Personalizing the Visitor Experience
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SPECIAL!!

The ASTC Exhibit Cheapbooks Bundle

Paul Orselli

These three collections of inexpensive exhibit ideas, shrink-wrapped and hole-punched to fit into a three-ring binder, have been extremely popular. Perfect for small museums and exhibit developers on a budget, each volume provides construction tips and exhibit schematics for 30 time-tested interactive exhibits. We are now selling these together for a discount, so buy all three for a special price today!

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To submit ideas for features or departments, contact Emily Schuster, editor, (202) 783-7200 x130, eschuster@astc.org. Email letters to the editor to dimensions@astc.org (subject line: Inbox) or mail them to ASTC at the above address, Attn: Dimensions Inbox. Include your name, title, and institution. We reserve the right to edit letters for publication.
Even the most dedicated supporter of science, technology, engineering, and math (STEM) learning today would not be faulted for some level of confusion over the many educational standards for science that seem to be in various stages of development or review. There is considerable discussion lately, for example, about the new Next Generation Science Standards (NGSS, www.nextgenscience.org), not to be confused with the Common Core State Standards for English Language Arts and Literacy in Science and Technical Subjects (www.corestandards.org/ELA-Literacy).

NGSS aims to establish common standards for U.S. K–12 science education (based in part on comparisons of 10 countries whose students have performed well on international assessments). These standards do not replace, but rather complement, the Common Core Standards, which are designed to help students learn to read, write, speak, listen, and use language effectively in various disciplines, including science. In short, NGSS will prepare a generation for science understanding, even as the Common Core Standards provide the literacy skills required for college and career readiness in science-related disciplines.

The good news is that these measures appear, in their own ways, to be directed toward a common goal of building capacities for science understanding and use. This is particularly good news for our field because science centers and museums are well positioned to meet the objectives and orientations of both sets of standards. NGSS emphasizes the mastery of scientific practices, core ideas, and crosscutting concepts, which are already reflected well in our institutions’ many interwoven themes, learning strategies, and approaches to teacher training. Moreover, our expressive techniques—conveying science through stories, theater, and other communication tools—help strengthen the literacy skills embodied in the Common Core Standards. In short, while these science education-related standards are not, themselves, interchangeable, our field offers meaningful programs that support the standards set forth in both cases.

Illustrating this point, ASTC has recently joined with the National Writing Project (NWP) in a new (U.S.) National Science Foundation–supported initiative that will integrate science and literacy: Building Informal Science Education and Literacy Partnerships (award number AISL-1224161). Ten partnerships are being established nationwide to create new programs that merge science and writing, reaching a diverse range of youth and educators. These programs will result in an infusion of literacy practices into informal science learning environments, while introducing non-science teachers to more STEM-rich learning experiences. The practices that will emerge from these programs will have universal application, and ASTC looks forward to disseminating the lessons learned.

Anthony (Bud) Rock (brock@astc.org) is ASTC’s CEO. Visit www.astc.org/blog/category/ceo to read more From the CEO editorials.
I was excited to read your March/April 2013 issue of *Dimensions*, with its focus on how digital media is transforming museum-based learning. Focusing two articles on games felt appropriate, but neither actually spoke about video games developed for use by museum visitors. Interesting examples abound: the Pokemon-style *Specimania* from the Field Museum in Chicago; the similarly named but quite different *PlanetMania* from the Maryland Science Center in Baltimore; the virtual world–based immersive narrative *Witnessing History* from the U.S. Holocaust Museum in Washington, D.C.; the geolocative scavenger hunt *California Dreaming* from the San Francisco Contemporary Jewish Museum; and the game/exhibit hybrid *FoodCraft* where I work at the American Museum of Natural History in New York City.

One of the biggest challenges faced by a museum that is considering game development is the lack of a wide variety of robust case studies exploring how game-based learning can deepen visitor engagement, learning, and new ways to envision visitors’ relationships with the museum, content, and each other. The examples I mentioned, however, were all early efforts by museums to explore this powerful medium and offer us a useful place to start as we continue to expand how our programs speak to youth interest in our digital age.

**Barry Joseph**, associate director for digital learning, Youth Initiatives, American Museum of Natural History, New York City

**And praise for our enewsletter, INFORMER:**

I just wanted to say that INFORMER has become my favorite online source of science tidbits. It’s the one enewsletter that I look forward to getting and the only one I read top to bottom. The selection of topics and the length are just right. Thanks, and keep up the good work!

**Charlie Trautmann**, executive director, Sciencenter, Ithaca, New York

I just wanted to tell you how much I truly enjoy INFORMER. You always have such interesting and relevant articles to share. Keep up the great work for ASTC members!

**Chantal Barriault**, co-director, Science Communication Graduate Program, Science North, Sudbury, Ontario, Canada

**Editor’s note:** To request a subscription to ASTC’s INFORMER enewsletter, contact Diane Frendak, dfrendak@astc.org.

Send letters to the editor to dimensions@astc.org (subject line: Inbox). Include your name, title, and institution. We reserve the right to edit letters for publication.
teaching tool,” says Small. The concrete exterior is designed to look like a geological formation, with landscaping that represents different Texas ecosystems. Eleven permanent exhibition halls—as well as a traveling exhibition gallery and six learning labs—extend over five floors. The Lower Level features a children’s museum and sports hall, where visitors can try to outrun Tyrannosaurus rex. Level 1 houses a multimedia theater, and Level 2 holds halls focusing on the biosphere, the human body, and engineering and innovation. On Level 3, visitors can explore a hall on weather or turn a wheel to open a giant geode in the gems and minerals hall. Level 4 offers a hall of birds where visitors can “fly” as a bird avatar, as well as a hall devoted to space and one on fossils that features the first-ever installation of the sauropod dinosaur Alamosaurus.

The museum is a result of the 2006 triple merger of the Dallas Museum of Natural History, the Science Place, and the Dallas Children’s Museum. The $185 million project was made possible by gifts from more than 100 donors, including a $50 million donation from the children of Margot and Ross Perot and gifts of $25 million and up from Lyda Hill, Jan and Trevor Rees-Jones, and Sally and Forrest Hoglund. –Sharon Barry

Details: marketing@perotmuseum.org, www.perotmuseum.org
EARTH HALL’S REBIRTH

Through its Energy & the Environment Initiative, Portland’s Oregon Museum of Science and Industry (OMSI) is seeking to become a national leader in education on sustainability, renewable energy, and environmental science. With the opening of two new bilingual (English/Spanish) exhibitions that have transformed its Earth Hall, OMSI has completed a milestone in that initiative.

Clever Together: Our Everyday Choices/Juntos Somos Ingeniosos: Una Decisión a la Vez demonstrates how small, sustainable actions can make a big difference when adopted by many people. In the exhibition, which opened in October 2012, visitors can weigh the environmental, economic, and social impacts of their choices regarding food, transportation, product consumption, and energy use. They can take a virtual walk or bike ride though the Portland area or use smart curbside sorting techniques to divert waste from landfills. A $2.4 million (U.S.) National Science Foundation grant supported the 1,500-square-foot (140-square-meter) exhibition, as well as an exhibit guide, community outreach efforts, and public events.

Renewable Energy/Energía Renovable, a 1,500-square-foot (140-square-meter) exhibition that opened in January, explores how energy from renewable sources like wind, water, and sun can support our daily energy needs. Visitors can take charge in displays like Power Up Portland, in which they enter a control room and adjust the inputs of a simulated electric grid in response to the city’s changing demands—weighing the economic, environmental, and social tradeoffs of different energy sources. Among the major contributors to the exhibition were Portland General Electric, Bonneville Power Administration, SolarWorld, Vestas, and Iberdrola Renewables.

The Earth Hall also includes Science on a Sphere and two other exhibitions: A View from Space and Earth Lab.

—S.B.

Details: Amita Joshi, public relations manager, ajoshi@omsi.edu. www.omsi.edu

In Clever Together, a visitor takes a virtual walk through the Portland area to learn about the environmental impact of personal transportation choices. Photo courtesy OMSI.
AT HOME WITH CHEMISTRY

In the newest permanent exhibition at the National Taiwan Science Education Center in Taipei, visitors look at a typical home with new eyes—and find some surprises. Explore the World of Chemistry allows visitors to examine major areas of a home at different scales to discover how chemistry is part of every aspect of our lives. Activities illuminate the composition and internal structures of materials, how these materials change, and how the characteristics of materials influence the ways in which we use them.

The 8,880-square-foot (825-square-meter) exhibition, which opened at the end of December 2012, is divided into five major sections. The Living Room introduces materials on the microscopic level. In the Bedroom, visitors shrink down to the nanoscale to examine materials in a computer monitor, concrete floor, goldfish, and houseplant. Visitors can make a gigantic bubble and learn why its colors keep changing in the Bathroom, or find out why eggs harden when they’re heated in the Kitchen. The Garden section features a display of all the elements in the periodic table—including some rarely seen metals and noble gases—and invites visitors to calculate how much carbon they contribute to the environment each month. The exhibition also includes a laboratory where visitors can conduct simple experiments.

Aimed primarily at elementary and high school students, the exhibition is intended to supplement what students learn about chemistry in school. Staff hopes that the exhibition will encourage visitors to start noticing the chemistry all around them. —S.B.

Details: Stephanie Wu, exhibition coordinator, Stephanie@mail.ntsec.gov.tw, www.ntsec.gov.tw

A staff member performs a chemistry demonstration. Photo courtesy the National Taiwan Science Education Center
NEW MYASTC WEBSITE AND BOOKSTORE

Staying connected to ASTC and the science center field is now easier than ever at the new MyASTC website, members.astc.org. Not only can you network with your fellow ASTC members using an improved member directory, but you can also purchase books and manage your account and subscriptions.

Now is the time to secure your own free subscription to the award-winning Dimensions magazine. By the end of 2013, ASTC will no longer be mailing a packet of five copies of Dimensions to each institution’s main contact. Main contacts will still receive one copy, and in addition, any paid staff member at an ASTC-member institution can request his or her own free print or electronic subscription. Electronic subscribers are the first to receive each issue, and also gain immediate free access to all issues published in the past year. To subscribe, sign into MyASTC and click on My Account. In the Demographics box, click on the pencil icon located in the upper right corner to make and save your changes. You can also add yourself to the Directory, list your email (or not), and subscribe to ASTC’s enewsletter, INFORMER.

