southern Maine
Diana Natividad, University of Texas Health Science Center
Kim Schuenke, University of Texas Medical Branch at San Antonio
Ben Koo, University of California, San Francisco
Laura Lynn Gonzalez, Green Eye Visualization

Why Us? The Curriculum: Broadening Access and Use

Facilitator - Claudia Pryor - Diversity Films
Panelists - Kathryn Kailikole - Drexel University
Rosetta Lee - Seattle Girls School

20 modules with video and curriculum: lesson plans
Federal TRIO program: middle school, high school, adult lessons, all 50 states

- Counselors, community-health workers using curriculum
- Science and society issues in classroom using module as a springboard to look at personal action
- Social determinates of health personal choices that increase health, address various disparities in our society

Tables picked modules to see/do
Module 13: Access to Medicine (7min:27sec)

- Stakeholder activity
- What information do you need?
- Respectful discussion of access to medicine
- Is lower-cost drug lower quality?
- Who pays for new research?
- Why are stakeholders laughing?
- Group Discussion:
- Where do you stand on access to medicine?
- What are your choices for accessing medicine?
- What can you do to close the gap?

Module 17: Natural Transfer Theory

- Theory or hypothesis? Which term is best?
- Divide into three subgroups and watch one theory/hypothesis: Natural Transfer, Serial transfer, Oral Polio Vaccine (OVP).

Claudia was shooting with Preston Marks for 4 years—what scientists do is tell a story; if it is documented, it can be broken down for students

- Need access to tell this story.
- Curriculum constructed so you don't have to see the whole film first
- Go in any order, but do three hypotheses together to complete the module.

Participants

Jeri Erickson, Foundation for Blood Research
Walter Allan, Foundation for Blood Research
Wendy Hansen, Pacific Science Center
Lew Jacobson, University of Pittsburgh
David Guilbault, Diversity Films
Peter Crown, University of Arizona
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Joan Griswold, Northwest Association for Biomedical Research
Tabitha Thigpen, King Drew Magnet High School of Medicine and Science
Maurice Godfrey, University of Nebraska Medical Center
Kim Soper, University of Nebraska Medical Center
Deborah L Colbern, Charles R. Drew University
Ishara Mills-Henry, Massachusetts Institute of Technology
Victoria Coats, Oregon Museum of Science and Industry
Veronika Nunez, Oregon Museum of Science and Industry
Monroe Duboise, University of Southern Maine

11:00am–12:00pm

Reflections on the Conference and Looking Forward

L. Tony Beck - NIH NCRR SEPA Program Officer
Reported by Jeanne Chowning - Northwest Association for Biomedical Research

Engaging with Congresspeople

- The SEPA Director's meeting will be in Washington, D.C. in mid-May next year; this will be a good opportunity to engage elected officials.
- Dr. Beck referenced the recommendations made by Representative Jay Inslee, Keynote Speaker: everyone should engage with their elected officials. The message should be, "We need to do something about science education for kids." SEPA programs can't lobby directly themselves.
- The NSF-ITEST conference was raised as a model: the day before the conference, teams of people from the same state visit their elected officials.
- The legislative affairs office in a University should be advised so that visits can be coordinated.
- The recommendation was made to get SEPA on the agenda of the University Legislative Affairs Office (although this can be challenging for some institutions).
- Another recommendation was to go through professional associations and their contacts to engage elected officials.
- PIs do represent their institutions, so even though they are individual citizens, they need to consider this aspect of the visits.
- Prior to the visit, PIs should identify people who sit on important committees; NAHSEP and ASP may be able to help. The US Congress website can help identify who would be important to visit.
- The Triangle Coalition—started by STEM companies—was mentioned as a resource. The Coalition should know what bills are on the floor and how they will impact SEPA.
- Some SEPA programs ask their elected representative for letters of support.
- APS offered an interesting model: for every teacher participant, a letter goes to a congressperson, noting that the teachers received federal funding, that SEPA is a national program, etc. Legislators target lots of teachers to serve as contacts in education.
- The need to continue to credit SEPA appropriately in all materials was also discussed.

