NSF ATE: Strengthening the Skills of the Nation’s Technicians

David Bond, Director, National Career Pathways Network

Each year, the National Career Pathways Network participates in disseminating information about the National Science Foundation’s Advanced Technological Education (NSF ATE) program. This is done through ATE presentations and exhibits at the annual NCPN conference and by publishing articles in the NCPN newsletter—like this one.

The NSF ATE program endeavors to strengthen the skills of technicians whose work is vitally important to the nation’s prosperity and security. Through collaborations between two-year institutions and industry, ATE centers and projects ensure that our future technical workforce receives the education and tools necessary to excel professionally and to meet the needs of our ever-growing high-tech industries. This mission is very similar to the efforts of Career Pathways programs that are “linking education and economic prosperity.”

Besides exposure at the NCPN conference, one of the most visible activities of NSF ATE grant recipients (centers and projects) is the High Impact Technology Exchange Conference or “HI-TEC.” The conference is usually held the last week of July with 500 to 600 attendees who are mostly educators (postsecondary and secondary) and industry personnel (administrators and technicians). The conference attributes that have been evaluated as highest are: 1. Gaining skills and technology, 2. Accessing resources, 3. Technology showcase exhibits, and 4. Discussions with other attendees. See the article by the 2013 HI-TEC conference chairman, Gordon Snyder.

In addition to Snyder’s article about HI-TEC, there are three more articles that give insights into the NSF ATE program. If you have never been the recipient of an NSF ATE grant, you can contact one of these authors for advice on where to start, or, better yet, attend the HI-TEC conference this summer in Austin, Texas (http://www.highimpact-tec.org/) to meet grant recipients and representatives of the National Science Foundation.

In 2013, we hope you plan two trips to Texas—HI-TEC in Austin in July and then the NCPN conference in San Antonio in October (http://www.ncpn.info/2013-ncpn-conf.php). Ya’ll come!
HI-TEC Enters 5th Year

Gordon Snyder, Director ICT Center, Springfield Technical Community College, and Chairman, 2013 HI-TEC Executive Committee

The High Impact Technology Exchange Conference (HI-TEC) is produced by a consortium of NSF-funded Advanced Technological Education centers and projects as an annual event where secondary and postsecondary educators, counselors, industry professionals, trade organizations, and technicians can update their knowledge and skills. “The conference, launched in 2009, evolved out of the highly successful SAME-TEC Conference and focuses on the preparation needed by the existing and future workforce for companies in the high-tech sectors that drive our nation’s economy,” said Michael Lesiecki, director of the NSF-funded Maricopa Advanced Technology Education Center in Arizona.

Each year, HI-TEC uniquely explores the convergence of scientific disciplines and new and emerging technologies including Advanced Manufacturing Technologies; Agricultural, Energy, and Environmental Technologies; Biotechnology and Chemical Processes; Electronics; Engineering Technologies; Information Communications, Geospatial, and Security Technologies; Learning, Evaluation, and Research; and Micro- and Nanotechnologies.

Deb Newberry, 2012 conference chair and director of the Nano-Link Center in Minnesota, said “Attendees include high school, community college and university educators, workforce development advocates, trade organizations, industry professionals, and technicians.”

“We encourage attendees to present on new and emerging technologies in their areas of expertise,” said Gordon Snyder, director of the ICT Center in Massachusetts and 2013 conference chair. “We’re currently accepting half-day preconference workshop presentation proposals, main conference session presentation proposals (45, 75, and 90 minutes), and poster session proposals on our website.”

Conference options include a choice of 14 preconference workshops and two industry site tours during the first two days, followed by the two-day main conference featuring keynote speakers, 60 breakout sessions, and poster sessions.

“There are opportunities for just about everyone attending to present, learn, and leave with classroom materials that can be used immediately. We want to learn about your technology and what you’re doing in your classrooms with your students. You don’t need to have an NSF grant to attend or present,” said Snyder. “HI-TEC is also a great place to network with people who have NSF grants and learn how you can write one and maybe even have a little fun. Austin is the live music capital of the United States and that, coupled with restaurants, shopping, and lots of other activities, makes it a nice conference to bring families along.”

HI-TEC runs July 21–24 this year in Austin with the call for presentations and registration currently open at http://www.highimpact-tec.org

For more information, contact Gordon Snyder at gsnyder@stcc.edu.
“Industry Days” across the state include tours for students to high-tech manufacturing facilities as well as school-site presentations about the advanced manufacturing industry, and large Expo-style events. These outreach events play an important role in FLATE’s own 2012 “Year of Manufacturing Awareness” initiatives and are helping make the advanced manufacturing career and college connection for Florida high school students. FLATE 2012 partnerships involved local manufacturers, Florida’s Regional Manufacturers Associations (RMA), the Manufacturers Association of Florida (MAF), the Career Technical Education Foundation, Inc. (CTEF), middle and high school educators and high school career academies, FLATE Outreach Ambassadors, the School District of Hillsborough County, public and private schools, local home schools, and parents joining forces and resources to change manufacturing’s negative image and promote college and career pathways in engineering and advanced technology.

