

**Florida Pathways to Engineering Technology Careers
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Abstract

This work in progress addresses how the National Science Foundation Advanced Technological Education Center of Excellence for manufacturing in Florida (FLATE) addresses Florida’s manufacturing sector re-shore, resurgent, and emergent technology requirements for preparing engineering technology professionals to support this vital economic sector. FLATE’s target objectives address the widening skills gap manufacturers face with respect to engineering technology related jobs. This paper outlines the strategies FLATE is using to integrate Florida’s education structure, to provide multiple pathways to various career levels within Engineering Technology. The paper outlines how high school, two year technical degree, and ABET accredited B.S Engineering Technology degree participate in an articulated pathway, The Florida Plan, to interesting and lucrative careers in manufacturing.

Keywords

program articulation; industry recognized credentials; Florida Plan; NSF-ATE; FLATE

Introduction

Florida's manufacturing empathetic Governor and Legislature strongly support a growing manufacturing infrastructure to build a global role for Florida manufacturing^{1,2,3,4}. This includes business friendly state tax structures, proactive regional economic development organizations, as well as a realistic anticipation of increased international trade via the enlarged Panama Canal. This paper reviews the current status of a Florida Department of Education (FLDOE) partnership, the **Florida Plan**, with the Florida Advanced Technological Education Center (FLATE), a National Science Foundation Advanced Technological Education Center of Excellence, to produce the technicians that can address Florida's intent to support its manufacturing sector re-shore, resurgent, and renaissance efforts. Fundamentally, this partnership is responding to the widening skills gap for middle skill manufacturing jobs by strengthening and growing Florida’s current technician education system including new pathways into that system.

FLATE's role in this process is multifold because of the structure of Florida's governance systems. Although interagency cooperation is very good, each has legislatively bound restrictions on their activities. This compartmentalization has its merits but with respect to technician production it does generate challenges. Skilled and knowledgeable technician production requires contributions from many sectors of the state. Figure 1 emphasizes the interconnectivity dependence among industry and state entities. The left side of the diagram implies that manufacturers must have a need to employ technicians and they, as well as the regional manufacturing associations focused on supporting manufacturers with their production and business needs, must broadcast that lack of technician support within their community. The right side of

the diagram indicates the support mechanisms to be provided by Florida's employment and job

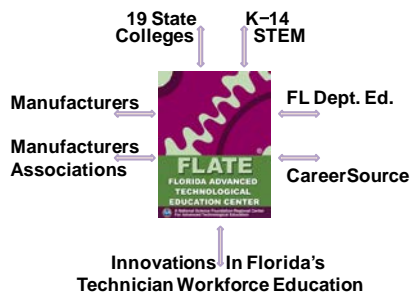


Figure 1: FLATE's Role in Developing Florida's Technician Workforce

placement (CareerSource) and technical education and training (FLDOE) services to help direct high school and two year colleges resources (top items in Figure 1) to address identified technician creation needs. FLATE is the only independent entity in Florida that has the statewide overview perspective, expertise, and resources to interact with all these entities to accomplish their mutually synergistic objective; reduce the skills gap for middle skill manufacturing jobs.

FLATE has extensive bidirectional communications and interactions with all six of these entities represented in Figure 1. Its resident engineering expertise facilitates interactions with manufacturers and manufacturing organizations to identify the specific skills technicians need. Its projects with education and workforce entities identify available resources. FLATE's academic expertise allows for effective efforts to trigger targeted responses within the Florida education and workforce placement systems as overseen, respectively, by FLDOE and CareerSource.

Work In Progress

Figure 1 identifies the stakeholders involved in technician production in Florida. Although the skills gap is significant, there is a focused effort to reduce it. This Work In Progress begins with an overview discussion of the current status, as illustrated in Figure 2. Figure 3 captures the target collection of subgroups that represent potential engineering technology student sources.