Mentorship

Dr. Beck referenced the pairing of new projects with mentors and the success of the HHMI Peer Evaluation process. He encouraged SEPA projects to invite their mentors to come visit their projects.

Regional

- Dr. Beck discussed an R24 infrastructure award with 6–12 months' support, which may be available for regional collaboration awards. These might possibly be structured as 3-year awards: 100K in the first year, 50K in the second year, and 50K in the third year.
  There are some specifics that would need to be addressed, such as what would be the goals? Who would be the PI or group of PIs?
- This award would provide opportunities for intensive collaboration.
- Dr. Beck mentioned that it would be ideal to have the funding start in 2012.
- Projects should take advantage of the SEPA website to post surveys and forums.
- There was some interest in having "regions" where all projects were within driving distance of one another. The Southeast region did not have consensus about regional meetings. Their region is large, and there was concern that resources would be better spent bringing together projects with similar audiences (urban/rural) or topics.
- The opportunity to rally around regional NSTA conferences (maybe in conjunction with a booth) was raised (especially in conjunction with the Seattle NSTA conference in December). The Mid-Atlantic group has discussed interest in having topic-focused meetings. The Rocky Mountain region is dispersed. The Midwest group plans on having a Google group to decide on goals.
- Dr. Beck also mentioned that SEPA working groups are useful for targeted emails and discussions (for example, Stem Cell Task force); participants should sign up on lists to become aware of special programs and opportunities they might be interested in.
- Community-Based Participatory Research
- Dr. Beck mentioned the program of Ann Chester and Bob Branch as an exemplar.
- There are opportunities to engage communities more directly in SEPA work (Boys and Girls Club, YMCAs).
- Dr. Beck mentioned that some other ICs also have targeted SEPA programs (NIDA, NIAAA).

New SEPA Program Announcement

Spring 2012 — New funding announcement will be released.

More SEPAs are needed to serve elementary schools.

Evaluation will continue to be emphasized as a critical part of SEPA projects.

SEPA Website

- The website is the single most-important marketing tool for SEPA.
- Dr. Beck requested that participants in this year's conference complete a survey on SEPA Collaborations, Teacher Professional Development, and Clinical Trials Education and send it to U University of Texas - San Antonio.

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SEPA 2011 Projects

Poster #	Project Name	Institution	Contact PI
1	Human Health and 'Human Bulletins': Scientists and Teens Explore Health Sciences	American Museum of Natural History	Scott, Monique
2	Six Star Science for Student-Centered Learning	American Physiological Society	Matyas, Marsha
3	Framing New Pathways to Medical Discoveries for Families, Students and Teachers	Arizona Science Center	Martin, Laura
4	CityLab: A Systems Approach to Biology - Phase I/II	Boston University Medical Campus	Franzblau, Carl
5	Gene U: Inquiry-based Genomics Learning Experiences for Teachers and Students	Baylor College of Medicine	Moreno, Nancy
6	Would you like to be a scientist? Discover Biomedical Sciences! - Phase I/II	Charles R. Drew University of Medicine & Science	De Lacalle, Sonsoles
7	PowerPlay	Children's Museum of Houston	Mccallum, Cheryl
8	Being Me	Children's Research Institute	Luban, Naomi
9	Nationwide Dissemination of Inside Cancer, a SEPA-Funded Internet Site for Teachers	Cold Spring Harbor Laboratory	Micklos, David
10	Choice, Control and Change: An Inquiry-based Science Education Program for Children Overweight Prevention	Columbia University Teachers College	Contento, Isobel
11	ASSET: Advancing Secondary Science Education with Tetrahymena.	Cornell University Ithaca	Clark, Theodore
12	Genetics of Taste: A Flavor for Health -- Community Lab and Education Programs	Denver Museum of Nature And Science	Coughlin, Bridget
13	Serial Passage: AIDS, Race, and Culture Phase II	Diversity Films, Inc.	Pryor, Claudia
14	Regenerative Medicine Partnership in Education (Phase I/11)	Duquesne University	Pollock, John
15	FoodMASTER: Impacting K-12 Learning Environments - Phase II	East Carolina University	Duffrin, Melani
16	Unlocking the Mysteries of Chronic Disease: Bioinvestigations of Family and School	Edventure Children's Museum	Bonk, Susan

