

PathTech LIFE (Learning, Interests, Family and Employment): Understanding Advanced Technology Students

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Abstract

Educators can create better learning experiences if they understand more about the students in their classrooms. In most two-year college technical courses and programs, student diversity is particularly high for most demographic characteristics including age, gender, ethnicity and socioeconomic background. The PathTech LIFE project seeks to understand how learning, interests, family, and employment (LIFE) experiences of two-year college students studying various engineering technology related disciplines impact their decisions to enroll, return for further coursework, and/or pursue a certificate or degree. Among other early results, one primary motivator for enrollment in the technical programs is a stronger, more stable and more secure career pathway for supporting the students' families. This paper represents a work in progress effort that will report on the initial data from a survey as well as the findings of from the "pilot" study conducted regionally in the greater Tampa Bay area.

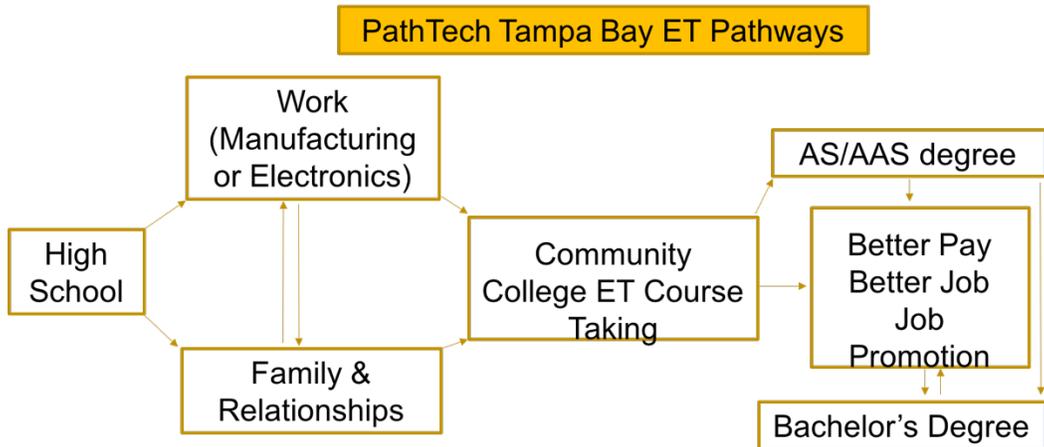
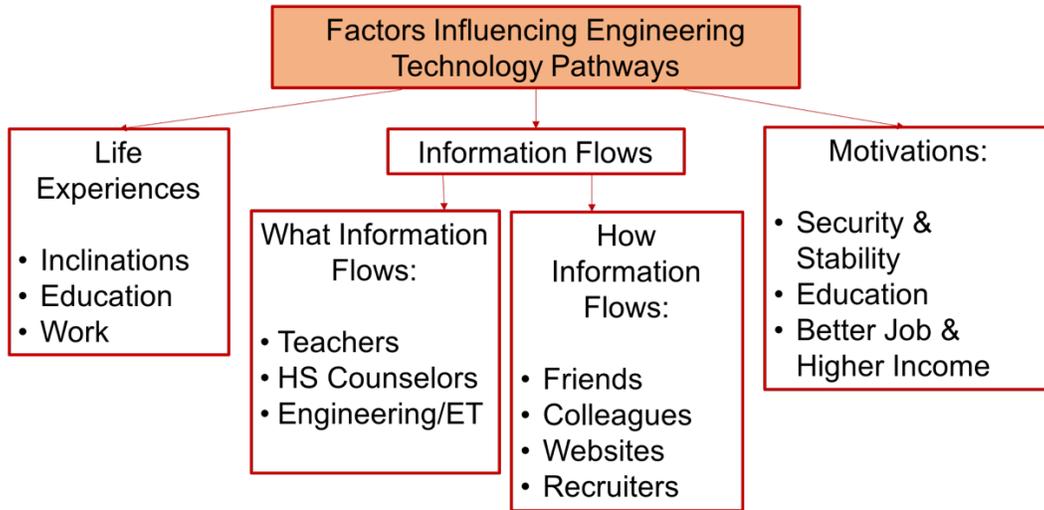
Keywords

