

PathTech



**Successful Academic & Employment Pathways
in Advanced Technologies**

Engineering Technology Pathways through High Schools, Community Colleges, and Industry (Year 3 of 4 Overview)

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PathTech seeks to design, create and foster collaborations between social science and education researchers and those experiencing technician educational and occupational pathways as administrators, teachers, students, employers, and policy makers.

These collaborations allow for organic development of research objectives and research design and interface and interaction that facilitate real-time knowledge construction and dissemination of emerging findings, which allows all collaborative members to benefit from the research.



Project Overview

“Successful Academic and Employment Pathways in Advanced Technologies” (NSF #1104214) is an ATE Targeted Research on Technician Education partnership between Florida Advanced Technological Education Regional Center of Excellence (FLATE) and an interdisciplinary team of researchers from the University of South Florida (USF). PathTech responds to the growing need to understand pathways to and from technician education programs and the technology workforce through interviewing students and key personnel in Tampa Bay high school career academies, engineering technology (ET) AS/AAS programs, and advanced manufacturing industry.

High School Findings

Interviews with 70 high school students in STEM magnet and career academies were interviewed to determine educational and occupational pathways leading them to ET education and employment opportunities. High school students were asked to discuss:

- What prompted their interest in pursuing advanced technology education
- Descriptions of their coursework
- Future plans and goals

High school data analysis reveals varied future plans:

- About 1/3 had completed high levels of math and science coursework in high school and are **bound for four-year universities to study in STEM fields**
- STEM students are more interested in pursuing degrees from four-year universities over two year community college technician programs
- Of the students who are interested in **community college** programs post-high school graduation, many see it as a **cost-effective means** to complete general education requirements and plan **to transfer to a four year institution**
- Less than 1/4 of the students were **considering associate's degree programs in technician education**
- Most of these students are only interested in programs which offer formal co-operative education (“co-op”) opportunities to work in relevant industry jobs while taking classes
- About 1/3 **could not afford to continue in school** without assistance. Their plans include:
 - joining the military in a technical field with hopes of going back to school with support from the GI Bill
 - entering the technician workforce

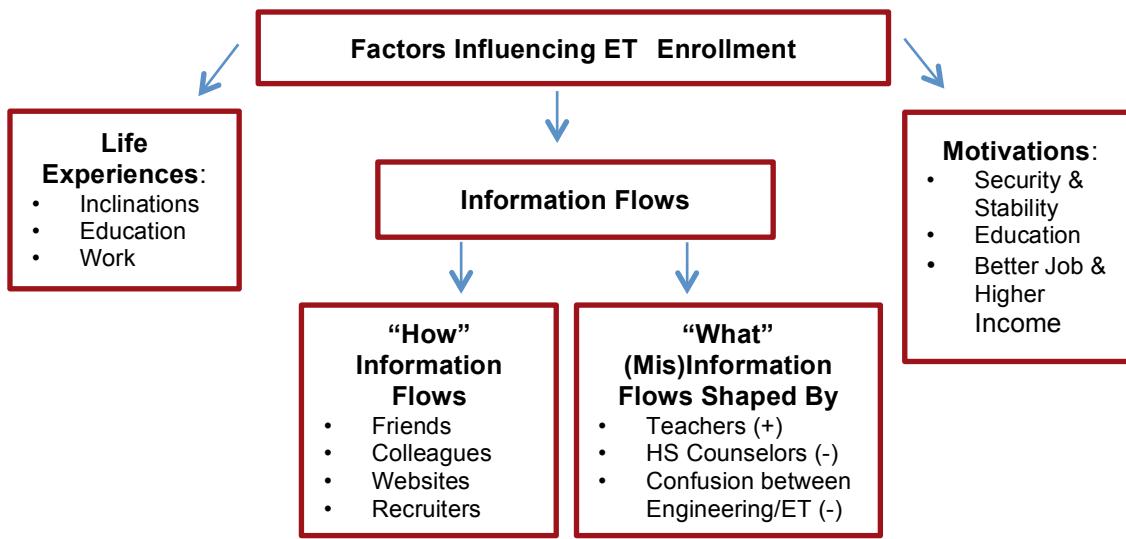
These students desired postsecondary schooling, but share an uncertainty about funding post-secondary education due to their family finances, thus potentially derailing their hopes for future degree attainment.