Main contacts (or designated staff) also have the ability to renew dues online and manage their organization’s roster by editing existing records, removing former staff, and adding staff members.

Purchasing publications is quicker, too. Customers can browse and check out online in our enhanced Bookstore.

CAISE TO RELAUNCH INFORMALSCIENCE.ORG

The Center for Advancement of Informal Science Education (CAISE) will relaunch informalscience.org in May, pursuing a vision for the site as the “one-stop shop” for informal science, technology, engineering, and math (STEM) learning professionals. The new site brings five websites under one tent, provides access to data aggregated from many more databases, and offers multiple venues for professionals to meet and share ideas online.

Informalscience.org pulls together resources contributed by colleagues in the informal science education field and from projects represented by the CAISE-convened Infrastructure Coordination Roundtable (ICR). CAISE is taking over management of the site from the University of Pittsburgh Center for Learning in Out of School Environments (UPCLOSE).

With the new website, users will be able to:

• View and contribute evaluation reports, instruments, research, reference materials, peer-reviewed articles, and other resources
• Curate project pages and browse projects
• Create a member profile and network with colleagues
• Track trends and share perspectives through blogs and news updates
• Join or create special interest groups with threaded discussion forums
• Share meetings, events, and funding opportunities on the calendar.

To suggest resources or learn more about how to become involved, contact Trevor Nesbit, tnesbit@astc.org.

ASTC ESTABLISHES SCIENCE MUSEUM CRISIS RELIEF PROGRAM

ASTC and its member institutions were deeply saddened by the news of the tragic fire that devastated Città della Scienza in Naples, Italy, on March 4. In response, ASTC has established a new initiative, the Science Museum Crisis Relief Program, to help restore science museums facing unexpected and catastrophic circumstances.

ASTC has immediately undertaken several initial steps to support Città della Scienza and Science Alive! (our member institution in Christchurch, New Zealand), which has suffered disastrous consequences from a major earthquake. We have formed a partnership with the Italian Embassy in Washington, D.C., to engage Italian friendship and business organizations throughout North America and the world to seek contributions for the restoration of Città della Scienza. In addition, we have initiated a similar outreach effort in support of Science Alive! by collaborating with the North American representative of New Zealand’s Business Chamber and Friendship Organization. We call upon ASTC members to add their support to these efforts. For more information, contact Anthony (Bud) Rock, ASTC’s CEO, at brock@astc.org.
ASTC 2013: FIVE MONTHS TILL LIFTOFF

Do your October plans include attending ASTC’s 2013 Annual Conference, to be held in Albuquerque, New Mexico, October 19–22? ASTC 2013 will be hosted by three institutions—Explora, the National Museum of Nuclear Science and History, and the New Mexico Museum of Natural History and Science—and the unique perspectives and influences of each will help to shape the conference experience.

If you’ve been considering joining your colleagues from the global science center and informal STEM learning fields, the conference has a tremendous amount to offer you, both professionally and personally, including:

- Over 100 concurrent educational sessions (including more than 60 workshops), on everything from education and learning, finance and development, visitor/customer service, and exhibits and experience, to management, research and evaluation, staff development, and community and member relations.
- Sixteen preconference workshops on Friday, October 18, to help jumpstart your educational experience.
- A new public Science in the Park festival on Tuesday, October 22, in Tiguex Park, located just across the street from two of the three conference host institutions. This festival will provide an opportunity for conference attendees to show off their outreach activities, prototypes, and demonstrations to their colleagues and local students.
- Museum Open House Day—at three museums this year—has also been moved to Tuesday. Just imagine what you’ll get from three times the access to the host museums’ operations, programs, and teams!
- Numerous opportunities to build and burnish connections with your colleagues—connections that can lead to future business success.

Visit conference.astc.org to view the preliminary conference program and learn more about the sessions, special events, and benefits that await you, as well as the four conference hotels within walking distance of the Albuquerque Convention Center. Why not consider arriving in Albuquerque early or staying after the conference to take advantage of all this city and nearby Santa Fe have to offer—including some one-of-a-kind postconference tours?

And here’s an exciting offer: Register at conference.astc.org by May 31, and you’ll be entered into a drawing for one additional full conference registration and a three-night hotel stay at one of the conference hotels!

Be sure you’re a part of what is going to be an unforgettable and valuable experience. It will be arriving sooner you think!
SCIENCE CENTER AND MUSEUM MEMBERS

• **American University in Cairo**, Egypt. Professors at the university are leading an initiative called Science & Society, which includes outreach projects such as a science bus and the Cairo Science Festival. The group plans to open a full-scale science museum in 2014.

• **Bursa Science and Technology Center**, Osmangazi, Turkey. Open to the public since October 2012, this center operates a 26,910-square-foot (2,500-square-meter) building and plans to open a new, larger facility in 2014. In May 2012, the center hosted the first International Turkish Science Centre Symposium.

• **Carnegie Museum of Montgomery County**, Crawfordsville, Indiana. First opened in 1902, this museum’s building served as a library through 2005, and was then renovated and repurposed as a museum of history, science, and art.

• **Centro Criollo de Ciencia y Tecnología del Caribe** (C3tec), Caguas, Puerto Rico. C3tec opened in January in an abandoned Sears building. The 51,000-square-foot (4,740-square-meter) building—now certified “green”—features exhibitions on local geology, energy systems, and more.

• **Everest Science Centre Nepal**, Sitaganj, Sunsari. This center is back as a member after a brief hiatus. It is the first science center in Nepal and houses the country’s first portable planetarium. Each year, the center hosts a week-long science fair.


• **Lick Observatory**, Mount Hamilton, California. This permanently occupied, mountaintop observatory is owned and operated by the University of California. Several moons of Jupiter were discovered at the observatory, which opened to the public in 1888.
• **Markham Museum**, Markham, Ontario, Canada. In 2011, the Markham opened a new LEED-gold building with two expanded exhibition spaces. The 25-acre (10-hectare) facility, with more than 10 distinct buildings, examines the city’s history, as well as the environment and the tools we use to adapt to our changing world.

• **National Science Museum of Yemen**, Sana’a. Back as an ASTC member, this group engaged ASTC Fellow Saroj Ghose in 2005 to help with the museum’s development. The proposed museum will include exhibit topics such as the geology of Yemen, evolution, and natural resources, as well as a children’s discovery center.

SUSTAINING MEMBERS

• **EMS Exhibits**, Vienna, Austria. EMS Exhibits produces traveling exhibitions, including CSI: The Experience, Dinosaurs—LIVE, Terracotta Army, and Leonard da Vinci—Man, Inventor, Genius.

• **Indigenous Education Institute (IEI)**, Friday Harbor, Washington. This nonprofit institution has the mission to preserve, protect, and apply traditional Indigenous knowledge in a contemporary setting around the world. ASTC was a partner in the IEI-led Cosmic Serpent project.

• **Meehan Media Consulting**, Alexandria, Virginia. Meehan Media works with clients in the educational media industry to develop and design projects for fundraising success and audience impact. Meehan’s recent client portfolio includes work for National Geographic, Public Broadcasting Service (PBS), and the Pearson Foundation.

• **Sietecolores Ideas Interactivas**, Mexico City. This museum planning and exhibition design company was founded by Marinela Servitje, former director of Papalote, Museo del Niño, Mexico City.

• **Triotech**, Montreal. This company manufactures interactive and immersive attractions for the amusement industry and the science center field. Products range from 6D motion simulator theaters to interactive gaming floors.

• **Worldfx Inc.**, Cincinnati. Back as a member after a brief hiatus, Worldfx provides real-world visualizations of Earth using satellite imagery mosaics and large-format print mediums. Products include large inflatable replicas of Earth, as well as murals and globes.
How did you get involved as a board member of the Sciencenter?
Seven years ago, my husband and I traveled to Ithaca, New York, to discuss our new appointments at Cornell University (my husband’s as president and mine as professor of molecular physiology). When I got back to my office at the University of Iowa, the first call I received at 9:00 a.m. was from Charlie Trautmann, executive director of the Sciencenter. He asked me about visiting the Sciencenter and possibly becoming a board member. I did visit on my next trip to Ithaca and was taken from the first moment with the vision and the team. I’ve been on board ever since.

What do you think science center executives should do to create good working relationships with their boards?
CEOs should understand that the board wants first and foremost to help advance the vision. Anything the CEO can do to keep communication channels open at all times will help make that happen. At the Sciencenter, we tour some part of the museum at each board meeting—a new exhibit, an area of the museum under construction, a program space—which helps ground the board in what is really happening at the museum. Some refer to the CEO/board relationship as a dance, and I think it’s a good metaphor. We should always keep talking, thinking, and working together. We do that well at the Sciencenter. We have a great board, a talented staff, and an excellent relationship with our executive director.

In what ways is the Sciencenter’s work meaningful to its community?
The Sciencenter has changed the lives of many young people in our community. We make ourselves accessible by providing free memberships to families with children eligible for free or reduced-price lunch. We offer free admission on the first Sunday of the month. We offer field trips to every second grade class in our county and the neighboring city of Cortland at no cost. We do all this because we believe that a rising tide lifts all boats, and we want to create a groundswell in our community that gets every child—regardless of means—involved with science as early as possible.

Where do you see the Sciencenter headed in the future?
We’re starting new major programs for children at three developmental stages, which we call Early Explorers (birth to age 5), Young Scientists (ages 5 to 11), and Future Science Leaders (ages 11 to 14), all with the underlying theme of youth empowerment through science. We are excited about our future and the impact we can have on our community.

Do you have a board member you’d like to see profiled in a future “Our Boards in Action” column? Please send their name, position, and contact information to dimensions@astc.org (subject line: Boards).
**NOYCE LEADERSHIP INSTITUTE ANNOUNCES NEW FELLOWS**

On February 26, the Noyce Leadership Institute (NLI, www.noyceleadership.org) announced the participants in a sixth round of sponsored NLI Fellowships, with the aim of expanding the community impact of science centers, museums, and related institutions. NLI, in partnership with ASTC, Ecsite (the European Network of Science Centres and Museums), and the Association of Children’s Museums, and with funding from the Noyce Foundation, the (U.S.) Institute of Museum and Library Services, and the Gordon and Betty Moore Foundation, hones the leadership talents of participating executives by increasing their capacity to manage change, focus outward, engage peers, and form key partnerships.

