

Library Exhibits and Programs Boost Science Education

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Science museums let visitors explore and discover, but for many families there are barriers—such as cost or distance—that prevent them from visiting museums and experiencing hands-on science, technology, engineering, and mathematics (STEM) learning. Now educators are reaching underserved audiences by developing STEM exhibits and programs for public libraries.

With more than 16,000 outlets in the United States, public libraries serve almost every community in the country. Nationwide, they receive about 1.5 billion visits per year, and they offer their services for free. Because libraries are often within walking distance of at least half of their patrons or near public transportation, they can circumvent two barriers that prevent a lot of people from visiting science museums: cost and transportation. While museums work to attract teenage audiences, teenagers are regular users of library services. Many libraries are already providing innovative STEM activities in their youth programs [e.g., *Shipp et al.*, 2008]. For these reasons, libraries can be ideal venues for reaching new and underserved audiences with a variety of STEM programming, including interactive exhibits.

The essential mission of most public libraries is to serve their communities with lifelong learning opportunities. With thousands of libraries, there is an enormous potential for engaging underserved youth and their families in fostering an appreciation and deeper understanding of science and technology topics. To utilize this largely untapped resource, the Space Science Institute's National Center for Interactive Learning (NCIL), in partnership with the American Library Association (ALA), the Lunar and Planetary Institute, and the National Girls Collaborative Project, has received funding from the National Science Foundation (NSF) to create a new national education project for libraries that focuses on building STEM skills through developing science-technology activities and resources (STAR). This project, known as the STAR Library Education Network (STAR_Net), is a hands-on learning program for libraries and their communities across the country.

The STAR_Net Project

STAR_Net grew out of NCIL's successful, NSF-supported "Discover Space" exhibit, which is currently touring Colorado libraries. The project is developing two additional

interactive traveling exhibits ("Discover Earth: A Century of Change" and "Discover Tech: Engineers Make a World of Difference"), coupled with a variety of education and outreach programs. This additional programming includes hands-on activities related to the content of the exhibits for different age groups. STAR_Net also provides library staff with training (online and in person) that introduces them to the STEM content of the exhibits, guides them in developing complementary programming, and helps them implement the STAR_Net activities.

The reach of the STAR_Net project goes beyond the host libraries, though. STAR_Net has created an online community of practice that includes host and nonhost librarians and STEM professionals. Sharing common concerns, such as providing informal STEM learning opportunities, and learning from one another about how to improve outreach endeavors are the hallmarks of a community of practice [Wenger, 1998; Lesser and Storck, 2001]. To these ends, members of the STAR_Net community of practice can meet online, share resources, and form partnerships around a common purpose.

The two STAR_Net exhibits and related programming will reach 18 libraries in more than a dozen states. Discover Earth, which has already begun its library tour, introduces library patrons to Earth's interacting systems of water, ice, air, and life. It includes a Magic Planet®—a digital globe that allows users to interactively explore how the hydrosphere, atmosphere, geosphere, and biosphere influence Earth (Figure 1)—and a 42-inch multi-touch table computer. Discover Tech, which is in development, aims to inspire patrons by delving into the role that engineers must play in solving critical challenges facing societies in the 21st century. The exhibit will explore both high- and low-tech examples of how engineering solutions can transform daily life and emergency care, such as a simple water filtration system that reduces life-threatening illnesses or a robotic device that helps surgeons perform lifesaving heart surgery on infants.

So far, Discover Earth has visited only two libraries, but the initial feedback has been positive. A young patron in Texas said, "Today I had the most fun and awesome day of my life. I loved coming and seeing everything. I love everything about today." On a more concrete level, the STAR_Net project conducted a front-end evaluation (K. Haley Goldman, STAR_Net front-end, unpublished report, NCIL, 2011) at two libraries—one in Roanoke, Va., and the other in Blanco,



Fig. 1. A young patron explores the Magic Planet® interactive display at the Louisville Public Library in Colorado.

Tex.—to test proposed concepts, topics, and titles for the two exhibits. The project also conducted a second study (May 2011), which collected online survey data from librarians about their perceptions and motivations concerning STEM learning and interactive exhibits.

Joining the STAR_Net Online Community

The overarching goal of the STAR_Net project is to bring effective, inquiry-based STEM learning experiences to libraries. The two exhibits—Discover Earth and Discover Tech—are just part of achieving this goal. A critical aspect is the commitment and efforts of the host libraries to provide related programming for their communities. The project team is choosing host libraries through an application process led by ALA. To be chosen, libraries must demonstrate a commitment to providing ancillary STEM programming and engaging their visitors and communities with activities and conversations related to the exhibit's STEM content.

Further, librarians from host sites are being brought together online with non-host librarians and STEM professionals as part of the STAR_Net community of practice. The project team is now asking STEM professionals who want to provide or support STEM programming in public libraries to join the STAR_Net community. By joining the online community, STEM professionals can find libraries where they can help bring STEM topics to the public. There are many

possibilities for such programing, including after-school classes, informal talks, documentary screenings, science fairs, nature walks, and citizen science activities.

To find a library partner for your education and public outreach efforts, please join the STAR_Net online community by visiting <http://www.community.discoverexhibits.org>. Anyone interested in learning more about the STAR_Net project and its online community should contact the authors of this brief report.

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