17	BiomedicineWorks: How Doctors Use Evidence-based Medicine; Phase I and II submission	Foundation for Blood Research	Allan, Walter
18	Helping K-12 Students Become Fluent in the Language of DNA	Georgia State University	Baumstark, Barbara
19	Mapping the Future of Bioengineering & Technology	Great Lakes Science Center	Davillier, Valence
20	Phase II: Opening the Pipeline for Native High Schools	Harvard University Medical School	Potter, David
21	It's Complex! Engaging Student Discussions Around Complex Genetics and Individualized Medicine	HudsonAlpha Institute for Biotechnology	Lamb, Neil
22	The Mind Projects Cutting Edge Health Science Initiative	Illinois State University	Anderson, David
23	Northstar (Phases I and II)	Imaginarium, Inc	Haywood, Savina
24	Meta!Blast: An Immersive Interactive Learning Module for Cell Biology	Iowa State University	Wurtele, Eve
25	Jackson State University Science Education Partnership Program	Jackson State University	Perkins, James
26	BioStart: Clinical Research and Education Experiences for Students, Teachers, Parents and Community	Louisiana State University Health Science Center Shreveport	Kleiner, Heather
27	Meharry Health Sciences Leadership Academy	Meharry Medical College	Dereimer, Susan
28	Fighting with Food: Battling Chemical Toxicity with Good Nutrition	Miami University	Hershberger, Susan
29	Partnerships to Promote Healthy Lifestyles for Children and Communities	Mississippi State University	Cross, Ginger
30	Epidemiology and the Energy Balance Equation	Montclair State University	Kaelin, Mark
31	Connecting Classrooms and Community with the Health Sciences	Montshire Museum of Science	Defrancis, Gregory
32	SIMLAB: Using Patient Simulation for Student Exploration of Community Health Issues (Pre-Year 1)	Museum of Science and Industry, Chicago	Ward, Patricia
33	Evolution & Health Traveling Exhibition and Education Programs	New York Hall of Science	Weiss, Martin
34	Collaborations to Understand Research and Ethics (CURE)	Northwest Association for Biomedical Research	Chowning, Jeanne
35	Science Club: Building A Science Community Partnership with the Boys & Girls Club	Northwestern University	Kennedy, Michael

36	Teacher Institute for the Experience of Science	Oregon Health & Science University	Cameron, William
37	Zoo in You: Exploring the Human Microbiome and Small Museum Research Collaborative: Exhibit-based Outreach/ Phase I & II	Oregon Museum of Sciences and Industry	Coats, Victoria
38	Mid-Atlantic Region Science Education Partnership Award	Pennsylvania State University College of Medicine	Bond, Judith; Chorney, Michael
39	Investing in the Future: Collaborative Research Experiences for Students and Teachers	Pennsylvania State University Hershey Medical Center	Bond, Judith
40	If a Starfish Can Grow an Arm, Why Can't I?	Pittsburgh Tissue Engineering Initiative	Schanck, Joan
41	Fat Dogs and Coughing Horses: Animal Contributions towards a Healthier Citizenry	Purdue University West Lafayette	Ratliff, Timothy
42	MedMyst III: Infectious Diseases Materials for Middle School Students	Rice University	Miller, Leslie
43	BioQuest Academy: Creating an Innovative Immersion Program for Teens	Seattle Biomedical Research Institute	Britschgi, Theresa
44	Spectrum: Building Pathways to Biomedical Research Careers for Girls and Women of Color	San Francisco State University	Tanner, Kimberly
45	The Stanford SEPA Project	Stanford University	Winkleby, Marilyn
46	Science Promotion in Rural Middle Schools: Phase I + II	Texas A & M University System	Johnson, Larry
47	A Collaborative Approach to Real-World Science in the Classroom	Tufts University Boston	Meiri, Karina
48	Going to Middle and Early High School Classes with Near-Peer Mentors	U.S. Walter Reed Army Institute of Research	Yourick, Debra
49	Minority Initiative for Students and Teachers (MIST)	University of Medicine & Dentistry of New Jersey-New Jersey Medical School	Johnson, Mark
50	Birmingham Science Education Partnership: Middle School Inquiry-Based Learning	University of Alabama at Birmingham	Wyss, Michael
51	Biomedical Partnership for Research Education Pipeline in Alaska (Alaska BioPREP)	University of Alaska Fairbanks	Hills, Susan
52	K-12 Virtual Clinical Research Center & Medical Ignorance Exploratorium: Phase I+II	University of Arizona	Witte, Marlys