A total of 17 senior-level and chief executives will gain access to knowledge, tools, and professional networks that strengthen their ability to lead effectively and advance innovation in their institutions, communities, and the field. The Fellowship program provides an action-learning framework via face-to-face sessions, executive coaching, peer learning, audio conferencing, and other strategies over a year, followed by ongoing Fellow alumni activities. Since 2008, 105 Fellows, representing 80 institutions from 25 nations, have participated in NLI.

The 2013–14 Noyce Fellows and their Strategic Initiative Sponsors are listed below (with ASTC-members institutions indicated in bold).

• **Bay Area Discovery Museum, Sausalito, California**
  Fellow: Amparo Leyman Pino, director of educational content and programming
  Sponsor: Karyn Flynn, CEO and executive director

• **Botanic Gardens Conservation International, Richmond, England, United Kingdom**
  Fellow: Julia Willison, director of education
  Sponsor: Kathy MacKinnon, board member

• **Children’s Museum of Pittsburgh**
  Fellow: Chris Siefert, deputy director
  Co-sponsor: Bill Valenta, board member
  Co-sponsor: Jane Werner, executive director

• **ECHO Lake Aquarium and Science Center, Leahy Center for Lake Champlain, Burlington, Vermont**
  Fellow: Molly Loomis, director of education
  Sponsor: Phelan Fretz, executive director

• **Explora, Albuquerque, New Mexico**
  Fellow: Kristin Leigh, deputy director
  Sponsor: Joe Hastings, executive director

• **International Centre for Life, Newcastle Upon Tyne, England, United Kingdom**
  Fellow: Andy Lloyd, head of special projects
  Sponsor: Linda Conlon, chief executive

• **Miami Science Museum**
  Fellow: Jennifer Santer, vice president of content and programs
  Sponsor: Frank Steslow, chief operating officer

• **Montshire Museum of Science, Norwich, Vermont**
  Fellow: Jennifer Rickards, associate director
  Sponsor: David Gaudy, executive director

• **Museum für Naturkunde, Berlin**
  Fellow: Katrin Vohland, senior scientist
  Sponsor: Johannes Vogel, director general

• **National Museum of Natural History, Smithsonian Institution, Washington, D.C.**
  Fellow: Barbara Stauffer, acting chief of programming and partnerships
  Sponsor: Shari Werb, director of education and outreach

• **Ontario Science Centre, Toronto**
  Fellow: Karen Hager, director of science engagement
  Sponsor: Lesley Lewis, CEO

• **Saint Louis Science Center, Missouri**
  Fellow: Jennifer Heim, director of strategic planning and projects
  Sponsor: Bert Vescovani, president/CEO

• **Sciencenter, Ithaca, New York**
  Fellow: Tim Scott, associate director for program
  Sponsor: Charlie Trautmann, executive director

• **ScienceCenter-Network, Vienna, Austria**
  Fellow: Barbara Streicher, executive manager
  Sponsor: Josef Fröhlich, board member

• **spectrUM Discovery Area, the University of Montana, Missoula**
  Fellow: Ric Trautt, director
  Sponsor: Joe Hastings, executive director

• **Thinktank—Birmingham Science Museum, England, United Kingdom**
  Fellow: Janine Eason, director of learning and operations
  Sponsor: Graham Allen, trustee, Birmingham Museums Trust

• **The Works, Bloomington, Minnesota**
  Fellow: Jill Measells, CEO
  Sponsor: Katy Kolbeck, trustee
WE'VE MOVED!
After 22 years in the same location, ASTC’s headquarters office in Washington, D.C., opened for business on May 1 in a new space, albeit just a few blocks away. ASTC now occupies an entire floor of an office building down the street from the White House, and the move will provide more room for growth, collaboration, and space to welcome our members and visitors. Our new address is: 818 Connecticut Avenue NW, 7th Floor, Washington, DC 20006. Our phone and fax numbers remain the same (phone: (202) 783-7200, fax: (202) 783-7207).

COMMUNITIES OF PRACTICE NEWS
The ASTC Volunteer Managers Community of Practice (CoP) launched its LinkedIn discussion group, which currently has more than 50 members. The group will host monthly discussions on topics of interest to those who work with science center and museum volunteers, including recruitment, training, and retention.

The Evaluation CoP is hosting a book club for new and established evaluators. Every two months they will be hosting a webinar to discuss the readings. The text for the first two discussions is Practical Evaluation Guide: Tools for Museums and Other Informal Educational Settings (2009) by Judy Diamond, Jessica J. Luke, and David H. Uttal.

The Giant Screens CoP is now on ASTC Connect (connect.astc.org).

For more information, or to join any of ASTC’s CoPs, email profdev@astc.org.

notes from astc

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Visit ASTC’s website to access extended content from our award-winning magazine, Dimensions. You can find podcasts and full transcripts of our Q&A interviews (www.astc.org/blog/category/astc-dimensions/q-and-a), as well as extended responses to Viewpoints questions (www.astc.org/blog/category/astc-dimensions/viewpoints) and expanded versions of some feature articles (www.astc.org/blog/category/astc-dimensions).

In addition, back issues of Dimensions are available for free at www.astc.org/blog/category/astc-dimensions one year after publication and may also be searched via informalcommons.org.

ASTC’s Board and staff wish to thank our Partners for their leadership and generosity. We are truly grateful for their visionary support.

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notes from astc
Looking for a new traveling exhibition?

Visit ExhibitFiles.org for the latest traveling exhibitions available for your museum. You'll find exhibition listings, photos, floor plans, and more!

Contact Wendy Hancock at exhibits@astc.org for details, rates, and answers to all of your questions.
Join us at The National Conference this June to advance the agenda for change in STEM education, policy and workforce development. Leaders in business, education and government will collaborate to create an impact to fill jobs now and advance the future of the STEM workforce.

Reserve your place today.

www.USNewsSTEMSolutions.com
Great Lakes Science Center, Cleveland, Ohio, has named Kirsten Ellenbogen as its new president, effective May 6. She succeeds Linda Abraham-Silver, who stepped down in July 2012 after serving as the center’s president and CEO since 2004. Don Paterson had filled the role of interim president. Ellenbogen was most recently senior director for lifelong learning at the Science Museum of Minnesota, St. Paul, and has served as president of the Visitor Studies Association and as a Noyce Leadership Fellow. She will continue her work as co-principal investigator at the Center for Advancement of Informal Science Education (CAISE).

Michelle B. Larson is the new president of Chicago’s Adler Planetarium. She began her term in January, succeeding Paul Knappenberger, who retired after 21 years. An astrophysicist and science educator, Larson came to the Adler from Utah State University, where she was vice provost and professor of physics. Prior to that, she was deputy director of the Center for Gravitational Wave Physics at Pennsylvania State University.

The Field Museum, Chicago, appointed Richard Lariviere as its president and CEO in October 2012. Lariviere was formerly president of the University of Oregon and has also worked as executive vice chancellor and provost at the University of Kansas, as well as dean of the College of Liberal Arts at the University of Texas at Austin.

The EcoTarium in Worcester, Massachusetts, announced Joseph P. Cox as its new president last July. He was previously founding executive director of the Golisano Children’s Museum of Naples, Florida. Cox replaces Stephen M. Pitcher, who had served as the EcoTarium’s president since 2005 and will continue his career in nonprofit transitional management.

Luke Swetland became the new president and CEO of the Santa Barbara Museum of Natural History, California, in January. He most recently served as interim head of the Autry National Center of the American West in Los Angeles, where he had been vice president since 2008. He has also worked at the Henry Ford, Dearborn, Michigan. Swetland replaces Karl Hutterer, who retired after more than 12 years of service.

In February, Scott Sampson took the position of vice president of research and collections and chief curator at the Denver Museum of Nature & Science (DMNS). He was formerly chief curator at the Natural History Museum of Utah, Salt Lake City, and is known to TV audiences as “Dr. Scott the Paleontologist” on the PBS KIDS series Dinosaur Train. Sampson replaces Kirk Johnson, who left DMNS to direct the National Museum of Natural History, Smithsonian Institution, Washington, D.C.

The American Association for the Advancement of Science has elected Dennis Schatz as a Fellow in its Education section. Schatz is senior vice president for strategic programs at Pacific Science Center, Seattle, and currently is on temporary assignment as a program director at the (U.S.) National Science Foundation.

U.S. President Barack Obama has appointed Paula Gangopadhyay to the National Museum and Library Services Board. Gangopadhyay is chief learning officer at the Henry Ford, Dearborn, Michigan.

Kim L. Cavendish, president and CEO of the Museum of Discovery and Science, Fort Lauderdale, Florida, has been elected to chair the Giant Screen Cinema Association. She will serve a two-year term.
Eyes on the Skies (EOS) at Toronto’s Ontario Science Centre is a rollicking planetarium program designed for children under age 5. The program introduces the night sky through songs, connect-the-dot constellations, and a journey to the moon. Participants receive a “moon-landing” certificate and a follow-up activity guide.

EOS has been a huge success that packs our planetarium. And every time I see it, I think about how sometimes there’s nothing as rewarding—or fun—as discovering when you’re wrong.

For years I resisted the idea of creating a planetarium show for toddlers. They squirm, get restless, and make noise. Spooked by the dark, they cry and have to leave. It’s a disaster. Besides, how can you explain science to a two-year-old?

Thank goodness for Alice Enevoldsen from Seattle’s Pacific Science Center, who showed me the error of my ways. During a tour of her center’s planetarium, Enevoldsen raved about Preschool All-Stars, remarking they had members who came regularly just for the show. The goal was not to teach toddlers science, but to give them a positive experience under a night sky—early exposure that primes a new generation of planetarium visitors.

Inspired by Enevoldsen’s success, I enlisted two Ontario Science Centre hosts with early childhood education training: Roshelle Filart and Sean Lee Ying. Together with programmer Zoran Miscevic, we created a loose outline that evolved into a specific talking points around which presenters are encouraged to improvise. And that’s our key ingredient: the presenters. Each is comfortable with (literally) getting on the ground with a group of children, singing loudly, acting silly, and improvising on the fly.