The Florida Plan

The heart of this intent to produce technicians that will satisfy Florida's manufacturing needs is the A.S. Engineering Technology degree program. This two year curriculum, as depicted in Figure 2, was designed, developed, and deployed by FLATE using NSF resources as a state wide mechanism to create the technician workforce with the skills and knowledge Florida manufacturing requires. This course of study is now offered within 19 colleges in the Florida College System and maintained via a set of FLDOE monitored and maintained Curriculum Framework.

Figure 2 highlights two entry pathways into the A.S. Engineering Technology degree program. The top entrance arrow includes the important new mechanisms that the FLDOE supports. These include apprenticeship programs, high school academies and technology programs, and nationally recognized industry certifications like the Manufacturing Skills Standards Council (MSSC) Certified Production Technician (CPT)⁵. Either the new entry pathway(s) or the traditional high school degree approach places the student in the first year of the ET program. This first year is accented by the Florida College System general education expectations plus the "core" technical curriculum (see Figure 2 Item II: Engineering Technology Core) ET degree requirements. The first year can also lead to college certificates and CPT certifications to allow the student to return, if desired, to the workforce to continue the degree later. The second year of the ET degree is where the colleges offer intense specialization studies that support specific expertise within the manufacturing sector. Typically, a college selects the specialization track it offers based on direct input and feedback from their regional manufacturing partners. Specialization options are listed in the orange box (see Figure 2 Item III: Engineering Technology Specialization Tracts)⁶. This relatively open ended second year of study preceded by a rigid first year curriculum structure give the colleges a large degree of freedom within the ET degree and still supports the intent to produce technicians with the same strong fundamental skills and knowledge set.

Engineering Technology Student Sources

The essence of this intent to produce technicians that will satisfy Florida's manufacturing needs