53	How sure are you? Science, Biostatistics and Cancer Education	University of California Davis	Molinaro, Marco
54	Educating High School Students and Their Families about Clinical Research	University of California San Diego	Boss, Gerry
55	Pathways: Promoting Access to the Health Sciences through Partnership	University of California San Francisco	Smith, Rebecca
56	Biomedical Explorations: Bench to Bedside	University of Florida	Koroly, Mary Jo
57	Learning Biological Processes Through Animations and Inquiry: A New Approach	University of Georgia	Oliver, Steve
58	Pacific Education and Research for Leadership in Science (PEARLS)	University of Hawaii at Manoa	Withy, Kelley
59	Project NEURON (Novel Education for Understanding Research On Neuroscience)	University of Illinois Urbana-Champaign	Hug, Barbara
60	PathOlogical Life Sciences Training Program for Students and Families	University of Kansas Medical Center	Thomas, Patricia
61	"TRY-IT" Translating Research to Youth through Information Technology	University of Kentucky	Leukefeld, Carl
62	Heart Smart	University of Miami Coral Gables	Saab, Patrice
63	Education for Community Genomic Awareness (Phase I & II)	University of Michigan at Ann Arbor	Citrin, Toby
64	BRAIN to High Schools	University of Minnesota Twin Cities	Dubinsky, Janet
65	Environmental Health Science Education for Rural Youth	University of Montana	Holian, Andrij
66	World of Viruses	University of Nebraska Lincoln	Diamond, Judy
67	Breaking Barriers: Health Science Education in Native American Communities	University of Nebraska Medical Center	Godfrey, Maurice
68	The Impact of a Three-Hour Neuroscience of Addiction Curriculum on University Students' Knowledge and Attitudes about Substance Abuse and Individuals with Substance Use Disorders: Results from the NIDA Enters College Project	University of Nevada-Reno	Roget, Nancy
69	The Science of Healthful Living	University of North Carolina-Greensboro	Ennis, Catherine
70	Phase I/II Partnership in Biomedical Discovery	University of Pittsburgh at Pittsburgh	Jacobson, Lewis

71	LSLC: Strengthening Connections Between Scientists and Classroom Learning	University of Rochester	Markowitz, Dina
72	Virtual Sprouts: Web-based Gardening Games to Teach Nutrition and Combat Obesity	University of Southern California	Spruijt-Metz, Donna
73	SCienceLab	University of South Carolina at Columbia	Ely, Bert
74	Micro-and Nano-space Explorations of Health and Disease	University of Southern Maine	Duboise, Samuel
75	Positively Aging®: Maximizing the Healthspan	University of Texas Health Science Center at San Antonio	Lichtenstein, Michael
76	The MENTORS (Model Education Networks To Optimize Rural Science) Project	University of Texas MD Anderson Cancer Center	Fuchs-Young, Robin
77	Genome Science for Health: Web-based Curricula for Biology, Phase I+II	University of Utah	Stark, Louisa
78	Genes, the Environment, and Me	University of Washington	Munn, Maureen
79	Biology-Environmental Health Science Nexus: Inquiry, Content, and Communication	University of Wisconsin Milwaukee	Petering, David
80	School for Science and Math at Vanderbilt	Vanderbilt University	Shepherd, Virginia
81	Project CRESST: Enhancing Clinical Research Education for Science Teachers, Students and the Community	Virginia Commonwealth University	Abrams, Lisa
82	Building an Infrastructure for Research Collaborations	Virginia Polytechnic Institute and State University	Dolan, Erin
83	Research, Education, And Linking Science Careers: REAL Science Careers	Wake Forest University Health Sciences	Lambros, Ann
84	CyberSurgeons Live Simulation and PBL Development and Dissemination	Wheeling Jesuit University	Wood, Charles
85	West Virginia HSTA Students Design Public Health Clinical Trials	West Virginia University	Chester, Ann
86	Curricula Modeled on Biodiversity & Vector-Borne Disease	Yale University	Munstermann, Leonard
87	Building Bridges to Health Science Literacy	University of Tennessee Health Science Center	De Bon, Maggie