1) **Toss out your preconceptions.** Changing our thinking about what’s “appropriate” planetarium behavior has been critical. Talking and moving around are encouraged. And the presenter—who’s in front rather than speaking from a control console in the back—asks questions at every opportunity to keep toddlers engaged.

2) **Let the audience be your guide.** Kids and caregivers quickly showed us what worked. We learned counting out loud was a great way to engage an entire audience when pointing out stars in a constellation. For children who are afraid of the dark, we’ve started passing around “Co-pilot Moonie,” a stuffed glowworm toy. One group taught us “Zoom, Zoom,” a high-energy ditty about taking a rocket to the moon. It was fun and fit the narrative, so we added it. To our delight, test groups suggested new interpretations of the constellations, including Leo as a mouse, and the Big Dipper as a kite. Our graphics department created cartoon overlays to reflect what the children saw in the sky.

3) **Find the right presenters.** Our 20-minute script follows specific talking points around which presenters are encouraged to improvise. And that’s our key ingredient: the presenters. Each is comfortable with (literally) getting on the ground with a group of children, singing loudly, acting silly, and improvising on the fly.

If you would like to write about what your institution has learned from a project in exhibit development, education, finance, and/or operations, contact us at dimensions@astc.org (subject line: What We Learned).

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**Sara Poirier** (sara.poirier@osc.on.ca) is an astronomer and researcher/programmer at the Ontario Science Centre in Toronto, Ontario, Canada.
Blue Telescope uses technology, storytelling, and design to create engaging interactive exhibits and experiences. From multi-touch and mobile apps to games, quizzes, and social interactives, our innovative solutions use the latest technology to educate, communicate, and connect with your visitors.
Should science centers prioritize adult-oriented programs? What are the benefits and challenges of such programs?

**Prioritize? No.** However, programming for adults should be part of every science center’s public program schedule. Having some form of programming for adults results in a community that is more likely to discuss issues of science and technology.

**Jared Wilkins**, visitor programs manager, Questacon—The National Science and Technology Centre, Canberra, Australia

Science centers should absolutely prioritize adult-oriented programming. Our recent findings show that adults of all ages want more opportunities to enjoy an intellectual evening out with friends. It can be challenging, particularly in a smaller community, to predict audience participation. We’ve enjoyed success by ensuring visitor “buy-in” with popular topics.

**Lora Clausen**, staff scientist, Science North, Sudbury, Ontario, Canada

It is not only the role of the science center, but also its moral obligation, to educate the adult public about science. The lives of future generations depend on it, as we are living in an era of climate change and dwindling biodiversity. Adults model behavior for their children, so it is their patronage that is essential. The real challenge is to capture adults’ attention. Science centers need programs like digital media labs, cultural mash-ups, young entrepreneur centers, and games for social change.

**Eli Kuslansky**, founding partner and chief strategist, Unified Field, New York City

When we hold cool events for adults, where kids aren’t allowed, we send a strong message that says we want grown-ups to feel welcome, too. Adults need to nurture their curiosity, creativity, and critical thinking skills as much as kids do. We love adult

Visitors enjoy a Scitech After Dark adults-only event in Perth, Australia, in connection with the exhibition Rescue. Photo courtesy Scitech
Exhibits.nl is a leading supplier of interactive exhibits, operating worldwide to the highest quality standards. Our exhibits are innovative, fun, educational and above all, of a world class built quality.

We have been running adults-only nights twice a year ever since we realized there must be an increasing number of young people who had experienced Scitech as children, but hadn’t returned because they felt that the center was just for kids. Even though families with young children will continue to be our primary target market, we believe it’s valuable to engage young adults to foster an appreciation of the value of science.

*Kate Elder,* director of communications and marketing, Scitech, Perth, Australia

Visit [www.astc.org/blog/category/astc-dimensions/viewpoints](http://www.astc.org/blog/category/astc-dimensions/viewpoints) for an extended discussion of this question. The above statements represent the opinions of the individual contributors and not necessarily the views of their institutions or of ASTC.

**Tell us:** When are evaluation and other visitor feedback strategies the most useful for helping advance a science center’s mission? When are such strategies less successful? Email dimensions@astc.org (subject line: Viewpoints), or post on our Facebook page ([www.facebook.com/ScienceCenters](http://www.facebook.com/ScienceCenters)). Include your name, title, and institution. Responses may be printed in a future issue and/or on our website. We reserve the right to edit responses for publication.
Making it Personal

Free-choice learning is the hallmark of science centers and interactive museums. But many institutions are taking this idea a step further by exploring strategies for personalizing the visitor experience—before, during, or after the visit. Some approaches are high tech, like compiling a visitor’s on-site experiences onto a personalized webpage. Others are low tech, such as delivering exceptional visitor service. Personalization projects have many goals, including enhancing learning, inspiring emotional connections and behavior changes, and building a sense of ownership. In this issue, we look at a variety of personalization approaches and tools, and examine their impact.
Solar Energy Powers the Museum

Solar Panels Cover Our Roof

There are 2,978 solar panels on the Museum's roof. Combined, these panels can produce up to 2,300 kilowatts of power, or 9,960 kilowatt hours per year for the Museum. The power is used first to power the Museum; any extra will be sold to Rocky Mountain Power to help fulfill the needs of the grid.
“Every visitor is a VIP” was a motto that guided our work at the Tech Museum of Innovation in San Jose, California, when I headed up exhibitions and programs there almost a decade ago. For us, the phrase evoked an image of responsive exhibits that delivered special treatment normally reserved for a Very Important Person (VIP). We wanted a system that recognized each unique visitor, remembered language preferences, and stored and retrieved visitors’ data. The Tech Tags technology was launched in 2003, but was built on prior versions going back to 1998 and even earlier, when bandwidth was at such a premium that we sent visitors home with printed souvenirs and deleted their multimedia creations daily.
Nowadays, personalization strategies abound due to converging trends in smartphone adoption, global positioning systems (GPS), indoor location tracking, and content co-creation. Let’s take a look at some guiding principles for personalization of three stages of the visitor experience: planning a visit to your institution, spending time on site, and following up online after the visit.

**PLANNING A VISIT**

1. **Give visitors access to personalization opportunities before they visit.**
   Most personalization projects emphasize the “scrapbook” approach of saving videos and data captured during their experience or the “content tagging” approach of gathering links to further information. You may be surprised to learn that in a 2007 survey of over 1,500 respondents, conducted by Chicago’s Museum of Science and Industry, visitors expressed more interest in personalization opportunities ahead of their visit and less interest in postvisit strategies.

2. **To maximize learning, familiarize visitors with your facility first.**
   Research studies have shown that students learn much more on a field trip when they receive prior orientation (“novelty reduction”) about logistics and the physical layout of the site (Balling & Falk, 1980). In one example of previsit personalization, Chicago’s Shedd Aquarium offers a series of 10 different self-guided tours, tailored to different group profiles, on its website (www.shedd aquarium.org/sheddmap.html).

3. **Look for ways to co-create.**
   As museum strategy consultant Bill Booth phrased it, “We need to shift our thinking from *for* visitors to *with* visitors. From *good* for them to *ideas from* them.” How might we engage people in creating digital content before their visit (or between visits) and give them access to it on site?

**THE ON-SITE EXPERIENCE**

1. **Tailor the experience to visitors’ personal motivations.**
   Not all visitors come to you in search of content, so it is worth reviewing John Falk’s research (2009) on categories for understanding visitors’ motivations, paraphrased here: Explorers (curious learners), Facilitators (hosts or parents), Experience Seekers (those making a beeline for the *Mona Lisa*), Professionals/Hobbyists (content specialists), and Rechargers (those looking to relax).

2. **Link visitors to opportunities based on their location or time of visit.**
   Help them find a bathroom on their route to the planetarium. Suggest nearby exhibits with the aid of a recommendation engine. Or factor in the time of day: The Audubon Zoo in New Orleans is exploring whether to use electronic labels to point out animal behaviors based on the time of day, temperature, or season.

3. **Don’t segment your audiences in a way that limits access.**
   In the 1990s, a team at Philadelphia’s Franklin Institute installed networked exhibit displays that provided separate tracks of information for young children, older children, adults, and teachers. According to project director Ann Mintz, visitor feedback prompted exhibit planners to provide everyone with access to all four tracks of information, and 40% of adults accessed the content for children at least some of the time.

4. **Offer something fresh that couldn’t be achieved without technology.**
   For example, *Expedition Health* at the Denver Museum of Nature & Science features a personalization strategy described by exhibition designer Jeff Kennedy: “Visitors to the exhibition choose one of nine ‘buddies’—real people who were filmed documentary-style—to accompany them during a virtual trek up Mt. Evans.”

5. **Research and address privacy concerns.**
   For *Expedition Health*, evaluator Jeff Hayward determined that 28% of visitors expressed concerns about privacy associated with storing and calling up their health information on a subsequent visit. However, nearly everyone (93%) was comfortable with the idea of using all visitors’ data anonymously for comparison purposes.

**AFTER THE VISIT**

1. **Don’t expect more than 10% of your visitors to follow up online.**
   Test your assumptions to avoid investing too much money in personalization initiatives with limited reach. A survey of institutions conducted by Filippini-Fantoni and Bowen (2007) indicated...
that only 1–10% of visitors tended to make it through the two-step process of using a tagging system on site and retrieving the content online after the visit. Most of the numbers hovered closer to 1–3%. My impression is that a robust experience on site leads to more follow-through online. For example, Chicago Children’s Museum visitors spend over 15 minutes building a skyscraper in the exhibition Skyline and producing a multimedia storybook about the experience. Roughly 27% of these visitors access the content online.

2. Email it home. Filippini-Fantoni and Bowen found that the term “bookmarking” was not meaningful to visitors, but the idea of emailing content to oneself was relatively clear. An email also serves as a convenient reminder and link to postvisit materials.

3. Get to know the people who make it back to your website. As Steve Silverman of Green Grid Analytics and Strategy Group pointed out, the people who filter through this sieve are the ones most easily nudged along a continuum from a first-time visitor to a loyal member, or from awareness of your mission to action on your behalf. Greet them with enthusiasm when they log in, and take this opportunity to engage them further.

GO FORTH AND PERSONALIZE . . . SENSIBLY

Personalization has the potential to benefit a large percentage of your visitors—or a small sliver. It can add genuine value to the experience—or simply duplicate activities people can accomplish with readily available cameras and search engines. Strike a balance between visitor motivations and your own. Allocate your resources sensibly to reach the most people. Use the technology to deliver an experience you couldn’t accomplish any other way. Have fun with it!

