

## Working with Industry Partners

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### Abstract

Industry partnerships are vital to the success of all manufacturing education programs. These partnerships enrich the academic programs at all levels in so many ways. Faculty that work closely with industry partners are exposed to issues and technologies that affect the manufacturing industry everyday. They become comfortable in the production workplaces and can seamlessly bring the knowledge and skill sets learned into their classrooms. Similarly, industry professionals who work closely with college program partners can shape and sharpen the internal training programs to assure outcomes that their current workforce achieve also promote and facilitate their enrollment into college programs. It's a win-win situation when strong and meaningful partnerships are developed and maintained.

Partnership questions that arise include initial startup issues. How does a college program approach an industry and how do companies approach academic institution? How do the relationships begin? How do they grow so both mutual needs (industry and the technical programs) are satisfied? This paper explores these issues as well as the characteristics and benefits of strong working partnerships with industry. An example of how one high school manufacturing program and one two year associate of science engineering technology program work with their local partners is provided. The example discussion indicates how the partnership benefits the students, the academic programs, educators, and the industry's workforce needs.

### I. Introduction

Developing a strong and robust pipeline of workers interested in pursuing careers in manufacturing has four important facets. Manufacturing has to have a positive image and be attractive to youth and other potential candidates. Manufacturing career options have to offer advancement paths with appropriate financial reward. There have to be robust, flexible, current, and accessible career pathways providing roadmaps to career advancements opportunities that may or may not involve classic education and training. Finally, there have to be industry-driven educational programs within the pathways so that graduates and completers move seamlessly into the workforce.

FLATE, an NSF funded Center of Excellence for Manufacturing Education in Florida, works within all four of these facets. The Center strongly supports and encourages its academic and industry partners statewide to work closely together in developing industry-driven programs of

study as well as strategic outreach initiatives to recruit students into those programs at various level. At the regional level educational institutions and regional manufacturing associations are

encouraged and supported as they develop partner projects such as Manufacturing Day Events as well as to get involved with local/regional industry and economic development organizations that often have workforce and education committees that welcome participation of educational professionals. FLATE also helps to identify and/or encourage high school and colleges to work closely with individual companies in their region to provide workforce education solutions for a single or small group or consortium.

FLATE provides a variety resources<sup>2</sup> aimed at both industry and education for starting this process and promoting common ways people engage. Typically, a relationship develops around a single activity request for participation from either industry or education. If the activity /event goes well, the partnership grows and expands to more interactions. A catalog of typical ways industry and education engage with each other and FLATE is provided by FLATE in its Best Practice Guide “Forging Partnerships”<sup>2</sup>. This guide is a great resource for educators trying to connect with industry and industry trying to connect to education. It also has tips on how to talk positively to students about manufacturing highlighting attributes that are attractive to young people.

## II. Background on Industry Partnerships with Education

*“A Community College and Industry Partnership is a collaboration between a community college and an individual business, group of firms, chamber of commerce, industry association, or sector partnership with the purpose of using the combined resources to create alternative college education programs that are tightly linked to regional economic development and labor force needs for nontraditional students—both younger workforce entrants and older ones in need of skills and education upgrades.”*

(Center for American Workforce Blog post in October 2010<sup>1</sup>)

This American Workforce definition for partnership serves the topic. Developing partnerships means developing relationships and defining a common goal. The partnership should also have its own leadership and governance that establishes accountability and includes effectiveness measures to define successful achievement of goals. Typically, the bulk of a partnership constituency includes several industry and educational partners, but there are other stakeholders that can and should be included. These groups include: community-based organizations, labor unions and apprenticeship committees, workforce-development agencies, human-service agencies, and economic-development agencies. Of course, the exact combination of stakeholders for any one of these groups will be different and defined by the local and regional groups and community organizations and their missions. In the end, activities, programs, or projects that these organized groups undertake to meet their workforce development mission must include review/rewrite of curriculum and instruction, providing academic and/or social

support, offering professional development for educators, sharing resources, and movement to more systemic institutional alignment and improvement.