A popular Industry Day concept model in operation in Florida is the “multiple tour” event. Credit is given to Paul Wahnish, president of CTEF Inc., for spearheading the model. Dr. Marilyn Barger, Executive Director of FLATE, says industry tours “serve as an effective mechanism to expose students to the real world of manufacturing and get students excited about STEM career opportunities.” The Industry Day tours represent a three-year partnership between FLATE and CTEF, and are an extension of FLATE’s “Made in Florida” outreach campaign, which is designed to connect classroom-based knowledge to real-world innovation and application. This year CTEF arranged for industry hosts Pall Aeropower, Nielsen Media Research, Micron Pharma Works, Bauer Foundation, Southern Manufacturing Technologies, and Mitre Corporation to host 235 students on eight buses over the course of two days. Participating students were provided an up-close, behind-the-scenes look at high-tech manufacturing operations, an activity that lends relevance to science, technology, engineering, and mathematics (STEM) skills learned in the classroom. In fact, 77 percent of 2416 survey responses received from students after taking a tour either agreed or strongly agreed that “The tour helped me understand the use of STEM (science, technology, engineering, and math) in industry.”
In keeping with the “Year of Manufacturing Awareness” theme, and encouraged by partners to expand Industry Day offerings, FLATE provided an Industry Day multi-tour experience to George S. Middleton High School (a Tampa magnet high school) to support the school’s engineering program. The magnet school programs at Middleton are designed to help students enter STEM career paths. Since the objective of the magnet programs is to give students a balanced and rigorous curriculum leading directly to industry, technical school, or college programs, making the practical connection between STEM subjects and college and career pathways in engineering technology and advanced manufacturing is a great fit for FLATE’s student tours to advanced manufacturing facilities. Tampa Armature Works, Vulcan Machine, MITRE, Southern Manufacturing Technologies (SMT), and Plasma Therm industries all opened their facilities and provided 67 students with firsthand knowledge about advanced manufacturing careers and the education needed to pursue these careers.

FLATE’s “Made in Florida” one-site tours are designed to connect classroom-based knowledge to real-world innovation and application and therefore easily translated into the multi-tour Industry Day event. Roy Sweatman, President of SMT, shares that he had received “20+ calls asking about a job in manufacturing from high school students who visited the facility,” and hired a couple for part-time work during the summer. In fact, FLATE research shows a cumulative 36 percent positive change in agree responses from students interested in careers in high-tech manufacturing who were surveyed after participating in a tour (3777 students have participated in tours since 2005), and a 43 percent positive change to-date for 2012. But we need to do more to ensure teacher and parent buy-in for manufacturing careers, since parents and teachers are major career influencers.

One way to aid in this connection is to support school-site “expo style” Industry Day events. To aid this initiative, FLATE provided all Florida RMAs with an outreach pack in late December 2011 to be ready for use in 2012. Each pack contained the following:

- The award-winning “Made in Florida” video
- Copies of FLATE best practice pamphlets for offering summer robotics camps and tours to high tech industries
- A postcard-size “Made in Florida” handout designed to appeal to students
- The new “Hire a Graduate” promotion, which networks industry and workforce needs with college programs and their graduates
- A resource sheet for online FLATE products and services
- Career pathways worksheets for students (also available online to parents, teachers, and career counselors)
- Annotated presentations that can be used for Industry Day and Industry Expo events.

Items were provided in hard copy as well as bundled onto robot jump drives for ease of access, printing, and portability.

After receiving the outreach kit, Marion Regional Mfg. Association (MRMA) referred Suzanne Mills,
Director of Human Resources at A&N Corporation, to FLATE for career fair resources. A&N Corporation is a manufacturer of high vacuum flanges, fittings, and chambers in Williston, and Ms. Mills wanted her Career Fair presentation at Williston High School to be representative of the local manufacturing industry. FLATE sent the “Made in Florida” DVD, pencils, FLATERS (FLATE’s robot mascot), and handouts to support this event. Suzanne reported that this event generated “lots of interest.” In fact, A&N Corporation received nine applications and over 18 employment inquiries from high school students after seeing the A&N display and watching the “Made in Florida” presentation at the March 2012 Williston High School Career Fair.

An Industry Day “expo” does not have just “one look.” It can be a tour to multiple sites, a school-site event, a large-scale expo or fair, or other events designed to increase awareness of college and career pathways in advanced manufacturing. For instance, Hillsborough County’s new Manufacturing Task Force has set a goal to define and promote educational opportunities that support manufacturing in the county, which could take the form of an Industry Day. The Bay Area Manufacturers Association (BAMA) in partnership with county school districts has a new “STEM goes to Work” tour model that takes place on a Saturday (thus enabling more parents to be involved) and is planned to include a hands-on curriculum experience, and “Dream It! Do It! Florida” is working with FLATE, MAF, RMAs, and manufacturers to develop best practices for Florida. Another important part of the equation is providing teachers and counselors with tools for promoting high-tech college and career pathways, such as industry-oriented curriculum, and professional development opportunities using the latest in high-tech equipment and applications.