Engineering Technology, education, pathways, student motivators, research

PathTech Tampa Bay Background

In 2011, researchers in the Sociology Department at the University of South Florida began studying the education and employment pathways of students entering 2-year engineering technology programs through interviews of all stakeholders associated with the pathway. Graduates of these programs are engineering technicians and in high demand for high wage positions across the country. These technicians build, maintain, operate and troubleshoot automated equipment in a number of different industry sectors including manufacturing, energy, material handling, transportation and many more. This first targeted research project focused on career pathways from high school to 2-year programs and beyond to baccalaureate degrees or to the workplace in a five-county region that directly serves the University of South Florida in Tampa Bay.

Five state/community colleges were included in this initial project in which interviews were conducted with high school and 2-year college faculty; students at both levels; administrators at both levels; and industry partners of the various programs. The project team conducted 174 in-depth qualitative interviews. The influencing factors defined by the interview results are summarized in the following diagram. The second diagram illustrates the emerging pathways for two-year associate engineering technician education. These results also supplied strong support for the direction and scope of the current project, PathTech LIFE.



PathTech LIFE Overview

The PathTech LIFE project was funded by the National Science Foundation (NSF) Advanced Technological Education (ATE) program in 2015 and seeks to understand how learning, interests, family, and employment (LIFE) experiences of two-year college students impact their decisions to enroll, return for further coursework, and/or pursue a certificate or degree. It is a partnership between the University of South Florida, Florida Advanced Technological Education Center (FLATE) at Hillsborough Community College and other ATE Centers and projects. This project expands the PathTech Tampa Bay to a national focus of community college students in advanced technology fields that are considered to be sub-disciplines of engineering technology using an in-depth online survey. A project pilot engaged with these colleges through appropriate Advanced Technological Education (ATE) grantees. The pilot survey instrument revealed a limited number of colleges in the spring of 2017. Preliminary data from this pilot informed a number of changes both in the survey questions themselves and the logistics of implementation that were modified during the summer of 2017 and are implemented in the national survey deployed in September 2017.

PathTech LIFE Survey Topics and Strategies

Colleges with engineering technology programs were recruited through the NSF ATE centers and projects. College program that achieve milestones in percent participation get a stipend and/or a specific program report. The survey delves into a number of aspects of students personal, student and professional lives with questions covering academic background, college experiences, employment background and current status, motivation for enrollment, program evaluation, academic and career goals and demographics. To entice students to participate in the 15-minute survey, each student responding to the complete survey receives \$25.

Pilot Survey Results

A small pilot of 528 students from 26 different colleges responded to the survey between April 3 and May 2, 2017. Students identified with engineering technology programs that were categorized as focused on energy and the environment, advanced manufacturing, micro and nano technologies, general engineering technology or none of the above. The survey results indicated that Most students were between the ages of 18 and 30 years old, with 84% of respondent identifying as male. Demographic data also revealed that 63% identified as white. Employment information revealed that only 34% of students employed full time had jobs in their field of study while 48% of part time students have positions in engineering technology. Most students are happy with their program and acknowledged that the class offerings accommodate their work schedule. Additionally, 71% had an associate degree as their goal with 55% of all respondents having a long-term goal of a bachelor's degree and to stay in the engineering technology field.