Advanced Technological Education (ATE) is a National Science Foundation (NSF) program under the Division of Undergraduate Education. The emphasis of the ATE program also resonates with the American Workforce definition for partnership. The Florida NSF-ATE Center for Manufacturing Education, FLATE, addresses this NSF mission to support development of innovative approaches in the education of technicians for high-technology fields. Thus, in Florida, educators at two-year colleges lead this effort in partnership with secondary schools, university educators, and industry with FLATE providing resources to facilitate these efforts.

### **III. Partnership Examples**

FLATE has assisted in the development of partnerships at the state, regional, and local level. Statewide efforts include an industry guided statewide articulated Associate of Science in Engineering Degree (ET) program. This ET program is now resident in 19 colleges within the Florida College System. Other statewide partner efforts include coordination of Manufacturing Day events and an active partnership with FloridaMakes. The latter effort involves interactions with Regional Manufacturing Associations and FloridaMakes. FloridaMakes the NIST MEP organization in Florida, whose personnel are focused on determining manufacturer technician skills needs across the state as well as other industry business needs.

The Northeast Region<sup>3</sup> of Florida provides typical examples of the industry-education partnership supported projects that fall into the regional and local categories focus. These examples span the K-14 education space as it relates to building the technical workforce the region requires. Each example clearly indicates the focused interactions on both sides of the partnership required to make that partnership work. The regional example is discussed first.

#### **Duval County Schools Manufacturing Partnerships**

Florida's K-12 education structure facilitates partnership construction. The state has defined the school district to be an entire county. In this case, Duval County school district encompasses all of the schools in the City of Jacksonville as well as the remaining rural region in the county. Thus, every manufacturer in Duval County is serviced by a high school within the Duval County School District. With this geographic and academic structure in mind, there is, in Florida, always a clear path available for a regional partnership effort to become a one-on-one project between a single manufacturer and a single high school. Thus the main effort with in this structure is to facilitate the connections. The bonus of this structure is the fact that successful individual partnerships easily become examples for other school and manufactures with Duval County. The Frank H. Peterson Academy/General Electric partnership is reviewed as an example.

On November 4, 2015 twenty students enrolled in Frank H. Peterson Academies of Technology's Robotics & Advanced Manufacturing and Aviation Academies were matched with employees from GE/Unison's Aviation Division in Jacksonville through the Beyond School Walls Program in partnership with Big Brothers Big Sisters of Northeast Florida and Duval County Public Schools. The immediate reward for the school is a group of very excited students spend the next three years learning through real world experiences in aviation and engineering!

The long-term benefit to GE is a prescreen filter for prospective technical employees and input into the academic program that prepares these students. The project works because each partner brings their expertise to the table.

Beyond School Walls connects mentors from a local business with career academy students focused on the same-targeted industry. Partnerships like these enrich the education and preparation of the career academy students by providing meaningful and relevant workplace experiences. All Beyond School Walls visits are coordinated and managed by Big Brothers Big Sisters of Northeast Florida. Students are transported to business sites to meet with their mentors and learn about the business and industry.

General Electric has been serving the aerospace industry since its inception. GE/Unison is a world leader in gas turbine engine components, electrical and mechanical systems for engine and airframe applications. The company supplies every major engine program and airframe manufacturer worldwide and equip gas turbine engines from intake to exhaust and airframes from nose to tail, drawing on key technologies and capabilities. Unison is recognized for their specialization in advanced materials, design, technology, and systems integration. Employing approximately 600 people and occupying 183,000 square feet, the Jacksonville facility manufactures gas turbine engine ignition systems, including ignition exciters, igniters and leads; as well as speed sensors and other electronic components. Product engineering, new product development and testing is performed on site. Jacksonville also repairs and overhauls ignitions systems and speed sensors. The company is well aware of its impact on the region as well as its dependence on the region to provide the technical workforce needed in the complex operations listed above. Thus, its investment as mentors provides a viable pathway for new employees and stronger intellectual and service connections with their employee's community. The project also serves as an exemplary portable activity to other GE manufacturing operations within Florida.