And one last thing: The next time I visit your institution on site or online, I expect VIP treatment. Keep an eye out for me.

REFERENCES


Rachel Hellenga is a Chicago-based consultant and principal of Hellenga Projects. For more of her thoughts on personalization, contact her at Rachel@hellengaprojects.com or visit her blog at www.hellenga.com.
Personalizing Visitor Service in a Small Museum

By Jennifer Jenkins

WonderLab Museum of Science, Health and Technology in Bloomington, Indiana, strives to be not just a destination, but also a valuable community asset. Open since 2003 in its current downtown location, WonderLab (www.wonderlab.org) is a small museum—7,600 square feet (700 square meters) of gallery space—with fewer than 15 full-time staff but more than 1,000 volunteers. Located in a small college town in mainly rural southern Indiana, WonderLab welcomed more than 85,000 visitors in 2012 and has 1,680 member families. We are fortunate to serve a core group of visitors who support the museum and our mission to create experiences that share the wonder and excitement of science with the public.
To ensure that WonderLab continues to be highly valued by the community, we work to keep each visitor engaged and invested in the museum. Meeting this challenge can be achieved by offering visitors individualized interactions with staff and volunteers. Consistently stellar visitor service can be the calling card for smaller museums such as WonderLab.

ACHIEVING EXCELLENT VISITOR SERVICE

At WonderLab, we provide visitor service training based on tenets such as honesty, anticipation of needs, and sincere personal interactions. Our goal is to have staff and volunteers share these values with every museum visitor, and in so doing make visitors feel that their experience at our museum is exceptional.

We train staff and volunteers to:

- **Anticipate needs.** Observant staff and volunteers can anticipate visitors’ needs and provide proactive assistance. Simple gestures such as holding the door for a parent with a stroller, offering a funny distraction to help a parent soothe an upset child, or finding a seat for an elderly visitor are all ways we personalize attention.

- **Use their own style.** Everyone differs in his or her approach to resolving issues and interacting with the public, and we encourage staff and volunteers to play to their strengths to meet the challenges of daily museum life. Although staff is expected to excel in all interactions, we promote a more individual approach for volunteers. Some volunteers relate best to children, so their approach is based on meeting a child’s needs, while others prefer to interact primarily with adults. Some feel most comfortable with their knowledge of our science exhibits, so they base interactions on providing information and learning opportunities.

- **Focus on the individual.** We encourage staff to get to know and remember individual visitors. For example, members appreciate staff remembering their names so they don’t have to find their membership cards at check-in. We also like staff to remember the interests of members’ children so they can make suggestions for camps, programs, and activities. We support this individual focus by creating a consistent schedule for a core group of staff and volunteers, so that staff, volunteers, and regular visitors come to know each other. The familiarity between these groups makes personalizing service more efficient and genuine.

- **Engage visitors.** By starting conversations with visitors based on personal experiences, staff can begin to find common ground. We encourage staff and volunteers to engage visitors about the activities they are doing in the museum, as well as to ask what science concepts and exhibits they enjoy or would like to see in the museum in the future.

In both staff and volunteer training, we present concrete examples to illustrate how to interact with visitors, using role-playing, conversational icebreakers, and science knowledge. New staff members receive one-on-one training from seasoned staff who can impart both their experience and their passion for their job. Volunteers receive group training that creates a sense of teamwork and the knowledge that they can rely on other volunteers and staff to make the museum experience fun and exciting for all visitors. We keep staff and volunteers apprised of new and revised procedures through email, printed materials, and subsequent training, as needed.

THE VALUE OF PERSONALIZING VISITOR SERVICE

Excellent visitor service benefits the museum in many ways. The value of personalizing visitor interactions is reflected immediately through higher attendance, membership sales, and retail sales. The impact broadens as we develop relationships within the community to recruit board members, attract donors and program partners, and generate fundraising opportunities. By reaping the benefits of dedicated and invested community partners, the museum can grow, create new exhibits, and offer innovative programs.
Personalizing visitor experiences is an area where small museums can excel. Having a small, dedicated staff allows us to create well-developed relationships with repeat visitors.

At WonderLab, personalized visitor service is also an invaluable tool in museum security. By paying attention to every visitor’s arrival at the museum and experience in the gallery, staff and volunteers stay aware of potentially unsafe situations. Personalizing visitor experiences is an area where small museums can excel. Having a small, dedicated staff allows us to create well-developed relationships with repeat visitors. It also allows each staff person to be more broadly knowledgeable about museum operations, which enables staff at all levels to resolve issues and educate visitors.

A small, loyal staff working together as a team creates an atmosphere that puts visitors first, because all staff members work with the same goals in mind. At WonderLab, we frequently re-evaluate our organizational goals and procedures for training staff so that we can grow and change with the community. Visitors’ needs also change over time as children age and families grow. A museum that focuses its resources on the needs of the individual visitor can continue to be a highly valued community asset for years to come.

Jennifer Jenkins (vsm@wonderlab.org) is visitor services manager at WonderLab Museum of Science, Health and Technology in Bloomington, Indiana.
21-Tech: Engaging Museum Visitors Using Mobile Technologies

By Keith Ostfeld

Society has reached a point where everyone desires customized services and products—from coffee to computers to museum experiences—that meet their needs, expectations, and aesthetics. With today’s easy access to phenomenal computational power through personal mobile technologies (PMTs) like smartphones and tablets, we have new avenues to customize museum experiences. How can we best leverage the high accessibility of PMTs to personalize and deepen the visitor experience?

Over the past two years, the 21-Tech project collaborative has been investigating this question. The project is led by the Children’s Museum of Houston, in partnership with the Lawrence Hall of Science, University of California, Berkeley; New York Hall of Science, Queens; Oregon Museum of Science and Industry, Portland; and Sciencenter, Ithaca, New York. Funded by a three-year (2011–2013) grant from the (U.S.) Institute of Museum and Library Services, the 21-Tech project team is researching effective methods for museum frontline staff to use PMTs as facilitation tools at specific exhibits.

WHAT 21-TECH IS AND ISN’T

First and foremost, 21-Tech is about museum facilitators using PMTs to enhance and advance hands-on learning, not replace it with screens. Even great apps that clearly demonstrate a concept are not used if they pull the visitor away from the hands-on experience. Next, 21-Tech gathers learning and experience scaffolds for use with specific exhibits; it is not developing resources like a cell phone tour or mobile map for an entire museum visit. In addition, each focal exhibit has several associated apps so that facilitators can customize the experience for visitors. Finally, 21-Tech uses existing apps and resources rather than creating new ones.

We’ve tested over 100 apps related to the project’s target exhibits and installed many onto facilitators’ PMTs. Additionally, we’ve loaded the PMTs with existing digital media (e.g., images, videos, and websites) in order to provide multiple access points for facilitators. For example, at one exhibit, visitors are encouraged to build and test paper airplanes. In addition to an app that shows how to build several paper airplanes and another with a wind tunnel simulator, a facilitator’s PMT has images of other paper airplane designs, a diagram of an airplane’s parts, and a video of how airplanes fly. These tools allow the facilitator to work with visitors through several potential interactions.

LESSONS LEARNED

When the project launched in 2011, our team had somewhat naive notions about the ease of implementation: Buy a device, load it with quality apps, and give it to staff to use with visitors. Our learning curve has been steep, and we’ve gained some...
valuable knowledge that will benefit others who adopt this model of PMT use.

The 21-Tech team primarily uses iPads because, when the project started, they provided the size, speed, efficiency, functionality, and app depth that we needed. Once we identify a suitable app, our education and frontline staff develop interaction strategies and test them with visitors. When we have finalized successful strategies for app/exhibit matches, we create “cheat sheets” to familiarize staff with the app and how it relates to the exhibit’s content. Some of our preferred apps are in an “app gallery” on the project website (www.21-Tech.org).

Investments in infrastructure, hardware, and software are only part of the puzzle. The other critical component is a commitment to training. One of the project’s key findings is the substantial amount of training needed for museum facilitators to become adept at approaching visitors, have adequate exhibit and app content knowledge, and understand how to move back and forth easily among the apps on the device and between the device and the exhibit.

While each project partner developed their own system of training due to different types of frontline staff, all training has four main areas:

1. **Hardware training** familiarizes frontline staff with the PMT device, including tips and tricks. (Allow 1–2 hours, depending on the individual’s level of competence.)

2. **Content training** allows staff to explore the apps, understand and make connections to the exhibit’s content, and experiment at the exhibits. Frontline staff rate this aspect of training most highly. (Allow 30 minutes per app.)

3. **Facilitation training** uses role-playing to model different approaches, methods of integration, and exit strategies for using PMTs at exhibits. (Allow 1–2 hours.)

4. **Immersion training** uses a reflective practice methodology where staff pairs (one facilitating,
one observing) discuss visitor interactions, including what went well and points for improvement. (Allow 1–2 hours.)

PRELIMINARY 21-TECH EVALUATION FINDINGS
In a recent survey conducted by project evaluator Cecilia Garibay, more than 90% of visitors agreed that the 21-Tech tablet experience enhanced their interaction with the exhibit, and 80% said they would look for facilitators with PMTs at other exhibits. All project findings to date are publicly available on the project website.

Incorporating PMTs into facilitation requires investments on many levels. However, the payoff in improving the visitor experience is immeasurable; we have found that most visitors have valuable learning experiences and can often verbalize connections to prior and future experiences. As one visitor put it, “[The app] really made it much easier to understand what [the facilitator] was saying and what the exhibit was showing me. I want to get it so we can explore it more at home.”

We post weekly updates to the project website. Please join us in the conversation and exploration. We’re happy to share your findings, as well.

Keith Ostfeld (kostfeld@cmhouston.org) is director of educational technology and exhibit development at the Children’s Museum of Houston.
On a Florida beach, on January 14, a beachgoer spotted a juvenile green sea turtle, tangled in fishing line. One end of the line was wrapped around the young turtle’s right front flipper, and the other end was attached to driftwood and a picnic table. The turtle also had line coming out of its mouth. With a shell 15 inches (38 cm) long, the turtle is approximately 5 years old. Later named Mahi, meaning “strength” in Hawaiian, this turtle was transported to the Jekyll Island Authority’s Georgia Sea Turtle Center (GSTC, www.georgiaseaturtlecenter.org) for treatment.