Community College Findings

Fifty-seven community college students enrolled in ET classes were interviewed about how their interests in ET developed as well as what they hope to gain from taking these courses. Specifically, community college students were asked about:

- How they came to learn about ET programs
- The factors that influenced their decision to enroll in an ET program
- Their high school preparation
- Their perceptions of the ET job market

Community College Student Enrollment and Profiles



ET students generally fit within one of the following four profiles, although several participants share characteristics from two or more categories.

- **Profile 1: DEVELOPING INTEREST IN EDUCATION THROUGH ENGINEERING TECHNOLOGY**
 - Have a HS diploma or GED
 - Enjoy working with their hands
 - Were indifferent toward schooling in the past
 - Have a winding job history
 - Have found ET classes of great interest to them
 - Are pursuing higher education for perhaps the first time
- **Profile 2: CREDENTIALING TO ENTER ENGINEERING TECHNOLOGY**
 - Have a HS degree and often some college
 - Describe themselves as good students in the past
 - Have never been exposed to ET through school or work
 - Have a stable work history
 - Aim to enter the industry with credentials/certifications from ET programs
- **Profile 3: RE-SKILLING FOR JOB STABILITY**
 - Are focusing on re-skilling to improve their job situation
 - Have had careers in manufacturing or related fields, but who have been laid off after several years of employment
 - Are taking ET courses and seeking certification for stable employment and to support their families
- **Profile 4: DEGREE-SEEKING AS SELF-EMPOWERMENT**
 - Are degree-seeking
 - Hope to empower themselves and gain the respect of others
 - Have a life-long dream of earning a degree in higher education

Overall, ET community college programs have a **transformative effect on students**.

Industry Findings

Interviews with 27 local industry leaders were conducted to gain a better understanding of employer and industry needs. Regarding **preparation for the workforce**, employers stated the need for:

- More continuity between education and occupational competence
- More STEM education and ‘hands-on experience’ with machines

Employers vocalized differences between community college and university education. While some participants stated that a four-year degree affects job placement, others stated that by the time students graduated with their degrees, the technology they learned during the program has become outdated. Therefore, community college ET training was often considered much more time and cost efficient. However, some interviewees felt the community college ET programs didn’t adequately prepare their students for the demands of the jobs. This suggests a **disconnect between skills learned and skills desired**.

Industry leaders also highlighted the need **for more awareness about ET career opportunities**. Several employers felt that ET jobs opportunities are not well known throughout the local community. Employers suggested exposing primary and secondary school students to ET education and career opportunities.

Employers were asked about the “**ideal worker**” and mentioned valuable skills including:

- Good STEM education
- Drafting experience
- Soft skills including punctuality, responsibility, a positive disposition and enthusiasm

Because tech skills were often seen as ‘teachable,’ positive attitudes and punctuality were considered to be important soft skills to look for in potential employees. Additionally, employers stated that they are looking for employees who can fit the changing manufacturing workforce. Specifically, employers are looking for employees who can easily adapt to new technologies.

Policy Recommendations

- Develop a professional network for technician educators across secondary and post-secondary educational institutions to connect and develop an infrastructure to “send” students from high school CTE classes into ET community college programs.
- Develop highly informational websites to improve the information flows about both what technician education is and **how to enter and succeed in community college ET programs**.
- **Focus recruitment efforts on mid-career individuals** seeking to re-skill and/or develop technical expertise to re-enter the workforce.
- Work specifically with high school counselors to improve their knowledge of **the differences between engineering and engineering technology** and the many **opportunities for technicians** in the current economy.
- Given the palpable stress personal finances presented for continuing in school, many more interested students with solid high school foundations would be attracted to associate’s degree programs if **financial assistance** were more readily available. In particular, scholarships, grants, and loans would be very helpful.