Frank H. Peterson Academy contribution is two-fold. First, the school's administration and faculty have to buy into the project. Student course and assignment schedules may need adjustments. Without total school wide awareness and cooperation, large scale mentoring programs such as the Peterson project will not succeed.

The second contribution from the school is, of course, the students! The quality, interest, and focus of the mentored is critical. Peterson students spent the 2015-2016 school year working with their mentors on various small projects. The students observe what the mentors routinely do on a day-to-day basis, from finding their supply chain, design, engineering, production, assembly, and testing. Some of the activities that students were challenged with included

building a small robot, soldering on circuit boards, taking a plant tour and observing final quality testing conducted in the testing labs. For the 2016-2017 school year, Peterson students are working on a long term management project in teams. Starting with a Request for Proposals, the project will encompass the entire design, approval, cost analysis, construction and small scale testing of a model by the end of the school year. With coaching from their mentors, this project exposes students to many of the processes used in industry. Thus, it also clear that the school has to put energy, time, and talent into the student selection and in-school activity support.

### **Florida State College at Jacksonville Manufacturing Partnerships**

This section outlines two specific partnerships that Florida State College at Jacksonville (FSCJ) has truly nurtured and embraced. FSCJ is a member of the Florida College System. Both of these partnerships are not only important to the Florida College System (they support the ET program specialization in Advanced Manufacturing) but vital to the companies and students involved. The examples highlight one on one partnerships and do not require regional consortium approaches. However, the one-to-one partnerships have the same quality components as a robust workforce consortium: clear shared common goals and, clear mutual agreements for operational processes and responsibilities.

Metal Container has been one of FSCJ's biggest corporate partners in recent years. Metal Container Corp., a member of Anheuser-Busch Packaging Group, supplies more than 45 percent of Anheuser-Busch's U.S. beer cans and over half of its domestic lids. Additionally, Metal Container also provides cans and lids for several major U.S. soft drink companies. The company has been highly engaged in hiring several of the recent Engineering Technology graduates along with currently enrolled students at FSCJ. Most recently, FSCJ has become the lead training partner for the company to train and educate over 100 new Metal Container employees in Mechanical Operations. FSCJ and Metal Container worked closely to defining the needed learning objectives as well as the many logistics steps for quickly implementing the new curriculum.

Johnson & Johnson has been a corporate and training partner with FSCJ for over 20 years. The College has been their lead training provider in electronics, IT, Leadership and industrial maintenance. Over the last three years, Johnson & Johnson hired 8 FSCJ Engineering Technology graduates as new employees. Johnson and Johnson has been a huge supporter other programs at FSCJ. They also actively participate on program Advisory Boards.

As an example of a one-on-one project blossoming into a regional effort, Johnson & Johnson, Englewood High School, and FSCJ partnered to design, develop, and deliver a dual enrollment program that provides the students with a clear pathway to the college that includes internships at Johnson & Johnson. Students in the program earn both their high school diploma and college credit. Representatives from the three organizations work together to ensure that skill gaps are identified and covered allowing students to acquire the skills needed to ensure their success with Johnson & Johnson as well as any employer.

### **IV. Concluding Remarks**

The demand for Next Generation technicians in today's manufacturing marketplace is great. Addressing the many challenges inherent in preparing the new workforce require an innovative approach. New academic delivery platforms (online learning curriculum and components, open educational resources, virtual classrooms, and virtual reality) can create regionally focused, vocational curriculum which is aimed to improve education. However, direct concrete interactions between industry and academia is now critical for increased capacity and access to Next Generation technicians.

This paper presented guidelines on ways manufactures could get involved. It also provided examples of how three local manufacturers have become strong integral partners with their academic institutions (high school and state college). The important and constructive role of a community partner was also demonstrated. The authors' hope that these examples are enlightening and that our takeaway message, industry partnerships in technical education are important and doable at the state, regional and local level, hits home.

#### References

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