Student Motivation

A number of survey questions addressed student's motivation to enrolled in their specific program. Students were asked to select from a list of sixteen items any/all that motivated them to enroll in the program. These results were analyzed using the PRISM Decision Model for Adult Enrollment (Stein & Wanstreet, 2006). PRISM categorizes 16 different responses in one of four categories: Pathway to a Better Life, Reflective Learner, Synchronizing Learning, Earning, and Living, and Match with an Academic Life. A strong majority of respondents wanted to increase their opportunities for a better life, a response that falls into the PRISM "Pathway to a Better Life" category. Least important motivator in this pilot was "wanting to improve my self-esteem", which also falls into the category "Pathway to a Better Life". The responses to the various student enrollment motivation questions were further distilled to five reasons for why students enrolled as identified by demographic categories. These categories are:

- Personal well-being
- Academic effort
- Skill building
- Job and financial concerns
- Family and other concerns

Next Steps

As a work in progress, the survey was slightly revised after the spring semester pilot and re-opened in the fall of 2017. Most notably, a few questions were modified slightly for clarity and the survey was reduced from 25 to 15 minutes to enhance completion by students. After the University IRB (Instructional Review Board) approved revised survey, the survey was re-opened and an aggressive student recruitment campaign began. The goal is to get at least 2,000 student responses from across the country and conduct the same analysis of the data. A national summary as well as regional and individual college reports will be generated where there is a significant sample size and response rate.

Project Impact

Individual college reports on their student responses can inform local educators about their student population with reliable statistical data about their students. This can certainly lead to a better understanding of the students a particular college is serving and provide some context and comparison with other colleges (similar or dissimilar) as well as the national norm. One anonymous faculty member in a strong and mature A.S. Engineering Technology degree program participating in the survey observed: “We have to be aware of and deal with the fact that many of the students enrolled in our programs are just one paycheck away from some kind of financial disaster.” How faculty support their students through these “life events” is critical to their completion of the courses and/or programs as well as their future career success. Success of our students is vital for the students as well as the industries we serve. The research team is planning a longitudinal study of a small group of those surveyed in PathTech LIFE.

References

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Danielly Orozco, is the Associate Director of the Florida Advanced Technology Education Center-FLATE, a National Science Foundation Center of Excellence in high-technology education focused on manufacturing. She holds B.S. and M.S. degrees in Sanitary Engineering and Environmental Engineering. Mrs. Orozco has worked for FLATE for over 8 years as a subject matter expert and curriculum coordinator. In her current role as associate director, Danielly helps to promote manufacturing and advanced technical education, participates in research on engineering technology recruitment and retention best practices by ensuring the continuation of exemplary industry partnerships, workforce opportunity, and educational synergy in Florida.

Will Tyson is an Associate Professor of Sociology at the University of South Florida. Dr. Tyson's research examines STEM educational and career pathways with a focus on student- and institutional-level influences on high school and college science and math course taking and STEM degree attainment. Dr. Tyson was the Principal Investigator of the NSF-funded project "Successful Academic and Employment Pathways in Advanced Technologies" (#1104214) or PathTech. Dr. Tyson is also the Principal Investigator of the follow-up study "PathTech LIFE: Constructing a National Survey of Engineering Technology Students through Regional and Statewide Testing" (#1501999).

Lakshmi Jayaram is a Research Associate at the University of South Florida working on the NSF-funded project "PathTech LIFE: Constructing a National Survey of Engineering Technology Students through Regional and Statewide Testing" (#1501999). Dr. Jayaram has 25 years of experience in education, as a professor, researcher, evaluator, curriculum developer, and program analyst. Dr. Jayaram is a recognized expert in qualitative research methodologies, has given several invited talks about qualitative research design, conducted coding and data analysis workshops, and provides methodological training and mentorship for student research. Dr. Jayaram's research interests include studying the experiences of under-represented and non-traditional groups in STEM fields.

Marilyn Barger is the Principal Investigator and Executive Director of the Florida Advance Technological Education Center of Excellence (FLATE) housed at Hillsborough Community College in Tampa, Florida. FLATE is funded by the National Science Foundation (NSF, #1204751) and serves technical education pathways and programs in Florida that support the manufacturing industry. Dr. Barger has over 20 years of experience developing and delivering STEM curriculum for K-20 students and educators and has initiated long-term, systemic education reforms. She is a licensed professional engineer in the state of Florida, holds a licensed patent and is a registered engineer in Florida.