Dive Deeper: A Personal Immersion Experience with Sea Turtles

By Kira Stearns

On a Florida beach, on January 14, a beachgoer spotted a juvenile green sea turtle, tangled in fishing line. One end of the line was wrapped around the young turtle’s right front flipper, and the other end was attached to driftwood and a picnic table. The turtle also had line coming out of its mouth. With a shell 15 inches (38 cm) long, the turtle is approximately 5 years old. Later named Mahi, meaning “strength” in Hawaiian, this turtle was transported to the Jekyll Island Authority’s Georgia Sea Turtle Center (GSTC, www.georgiaseaturtlecenter.org) for treatment.

Living on land, people may find it difficult to fully comprehend the hurdles sea turtles face throughout their life cycle. To help visitors at the GSTC understand sea turtles’ low chances of survival, we developed a self-guided, personalized activity that immerses visitors in the journey of a sea turtle’s life while they tour our exhibits. The activity is intended to help visitors connect with these animals on an emotional level, and we hope that it sparks behavior change. We would like visitors to leave our center with a resolve to act based on their new understanding of the consequences of littering beaches, disturbing nesting turtles, and damaging beach habitat.

A VISITOR’S JOURNEY AS A SEA TURTLE

The journey begins when visitors receive a bookmark with numbered circles that guide them around five exhibits highlighting specific aspects of a sea turtle’s life history, such as nesting and human-associated threats. At each exhibit, visitors can learn about sea turtles at the interactive displays and then emboss their bookmark with their choice of one of several unlabeled stamps at the corresponding station. At each station, one stamp produces an image showing an ideal situation, and the others show less favorable situations. For example, the first exhibit describes turtle nesting habitat, and depending on which of four stamps visitors choose, their “turtle-self” is a hatchling in a nest laid above the high tide line, below the high tide line, underneath artificial light, or in vegetation. A panel above the stamps explains the hatchling’s likely fate in each nest location.

This simple, low-tech activity focuses attention on the intended path around the displays and engages visitors to think about what is happening to them as a sea turtle, as well as about human impacts to turtles and their environment. With their bookmark stamps, visitors might discover that despite
beginning in less than ideal conditions—such as hatching in a nest laid under artificial light, which can confuse hatchlings’ sense of direction while trying to reach the ocean—they have beaten the odds and are one of the 4,000 hatchlings that survives to become a mature adult turtle. Other visitors might find that despite hatching in an ideal nest site and making it to the ocean, they live to be only a one-year-old hatchling that succumbs to a predator or gets tangled in marine debris.

A visitor’s journey culminates at the rehabilitation hospital pavilion housing sea turtle patients beating the steep survival odds with the aid of a dedicated team. Here, our veterinarian removed the fishing line from Mahi’s gastrointestinal tract and amputated Mahi’s right front flipper. Remarkably, Mahi returned to swimming in deep water and eating within days.

LESSONS LEARNED AND KEY DESIGN ELEMENTS

When the center first opened in 2007, we gave visitors a passport-like booklet with a page for each station and “fun facts.” We quickly learned that the booklets were costly to produce, and despite being recyclable, they created lots of waste, contradicting our efforts to be “green.” In 2009, we decided to create a single-page bookmark to reduce waste and costs yet maintain the interactive nature of the activity.

We have also realized that many of our regular visitors learn where the ideal-situation stamps are located, so to keep the activity fresh and maintain the randomness in how a visitor’s “turtle life” plays out, we made the stamps movable and regularly rearrange the choices.

For such an activity to be effective, the stations must give relatively broad information and use a mixture of pictures and text to appeal to visitors of all ages while still conveying the key message. We incorporated elements of universal design by ensuring adequate space at the stations while placing each one close enough to its corresponding exhibit to maintain a connection. We also located the stamps at a height where children and visitors in wheelchairs can access them. Last year, we added brightly colored carpet circles in front of each station to draw visitors’ attention, particularly those with visual impairments.
Together, the personalized bookmark activity and the opportunity to observe sea turtle patients allow a connection to be made between visitor and turtle.

THE IMPACTS OF A PERSONAL EXPERIENCE

Together, the personalized bookmark activity and the opportunity to observe patients allow a connection to be made between visitor and turtle. We frequently observe visitors pausing in front of the stamp stations to think about what could happen if they get a certain outcome. Some even verbally express their hope for a particular stamp, reinforcing the randomness of survival. By the end of the self-guided tour, visitors have had an opportunity to “become” and view an endangered species facing many struggles. Visitors’ personal experiences often generate questions and conversations, so staff and volunteers are readily available to answer inquiries and help foster a deeper understanding of sea turtle ecology and critical thinking about the plight of these animals.

In reality, our visitors’ journeys are just beginning as they leave the GSTC with knowledge and understanding of sea turtle habitats and conservation challenges. We hope their experience will lead them to think twice about littering beaches or releasing balloons into the sky and to think more about reducing waste and recycling not only to help sea turtles, but also to improve the overall health of ocean environments.

Kira Stearns (kstearns@jekyllisland.com) is the educator at the Georgia Sea Turtle Center on Jekyll Island.
A Custom Fit: Personalizing Experiences Using Technology

At the grand opening of VilVite in Bergen, Norway, in 2007, we could already invite our visitors to personalize their experiences. Based on a system platform developed with Expology of Oslo, Norway, visitors can use a radio-frequency identification (RFID) card to initiate experiments and retrieve the experience (including video clips, pictures, and other data) on the VilVite website after the visit. The information is also available on terminals in the exhibition area. Use of the personalization is optional in many of our approximately 40 educational programs.

In one school program about energy production, students pedal a bicycle in order to produce the power needed to pump water through a turbine. The mechanical energy from the cycling is transformed into electrical energy. Both types of energy are measured and presented on a screen in real time as well as on a personal webpage. The students use the data to solve both physics and math problems back at school after the museum visit. All teachers surveyed gave the postvisit activities a score of 5 or better, on a scale of 1 to 6.

Svein Anders Dahl, managing director
VilVite, Bergen, Norway
In the 8,070-square-foot (750-square-meter) traveling exhibition *Imitation*, exhibits range from robots that imitate human behavior to counterfeit objects to spare parts for humans. Visitors receive a wristband with a unique RFID chip. The first time they use the wristband, they choose a language and enter their name, age, gender, and email address. From then on, each exhibit recognizes the visitor.

Visitors can compare their results in various activities with those of other visitors; this challenges them to do their best. In some exhibits, they can produce their own images, sounds, and videos, which are stored on a personal webpage. They can then continue their experience at home and share their results with friends via Facebook and Twitter. This sharing also generates free publicity for the exhibition.

An added advantage of the personalization is that we can track visitors to determine how many people took part in each exhibit, the average dwell time, and how these factors correlate to age and gender.

The exhibition is a co-production of Museon, the Hague, the Netherlands; VilVite, Bergen, Norway; Expology, Oslo, Norway; and Technopolis, the Flemish Science Centre, Mechelen, Belgium.

*Patricia Verheyden*, experience director
Technopolis, the Flemish Science Centre, Mechelen, Belgium

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The Natural History Museum of Utah is located along a popular hiking trail in the foothills of Salt Lake City. The physical setting, as well as metaphorical ideas about trails, permeated our thinking during architectural design and exhibit development. We created an overarching trajectory through the building, but we also invite audiences to choose their own trails each time they visit.

To enhance this personalized experience, we developed the *Trailhead to Utah*, an award-winning smartphone guide that enriches experiences inside the museum, links to a personal portal on the museum’s website, and offers connections to sites throughout the state.

We opened the museum in November 2011 with four thematic “trails” in the Trailhead to Utah system. Each theme includes nearly 20 stops. Early audience testing showed that most users enjoyed the personalized experience and liked using their own devices. However, because the smartphone guide is nonlinear, the notion of “trails” inside the museum can be confusing. When visitors understand the broader concept—an invitation to explore sites throughout the region—enthusiasm is high.

*Becky Menlove*, director of exhibits and public programs
Natural History Museum of Utah, Salt Lake City

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Photo by Stuart Ruckman
At NorthernLight in Amsterdam, the Netherlands, we often design exhibitions that include digital personalization before, during, and after the visit. Here are a few examples:

- With the app we are currently developing for the recently reopened Rijksmuseum, Amsterdam, visitors can receive a fully customized route based on a quiz to determine their preferences.

- At the Centre of New Enlightenment (TCoNE) at Kelvingrove Museum, Glasgow, Scotland, United Kingdom, students ages 10 to 14 use a smartphone on a journey through the museum to discover their own strengths. Evaluation showed that the experience increased students’ awareness of their traits. As they exit, students watch a movie personalized to their group, incorporating their results and photos taken as they were participating in the experience.

- We are now exploring ways to use in-classroom technology to personalize field trip preparation. Most Dutch classrooms are now equipped with digiboards. Connecting interactive digiboards to the science center could allow teachers to make use of orientation programs and arrange field trip logistics. In addition, students could be invited to ask their own questions, prepare reports, and design their own plans for exploring the science center. Our trial of such a digiboard app is showing promising first results.

**Esther Hamstra**, content manager
NorthernLight, the Experience Company, Amsterdam, the Netherlands

The National Museum of Mathematics (MoMath) opened in New York City in December 2012. From the beginning, founder Glen Whitney had a vision of bringing math to the masses in a new way, but critical to that vision was the ability to tailor the experience in personally meaningful ways.

Static signage found in most museums was set aside, replaced with “smart” electronic kiosks. Using RFID tags, exhibits “recognize” visitors, displaying information in their language and at their desired level.

The electronic signage has additional benefits. Content managers have the ability to modify signage on the spot, incorporating great ideas from visitors or even correcting errors. What better way to customize a visitor experience than for a visitor to see his or her feedback incorporated immediately into the fabric of the museum?

The concept is in its infancy, and there are still kinks to be worked out. RFID antennae need to be repositioned for some exhibits, and visitors need to be oriented to a new way of interacting with information. But after two months of experience, MoMath remains committed and energized.