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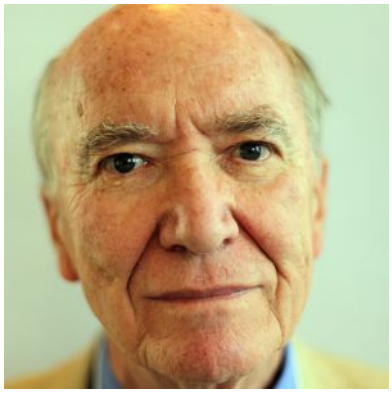

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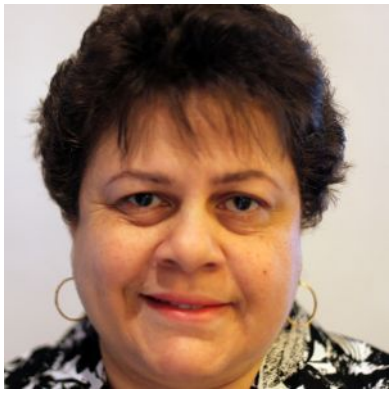

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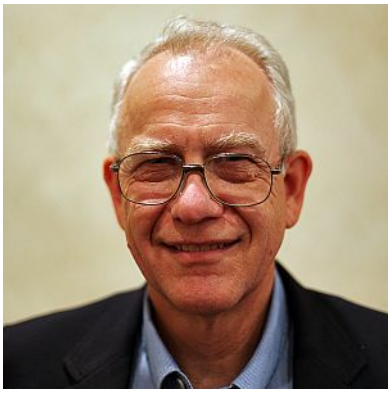

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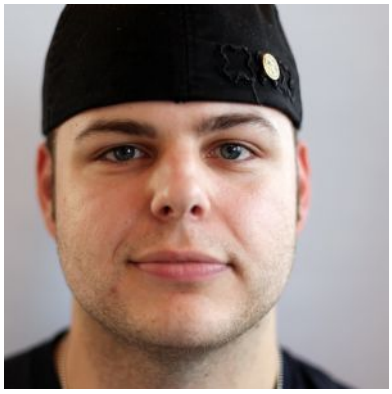

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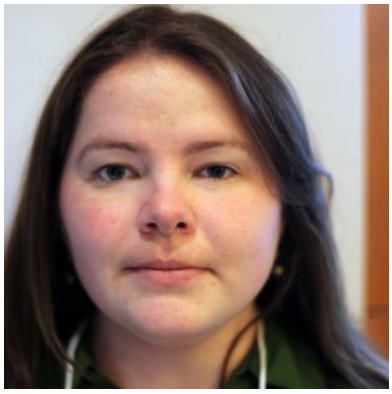

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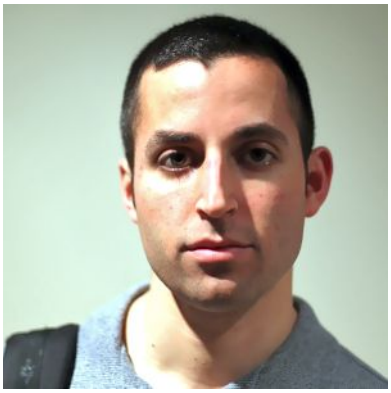

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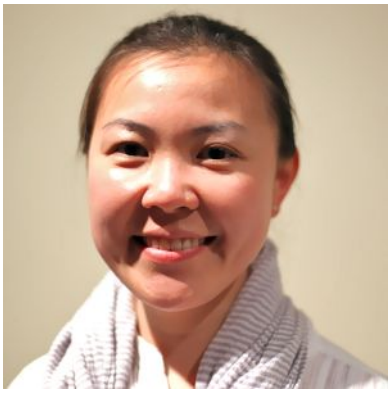

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