



Best Practice #74

Developing a pipeline of potential critical skills candidates at the local level: the High School Technology Academy

Facility: Sandia National Laboratories

Title: Developing a pipeline of potential critical skills candidates at the local level: the High School Technology Academy

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Brief description of Best Practice: Implement an academy-type environment at the high school level that ensures math and science proficiency, is self-sustaining, and helps your organization meet its critical skill needs

Steps:

- Identify need based on hand and head skills
- Work with school district to release Request for Proposal, whose requirements include minimum 0.3 FTE support for Academy director, sufficient space, maximum classroom size of 19 students, cross-curricular teacher cohort participation and student cohort implementation
- Engage curriculum development expert to work with teachers and existing curriculum to package a four-year academy curriculum with a specific technology focus
- Recruit from within high school and at middle school level
- Reserve x internships for these students
- Articulate curriculum at post-secondary levels
- Identify an exit strategy for sustainment

The *Advanced Technology Academy* is a four-year high school curriculum, that was funded by the US Department of Energy/Defense Programs and sponsored by Sandia National Laboratories, and combines photonics/optics and R&D development activities with technical organizations at the Labs. Students take technical courses at the high school level and can enroll concurrently at Central New Mexico Community College, New Mexico State University, or the University of New Mexico. The articulated curriculum creates a technology-focused pathway within the high school environment. Students may begin interning at Sandia during the summer following their high school graduation and continue working while attending CNM or UNM.

The *Academy* is the foundation for a comprehensive optical science & engineering program that spans middle school through the Ph.D. level. New Mexico is unique nationally in this respect and offers students the flexibility to enter and leave the workforce at any juncture in the educational ladder.



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The four-year curriculum encompasses courses in mathematics, science, computer applications, metallurgy, pre-engineering electronics, CAD, manufacturing, introduction to photonics, digital circuits, photonics, optics, lasers, semiconductors. The program does not pigeonhole students: graduates emerge with proficiency in math, science, and core courses equipped to enter a four- or two-year institution or proceed straightaway into the workplace.

The *Advanced Technology Academy* provides a link to New Mexico's advanced manufacturing and optics industries and Sandia's Microsystems S&T and Components Center, Engineering Design & Integration Center, and Surety Components & Instrumentation Center. The Centers develop and apply advanced manufacturing processes in support of Sandia's primary mission of ensuring the security and reliability of the nation's nuclear weapons stockpile. Students are trained to work in the centers' design, development, or fabrication areas.

The *Advanced Technology Academy* has received endorsement from the Optical Society of America (OSA) and the International Association of Optical Engineers (SPIE), National Council for Advanced Manufacturing (NACFAM), Manufacturing Skills Standards Certification (MSSC) program, Department of Energy Human Resources and can be used as a national model. It is supported by the Center for Occupational Research & Development, Air Force Research Laboratory, Directed Energy Professional Society, New Mexico Optics Industry Association and the Center for High Tech Materials at The University of New Mexico. It has successfully integrated -- both vertically and horizontally -- educational, industrial, academic, and governmental components. These include a national laboratory; DOE/NNSA/DP; a district school system; articulation of curriculum with three technical institutes; parents; the Next Generation Economy Initiative, an economic development activity; regional industry; the leading professional societies; skills standards; Carl Perkins Grant; and local and national media.

Why the Best Practice was used: Group Trades population was aging, past apprenticeship programs had proven untenable, recruitment efforts for out-of-state candidates were less than successful; Sandia decided to "grow its own."

This model was used to:

- introduce students to math and science in an applied fashion
- package a curriculum to ensure math and science proficiency
- funnel students into post-secondary education
- funnel student interns into Sandia, acquaint/acclimate them to the culture, gain a security clearance
- hire them into the Labs and convert them to FTE status



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What are the benefits of the Best Practice:

- student academic achievement
- extended “interviewing” opportunity for both parties
- targets a diverse and underrepresented population
- familiarity with lab culture and processes
- proper training and safety awareness from the outset
- immediate productivity for converted new hires
- new hires pre-cleared
- strong retention rate of local talent
- partnership with Metal Trades Council
- utilizes existing Sandia infrastructure
- under-represented groups very well represented
- populates the pipeline!

What problems/issues were associated with the Best Practice:

- 1) Transition of leadership, both at the Academy Director level and eventually at the Principal level. Sandia actually hired the first Academy Director, the second was a builder who preferred construction to Advanced Technology; the third was a charm. The priorities of successor to the original principal were centered around bilingual education.
- 2) Integration of program into Metal Trades Council.
- 3) Ensuring academic rigor and cross-disciplinary cooperation.
- 4) Encouraging 8th graders to take Algebra I.

How the success of the Best Practice was measured:

- 1) average gpa of Academy students (from 2.5 to 3.86 in two years).
- 2) graduation rate of Academy students (95%).
- 3) Sandia hires (more than 60 students converted to staff since 2000).
- 4) early career retention rate (78%).

Description of process experience using Best Practice: see “why” above

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under Contract DE-AC04-94AL85000.