**Cindy Lawrence**, associate director and chief of operations
National Museum of Mathematics, New York City
Upon entering the 2,500-square-foot (230-square-meter) traveling exhibition *Black Holes: Space Warps & Time Twists*, visitors are prompted to create their own Black Hole Explorer’s Card. This system is intended to enhance motivation and learning by increasing the personal significance of the exhibition, which was developed by the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts.

Each visitor selects a nickname, such as Galactic Seeker or Techno Genius, from a list of 12 first names and 12 second names. Visitors can scan their cards’ barcodes throughout the exhibition to collect and record images, movies, and their own predictions and conclusions. After their visit, they can access a personalized online journal of their experience.

The Explorer’s Card system also facilitates evaluation. We found that visitors who use an Explorer’s Card spend nearly twice as much time exploring the exhibition as non-card users and show evidence of significantly higher enjoyment and learning outcomes. However, students who are given preprinted Explorer’s Cards with preselected nicknames demonstrate significantly less engagement than those who personally choose their own identity. Overall, 10% of Explorer’s Card users visit their personal web journal, a relatively high “take-up rate” among projects similar to this, but a rate that does prompt questions about better linking the physical exhibition to later reflection.

Mary Dussault, science education project manager Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts

Heart Smart, a 1,500-square-foot (140-square-meter) exhibition, focuses on common risk factors associated with cardiovascular health. It includes opportunities for visitors to measure their blood pressure, take their waist circumference, calculate their body mass index (BMI), and take a lifestyle quiz. Other components explore heart-healthy behaviors, including stress management and physical activity. The exhibition was developed by the Miami Science Museum, working with the University of Miami and Jeff Kennedy Associates.

At a check-in station, visitors anonymously enter their own gender, age, and ethnicity/race information. Each visitor then receives a card with a unique barcode to activate each interconnected interactive station.

Tailored personalized health feedback is a distinctive feature of this exhibition. Each of the four health interactive stations provides visitors with brief health risk appraisals, constructed using algorithms based on gender and age. The visitor is able to view personal results immediately or later online. In a two-year follow-up, 55% of high school students who visited Heart Smart reported making at least one healthy lifestyle change because of their visit.

Sean Duran, vice president of exhibitions and design Miami Science Museum, Florida

To read an extended version of this composite article, visit www.astc.org/blog/category/astc-dimensions.
The QRator Project: Promoting Personal Meaning-Making in Museums

By Steven Gray, Claire Ross, Andrew Hudson-Smith, Melissa Terras, and Claire Warwick

Should we clone extinct animals? Is domestication ethical? How should museums balance the needs of their artifacts and the desires of their visitors?

At the Grant Museum of Zoology at University College London (UCL), visitors encounter questions like these on 10 iPads throughout the exhibit space, as part of QRator, a project of UCL Centre for Advanced Spatial Analysis (UCL CASA) and UCL Centre for Digital Humanities (UCL DH). The project, first installed at the Grant Museum in March 2011, aims to engage visitors actively in creating their own personal interpretations of museum objects and related issues. In addition, the QRator project explores how technology can create new models for personal meaning-making and two-way public interaction in museum spaces.
Each of the “big questions” posed by curators through the project’s iPads relates to the life sciences or museum practice and links thematically to an adjacent exhibit case. Visitors are invited to respond to these questions directly onto the iPad, via Twitter, or through an app downloaded to their own mobile devices. Off site, the public can reply to current and archived questions through the project website (www.qrator.org). All these comments become part of the exhibit, creating interactive “living” labels that subsequent visitors can read and respond to in real time.

This article will focus on the integration of the QRator project into the Grant Museum, which houses one of England’s oldest natural history collections. UCL is rethinking what a university museum can be: a place not simply for a passive experience, but also for dialogue and debate. Although this article will concentrate on a natural history museum, issues of personal meaning-making and co-creation of content are applicable to any museum. (QRator was rolled out in February at a second museum: London’s Museum of Brands, Packaging, and Advertising).

**TALES OF THINGS**

The QRator project is an extension of the Tales of Things project (www.talesofthings.com), a collaboration between Brunel University, Edinburgh University, University of Dundee, University of Salford, and UCL CASA. Tales of Things allows users to attach their memories and stories to any object and share them with other users. The system uses Quick Response (QR) codes, which can be printed out and physically attached to the object.

Through the QRator project, each question is stored as an object in the Tales of Things database. In the same way that users tag their memories to physical objects, museum visitors tag their comments to the question.

**STAYING ON TOPIC**

Between March and November 2011, visitors entered a total of 2,784 comments into the Grant Museum’s QRator system. The majority of the comments fell into two main categories: about the museum (42%) and about the question posed by museum curators (41%).

Some QRator questions produced higher levels of on-topic comments than others. The question “Is it ever acceptable for museums to use replicas?” received the most on-topic contributions (170 comments), followed by “Can keeping pets be justified given their impact on wildlife?” (154 comments) and “Should human and animal remains be treated any differently in museums like this?” (146 comments). This is likely because these questions were direct and easy to associate with visitors’ previous personal experience and perspectives. In comparison, the question, “What makes an animal British?” received a lower number of on-topic posts (87 comments), possibly because the question prompted visitors to think more scientifically.

**RADICAL TRUST IN THE VISITOR COMMUNITY**

The relative lack of spam and inappropriate commenting (“noise”) is surprising (19%). Many museums have been hesitant to open up communication to greater visitor participation. There is an ingrained fear that visitors will leave inappropriate comments (Russo et al., 2008) despite research showing that
Many museums have been hesitant to open up to greater visitor participation. The QRator project has, however, adopted the concept of “radical trust.”

museum visitors want to engage with complex topics along with staff and other visitors (Kelly, 2006). The QRator project and the Grant Museum have, however, adopted the concept of “radical trust”:

Radical trust is about trusting the community. We know that abuse can happen, but we trust (radically) that the community and participation will work. In the real world, we know that vandalism happens but we still put art and sculpture up in our parks. As an online community we come up with safeguards or mechanisms that help keep open contribution and participation working. (Fichter, 2006)

Inherent in the term “radical trust” is the suggestion of a previous lack of trust shown by museums toward visitors, but also the admission that such trust is regarded as new and perhaps dangerous. Nevertheless, the QRator data suggests that radical trust in visitors does indeed work: Spamming and inappropriate commenting does not appear to have been a significant issue at the Grant Museum. (We allow messages to be uploaded immediately, but museum staff regularly monitors the posts and deletes inappropriate content. We also present “CAPTCHA” challenges that require users to prove they are human, thus cutting down on spam from automated bots.)

ANALYZING VISITOR CONTRIBUTIONS

Using Voyeur (voyeurtools.org), a text analysis tool, we found that the most frequently used words in the QRator data were: animals (288), like (218), museum (186), think (159), and love (148). These words seem to highlight positive visitor contributions as well as the key topics discussed, the natural history specimens,Through interactive museum labels, installed on iPads at University College London’s Grant Museum, curators pose questions to visitors and give brief background information on the issue at hand. Image courtesy Steven Gray, UCL CASA.
the museum, and the action QRator is encouraging visitors to undertake.

The length of comment may also be used as an indicator of engagement, if we assume that those who are interested in a topic may write at greater length. The noise category had an average of 4.07 words, comments on the museum had an average of 7.43 words, and visitor contributions on topic had an average of 15.37 words. This suggests that visitors were inspired by the questions to engage with topics in a relatively complex fashion.

Additionally, we used the sentiment analysis tool SentiStrength (sentistrength.wlv.ac.uk) to measure emotion in the visitor comments on a scale of 1 (no sentiment) to 5 (very strong positive/negative sentiment). The comments on the museum were on average more positive (2.04 positive), whereas the comments responding to the questions had an equal positive to negative response (1.52 positive; 1.55 negative). This result suggests more engaged texts often contain a mix of positive and negative sentiment, in contrast to less engagement, which is more likely to produce a single sentiment result.

FUTURE WORK
This article has aimed to introduce the concept of digital technology in museums as a way to co-create personal meaning-making and the construction of multiple interpretations inside museum spaces. Nevertheless, it is not until a strong research base has been developed that we will begin to truly understand the value of digital technology as tools for making meaning and creating a dialogue between visitors and museum staff.

REFERENCES

Steven Gray (steven.gray@ucl.ac.uk) is spatial software researcher and developer, University College London Center for Advanced Spatial Analysis (UCL CASA). Claire Ross (claire.ross@ucl.ac.uk) is research assistant, UCL Department of Information Studies (UCL DIS). Andrew Hudson-Smith (a.hudson-smith@ucl.ac.uk) is director, head of department, and deputy chair, UCL CASA. Melissa Terras (m.terras@ucl.ac.uk) is co-director, UCL Centre for Digital Humanities (UCL DH). Claire Warwick (c.warwick@ucl.ac.uk) is professor of digital humanities and head of department, UCL DIS. This article is adapted from a paper presented at the 2012 Museums and the Web conference (www.museumsandtheweb.com/mw2012/papers/enhancing_museum_narratives_with_the_qrator_pr).
Applying Simulations to Social Learning Experiences

By Eileen Smith, Michael Carney, and Kim Cavendish

In November 2011, visitors to the new EcoDiscovery Center wing at the Museum of Discovery and Science (MODS) in Fort Lauderdale, Florida, began exploring a series of stations developed for a project titled Water’s Journey through the Everglades. This project aimed to increase adolescents’ awareness and understanding of the environment, and water in particular, in South Florida. Funded by the (U.S.) National Science Foundation and led by E2i Creative Studio, a research lab at the University of Central Florida’s Institute for Simulation & Training (e2i.ist.ucf.edu) in Orlando, the Water’s Journey project brought together MODS’s creative team and E2i in designing, developing, and producing technology-based experiences to enhance exhibit learning in the museum’s new wing (wwwmods.org/exhibits/discovery.htm).
The stations take customization to a new level beyond traditional learning experiences at science centers by making the experience different each time; learners have a unique experience because they make different choices. Their choices pull different data from the system, thereby driving different results. The stations encourage social interaction while keeping each learner’s results unique, which encourages “What if?” discussions.

**DESIGNING OPEN-ENDED LEARNING SIMULATIONS**

We chose adolescents (ages 10 to 16) as the target audience, because they are frequently their family’s gatekeeper for accepting new technologies. The technologies in question are engaging, open-ended learning simulations, designed to stimulate learners to predict outcomes, discover possibilities through experimentation, and explore at their own pace, even repeating elements that keenly interest them. The simulations were based on science content from MODS’s education team and developed through an iterative design process. The process included front-end focus groups, prototype testing with target audiences, and formative evaluation looking at intuitiveness of the interfaces, appropriateness of the language used, and engagement level of the simulated scenarios.