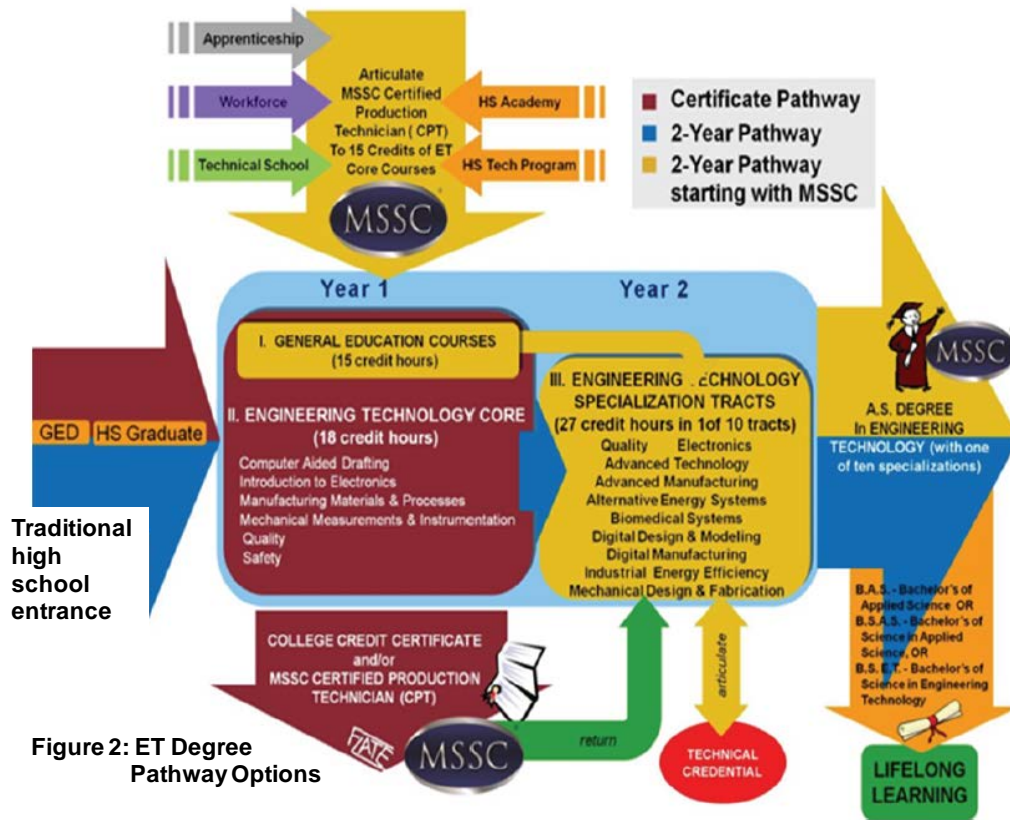


Figure 2: ET Degree Pathway Options

requires the wielding of a double edged sword. At the heart of this intent, as suggested in Figure 1 and Figure 2, the specific job types have to be available, the skills needed have to be identified, and curriculum must be developed and delivered that addresses the identified needs. The other edge of the sword, as illustrated in Figure 3, is securing the pool of students that can and will enter the Florida College ET degree program. The skills gap reduction objective will not be achieved unless both of these edges (heart and soul) are dealt with.

To move forward with this skill gap reduction task, FLATE will capitalize on the technical education and training structure it envisions for the Florida College System's two-year program education space (Figure 3) to increase enrolment within specific ET degree programs in Florida. Figure 3 includes a red oval to represent the entire community college instruction space with the ET degree program shown as a blue-outlined, gray-overlaid region. The diagram presents FLATE's belief that the college's role in manufacturing education is to support and then emphasize a structure where various student populations (groups (a), (b), (c), (d), (e), and (f) in Figure 3) are welcomed into the ET technician credit program. Figure 3 also emphasizes the approaches FLATE will use to broaden ET program impact by providing alternative pathways to rewarding manufacturing careers.

These student populations are clustered to illuminate four important pathways (high school, workforce, college graduate, and current A.A. student) that can ultimately support manufacturing success. FLATE's work within the first cluster's (a), (shown on the bottom right portion of the Figure 1) pathways will result in increased awareness, additional curriculum resources, and more manufacturing academies that will bring more credentialed students immediately into the A.S. ET program. Increasing students from this high school cluster will build capacity in the ET degree.

Increasing credentialed students from the CTE programs within Florida’s 67 school districts place students directly into the ET program with articulated credit. FLATE is currently partnering with MSSC to execute this credentialing activity. This statewide partnership intends to add new high schools across the state offering CPT certification for high school students to immediately enter their local college ET program with 15 credit hours already included on their transcripts^{5,6}.

New apprenticeship approaches (e.g. the American Manufacturing Skills Initiative) are attracting attention in Florida and represent possible progressive pathways into manufacturing careers⁷. These initiatives are spearheaded through regional chambers of commerce, economic development commissions, and concerned manufacturer coalitions. FLATE works with these coalitions to identify articulated pathways for appropriate apprentice skills to the ET degree.