However it looks, every Industry Day will:

- Emphasize STEM subject importance and connection to manufacturing college and careers,
- Focus on the positive points of high-tech manufacturing careers,
- Expose students to the real world of manufacturing through tours and hands-on work experiences,
- Educate and inform parents to generate buy in, and
- Publicize job opportunities.

Working together in partnership to provide educational experiences that attract the next generation of high-tech workers is a worthy endeavor that helps to change the image of modern manufacturing and get the word out about the many fine opportunities it provides.

Thinking about planning your own Industry Day? Contact Marie Boyette (Mboytette3@hccfl.edu) or Marilyn Barger (barger@fl-ate.org) for help when you are ready to start.
Preparing Students for the High Performance Workplace Through Problem-Based Learning

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According to former Secretary of Education Richard Riley, our challenge is “preparing students for jobs that don’t yet exist, using technologies that haven’t been invented, in order to solve problems that we don’t even know are problems” (http://www.scottmcleod.org/didyouknow.wmv).

The high-performance workforce must be able to learn and adapt, and adapt quickly. Problem-based learning (PBL) is a teaching methodology that provides opportunities for students to develop personal attributes that are of greatest value to employers such as critical thinking skills, problem-solving skills, teamwork, and effective communications while learning and applying technical and scientific content knowledge.

Lew Platt of Hewlett-Packard once observed, “Whatever made you successful in the past won’t in the future” (Peters 1997). In the marketplace and in education, we have seen that organizations must be flexible, constantly evolving in response to changing expectations and demands—not just to maintain the status quo but to survive and flourish. Employers are demanding highly skilled technicians and other employees with strong teamwork, communications, and problem-solving skills (Judy 1998). Employees needed for the new high-performance workforce must have “a high level of education, engagement, and responsibility” (O’Conner 2006). Or, as John L. Chambers of Cisco Systems has said, “We have to face the difficult challenge of changing when things are going well” (Boone 1999). How can this be accomplished in today’s classrooms, with today’s students?

The South Carolina Advanced Technological Education Center of Excellence (SC ATE), funded by the National Science Foundation since 1994, is addressing this challenge by promoting the use of problem-based learning curricula such as the SC ATE Technology Gateway. SC ATE and its partners draw teachers together around a common desire to learn about and use PBL to improve learning outcomes (“roots”) and then send them out as co-leaders in the diffusion of innovation to adapt, implement, and spread PBL in their own ways (“wings”).

The annual “Roots & Wings” faculty event develops new practitioners, teaches strategies for developing effective scenarios for teaching, and encourages and facilitates peer mentoring by experienced practitioners. Both high school and
technical/community college faculty participate. Increasingly the event attracts participants from funded NSF projects who have included the use of problem-based learning as a key element of program improvement in their projects. For dates, details, and registration information, visit www.TeachingTechnicians.org or email scate@fdtc.edu.

Since 1994, SC ATE has been guided by the following research-based mandates:

- A clearer connection must be made between the skills taught in the classroom and the skills needed in the workplace (Collins et al. 1993).
- Appropriate teaching methods—based on the latest learning theory research—must be used to meet the learning needs of all students (Felder 1993).

References


Free Online Outreach Kit: Designed to Help You Target Your Marketing and Dissemination Efforts

Rachael Bower, Director, Internet Scout Research Group, University of Wisconsin Madison, WI

Whether talking to prospective students, industry partners, school administrators, or colleagues, many of us in the education and nonprofit sectors spend a large percentage of our time doing outreach. However, finding ways to do effective outreach with limited time and resources can be a challenge. To address this need for outreach support, ATE Central, an NSF-funded project based at the University of Wisconsin-Madison’s Internet Scout Research Group, created a free online Outreach Kit. While the kit, created in conjunction with WGBH-Boston, was designed to support National Science Foundation Advanced Technological Education (ATE) grantees, it is broadly useful to other nonprofit and education groups that want to build outreach plans or enhance their outreach approaches.

The kit consists of four parts: Planning, Social Media, Communication, and Resources. Users can start with the first section and proceed through the kit in a linear fashion, or use portions of the kit to enhance the outreach they are already doing.
Planning includes best practices and resources related to creating an outreach plan. These are flexible and sensitive to the diversity of resources available for outreach. To show users a plan in all its stages of development, this section also includes a sample outreach plan broken into manageable steps.

The Social Media section outlines popular tools (Facebook, Twitter, blogs), recommends analytics tools, and explains how to use social media to develop a professional profile.

The Communication section guides users through the creation of a mission statement and key messages, both of which are vital to effective outreach campaigns. Subsections include tips on making news, making a pitch, creating a media kit, choosing media outlets, and finding outreach paths. A selection of resources, including a checklist of what to include in a media kit, ties the section together.

Finally, the Resources section provides links to useful sources available online or in print. These are heavily weighted towards free and low-fee tools as well as books that should be available through college or local libraries.

The Outreach Kit is available at https://atecentral.net/OutreachKit and can be used online or printed out from a PDF. As the Kit evolves and grows, ATE Central hopes to include more resources and information from the education and nonprofit communities. The ATE Central outreach team always welcomes questions, comments, and feedback at info@atecentral.net.

For more information, contact Rachael Bower at bower@scout.wisc.edu.