Since museum learning is free choice, driven by the individual learner for as long as he or she is interested and engaged, we emphasized successful learning as perceived by the learner. The project team worked with the Institute for Learning Innovation in Edgewater, Maryland, for summative evaluation to gauge whether the project was able to (1) increase awareness of water’s role in the environment, (2) increase understanding of time scales and scope of environmental change, and (3) increase adolescents’ confidence in their ability to understand the relevance of science.

**WATER’S JOURNEY THROUGH THE EVERGLADES**

We designed 10 exhibit-enhancement simulations for four of the EcoDiscovery Center exhibit areas ([e2ist.ucf.edu/everglades](http://e2ist.ucf.edu/everglades)). In Otters at Play, two simulations allow learners to explore the impacts of human encroachment and invasive species, respectively, on one of Florida’s natural environments. Florida’s Water Story has four simulations where learners can explore the hydrologic cycle; how storms manifest in wet versus dry seasons; how water flows in a shallow sheet across the flat topography of South Florida; and how water levels impact the tree islands, one of the most important geologic formations in the Everglades. In Prehistoric Florida, two simulations address terrestrial and aquatic fossils, respectively, each showcasing virtual specimens and showing how Florida’s land mass has changed from prehistory to today.

In the Storm Center, two simulation
We have seen that, given the right design, learners create their own experience and take it to their own level according to their existing knowledge.

stations explore hurricanes and allow learners to interact with each other. Working together or separately, learners at the two stations construct a house and then see how it fares in a hurricane. The learner at one of the stations determines the storm’s intensity, size, and speed, and as the storm approaches, the learner at the other station must make choices, such as sand bagging, protecting windows, and removing potential airborne objects. The simulation is on a timer, mimicking the constrained preparation time in real hurricane situations.

After the storm has passed, an aftermath screen shows both learners detailed information about what happened. Although this screen contains a tremendous amount of information, we have found that learners read all of it, calling out to each other the various decisions the other person made. Typically, they want to run the simulation again and change the variables. We have observed this behavior at MODS and at other venues where we’ve displayed the hurricane simulation. Small groups of learners spend as long as 30 minutes with this simulation and exhibit rich discovery learning, including high-level predictive and reflective conversations.

**IMPACTS ON THE AUDIENCE**

Open-ended learning simulations give learners opportunities to play with the content and talk together about science as they manipulate variables and make decisions. We have seen that, given the right design, learners create their own experience and take it to their own level according to their existing knowledge. Within family groups, we also see adults mentoring youth, and families having discussions that could continue long after the museum visit is over.

Summative evaluation for Water’s Journey revealed that the simulations achieved the desired outcome of increasing the adolescent audience’s confidence in understanding the relevance of science. Adolescents could articulate how the environment was affected by water levels and how storm damage could be mitigated. They also described the necessity of caring for animals and the environment. The experiences supported social interaction between adults and youth and between peers. At many exhibits, the social interactions included goal setting, hypothesizing, problem solving, and observing results. The summative evaluation is available at informalscience.org/evaluation/show/629.

**OTHER AVENUES FOR CUSTOMIZING LEARNING**

As a university research lab, E2i explores learning and training not only in museums but also in K–12 classrooms, out-of-school education programs, and trainings for professionals such as nurses and firefighters. Examining the core similarities and differences among learning environments and learning goals can provide important information for designers of museum experiences. In addition to content, major differences include the use of a training curriculum alongside and coupled with simulations and the use of different interface devices, such as a radio in the case of training a fire incident commander in the field. Similarities include the use of real data that is collected, stored, and then synthesized back into the simulated experience. In all areas of learning, we find that making a simple, clean simulation allows core concepts to be demonstrated and advanced concepts to be discussed at the level of each learner.

For museums interested in using technology to enhance their exhibits, the first step may be to ask the question, “If we could design an experience for learners to mess around with this topic, change things, and see the results of their actions, what would the experience be?” Each learner’s brain works differently, and learners’ motivations for exploring are different. What a design achievement to create an experience that celebrates that uniqueness! Technology-based simulations are not the magic bullet that solves the challenge of learner engagement. Rather, they are a tool that allows learners to examine phenomena in an interactive fashion, gather data as they make choices, and synthesize that data into a result that is unique to that learner at that time.

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The Yawkey Foundation has awarded the Museum of Science, Boston, $10 million to create a three-story gallery and exhibit space located in the museum. The Yawkey Gallery on the Charles River will use the Charles River basin and watershed to engage visitors of all ages and backgrounds in understanding the natural and engineered worlds and their delicate interrelationship. The goal is for the museum to articulate one all-encompassing story connecting the engineered and natural worlds by transforming its two major wings.

The (U.S.) National Institutes of Health awarded Science Education Partnership Awards (SEPA) to four ASTC members in 2012:

- The Lawrence Hall of Science, University of California, Berkeley: $1,040,438 to design a hospital-based educational program through tablet computers called PlayPads
- The Morehead Planetarium and Science Center, Chapel Hill, North Carolina: $784,767 to develop a full-dome planetarium show
- The Science Museum of Minnesota, St. Paul: $1,318,288 for the traveling exhibition Weighing the Evidence: Making Informed Health Care Decisions
- The University of Nebraska State Museum of Natural History, Lincoln: $1,328,618 to promote better public understanding of advances in biomedical research.

The (U.S.) Institute of Museum and Library Services has awarded $249,999 to the Chicago Public Library Foundation, which will partner with the Museum of Science and Industry, Chicago, to create a maker space within the Chicago Public Library. This partnership will plan, design, and pilot a digital design and fabrication lab that will be available to the general public within the library’s main branch.

The Fort Collins Museum of Discovery, Colorado, has received a grant of $40,000 from the Cache La Poudre River National Heritage Area toward the completion of the Water Zone exhibition in the museum. This exhibition will explore the historic and contemporary impact of the river on northern Colorado communities, including water rights, agriculture, recreation, and more. In addition to exhibit elements, the grant will support the development and implementation of educational programs and public outreach.

The PNC Foundation has awarded the Discovery Center Museum, Rockford, Illinois, a $30,000, three-year grant for an early childhood program for children facing multiple risk factors. The program presents an opportunity for preschool children to participate in hands-on science, math, and arts activities, both in school and at Discovery. The project will provide direct services to children through field trips to the museum. Discovery will also provide hands-on workshops to give preschool teachers the tools they need to incorporate hands-on science activities into the classroom.

The Girls, Math & Science Partnership (GMSP) program from Carnegie Science Center, Pittsburgh, was recently recognized by the City of Pittsburgh for its commitment to educating, equipping, and empowering young women in the western Pennsylvania region to achieve higher success in math and science fields. GMSP earned the Citizen Service Award for its work with teachers, parents, and mentors to expand opportunities for girls in the science and technology workforce.

The Museo de los Niños, Caracas, Venezuela, has received a Certificate of Excellence from the website TripAdvisor, where travelers cast votes based on preferred locations to visit and on customer service. The museum received a score of 4 out of 5 and was listed as one of the top 10 places to visit in Caracas.
Q&A

Ilan Chabay
Interviewed by Joelle Seligson

“It was a case of professional schizophrenia—but a very useful one,” laughs Ilan Chabay about his varied career path. He has dabbled in the natural sciences, exhibition design, museum administration, and higher education. Currently professor and senior fellow at the Institute for Advanced Sustainability Studies in Potsdam, Germany, Chabay advocates taking a similarly multidimensional approach to addressing global change. Here he advises on how science centers and museums can become key partners in transdisciplinary research for sustainability, as he’ll discuss at the 2013 ASTC Annual Conference in Albuquerque this October.

What is your experience working in science centers and museums?
I had the good fortune to spend a year and a half working at the Exploratorium as associate director with Frank Oppenheimer. Then I started a company and designed and built science exhibits and learning environments for over 200 institutions worldwide. I enjoyed it enormously, and it was a worthwhile endeavor, but it raised questions for me. Beyond inspiring interest in science, how was that going to affect larger societal issues? That’s where I diverted. I was offered a position at two universities in Sweden, and I spent five years in the chemistry, information technology, and sociology departments. I tried to understand how to use the tools and framing of social science to address science and technology.

What is transdisciplinary research in terms of global change?
Global change includes of course climate change, but also financial changes, demographics, urbanization, energy—pick your favorite. They are deeply interwoven. “Transdisciplinarity” has become this buzzword to address the problem—and to even know what problems to address.

How can science centers and museums help in that charge?
Science centers are tremendous resources for engaging with the public, and by the public I mean all of us. It is not just the prototypical person on the street—it’s policy makers, policy shakers, research scientists in all different fields. Science centers have the capacity to bring stakeholders in the community into a dialogue with the people who are trying to do research that would affect that community.

Many science centers are implementing Science Cafés, with dialogues with the public and scientists and researchers at all levels. Museums and science centers could be very good environments in which to foster balanced science, with multiple ways of representing that, in ways that people can relate to their own condition.

How are you involved with the Future Earth initiative?
I’m on the scientific committee of the International Human Dimensions Programme on Global Environmental Change, which is one of the four global change research communities. Many projects within those have been running over the last 15 years, and many have been fruitful in illuminating how society reacts to natural science changes. That effort now is being put under a larger umbrella called Future Earth (www.icsu.org/future-earth). It will help synthesize all these research projects in supporting the new directions of researching this.

For a podcast and full transcript of this interview, visit www.astc.org/blog/category/astc-dimensions/q-and-a.
If you’re looking to maximize your professional development dollars, look no further than ASTC’s 2013 Annual Conference, to be held in Albuquerque, New Mexico, October 19–22.

This year, Museum Open House Day, Big Screen Day, and Digital Planetarium Demonstrations have been moved to Tuesday, along with a fantastic public Science in the Park festival ... you won’t want to miss this!

Register at conference.astc.org using the code SAVETD2013 by May 31, and you’ll be eligible for one additional complimentary conference registration AND a free, three-night hotel stay during the conference! Don’t miss out on the chance to bring another colleague to ASTC 2013!