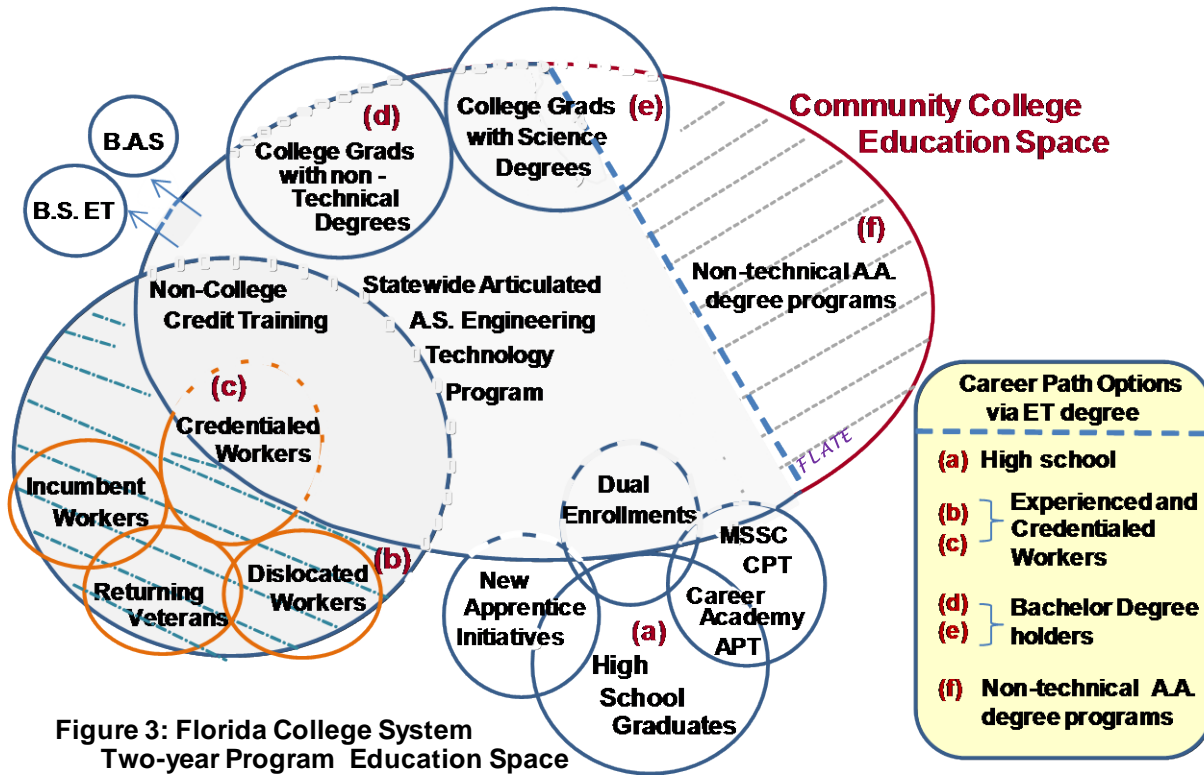


Figure 3: Florida College System Two-year Program Education Space

Workforce pathway, (b), represents a second cluster. It is traditionally a non-college credit on campus (corporate college) approach that provides an immediate ET broadening option. FLATE will develop and implement a statewide recommended process that uses CPL (Credit for Prior Learning) to assign appropriate work experience technical skills to credit in the ET degree program.

Pathway (c) uses seamless transfer of nationally credentialed workers into the ET program via FLDOE articulated credit. FLATE partners with FloridaMakes (a Department of Commerce-NIST MEP supported manufacturing development organization) to identify and promote career pathways^{8,9}. FLATE uses their expertise to identify training program related skills important to manufacturing technicians statewide to be added to the ET degree. The pathways in the college graduate cluster, (d) and (e) (Figure 3) represent a source of up-skilled technical workers. The

sixth cluster, (f), enlists students from non-technical A.A. degree programs and represents an internal pathway within individual colleges that offer the ET program.

Conclusions

FLATE's vision for Florida's technician education is constant. The Center understands that a skilled technician work force that contributes to manufacturing successes in Florida requires close partnership and interactions with all of the sectors (Figure 1) that are linked to manufacturing. Florida's manufacturing technician education platform, **the Florida Plan**, is in place (Figure 2) and ready for the next steps to expand ET degree enrollment from every education and training segment (Figure 3). A Work In Progress, absolutely, but FLATE's specific efforts to create the workforce Florida needs must continue to push the boundaries of Florida technical education by:

- emphasizing seamless integration of technician education and certification-based training to produce lucrative manufacturing career pathways;
- increasing high school involvement in technician education;
- increasing the number of colleges adopting the program and model;
- slanting its activities toward a supportive role for post-secondary education in Florida;
- increasing its impact on industry/education professional development and outreach interactions statewide.

These activities will assure that manufacturing supportive technician preparation in Florida will keep pace with Florida's future as the third largest (population) state and the primary target for advanced manufacturing as driven by Florida's global commerce posture.

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