

Final Report Attachment 4

Selected Conference Presentations Years 1 and 2 (Sept 2015 – August 2017)

Year 1:

Tyson, Will. 2016. "PathTech LIFE: Constructing a National Survey of Diverse Community College STEM Students." Paper presented at the Annual Meetings of the Southern Sociological Society, April 13-16, Atlanta, GA.

Year 2:

Tyson, Will. 2016. "Survey Development Challenges: Examining Student Retention in STEM Programs." Paper presented at the 7th Annual STEMtech Conference, November 6-9, Philadelphia, PA.

Tyson, Will and Edward C. Fletcher. 2017. "Examining Enrollment Decisions and Life Challenges of Adult Learners in Engineering Technology." Paper presented at the Annual Meeting of the American Educational Research Association, April 27-May 1, San Antonio, TX.

Tyson, Will. 2017. "PathTech LIFE: Preliminary Findings for a National Survey of Advanced Technology Students." Paper presented at the High Impact Technology Exchange Conference, July 17-20, Salt Lake City, UT.

PathTech LIFE: A National Survey of

Learning Experiences
Interests Influencing Pathways
Family into Advanced
Employment Technologies

PathTech LIFE: Constructing a National Survey of Diverse Community College STEM Students



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Skills Gaps in the Technology Labor Force

- ▶ 2,000,00 US jobs will go unfilled because of shortfalls in skills, training, or education.
 - ▶ 600,000 a jobs that require more than a high school diploma but less than a bachelor's degree. "Middle skills" such as:
 - ▶ vocational certificate
 - ▶ industry-based certification
 - ▶ some college credits or an associates degree
 - ▶ Despite the focus on Science, Technology, Engineering, and Mathematics (STEM) related occupations with bachelor's and higher degrees, **over a third of all STEM jobs will be for those with less than a bachelor's degree.**

(Anthony Carnevale, Georgetown University Center on Education and the Workforce)



How We Understand Community College Students

- ▶ “Cooling out” - community colleges serve to “cool out” students who may not have the academic ability to complete their academic goals, including a bachelor’s degree (Clark 1960, 1980).
- ▶ Focus on the tension between the democratizing mission of community colleges (open enrollment, lower costs, etc.) and the questions about community college pathways to social mobility.
- ▶ Roles of cultural and social capital in community college enrollment. Need to understand social contexts of student experiences. (Schudde and Goldrick-Rab 2015)



PathTech LIFE Goal

- ▶ Understand **education and employment pathways, career goals, and school-work-life balance** of individuals completing community college coursework, certification, and AS/AAS degrees in four technology fields using a national survey.
 - ▶ Community college technology programs attract **non-traditional students, veterans, incumbent workers, and the long-term unemployed**, all who play a crucial role in filling technician jobs that often go unfilled due to shortfalls in skills and training within local workforces.
 - ▶ Understanding pathways to and from technician education programs is vital to sustain workforce development, improve student/worker life chances, and stabilize local economies.



PathTech LIFE Background

PathTech LIFE: A National Survey of LIFE (Learning, Interests, Family, and Employment) Experiences Influencing Pathways into Advanced Technologies

- ▶ NSF Advanced Technological Education (ATE)
 - ▶ 3 years, \$778,031; started Sept 2015
- ▶ **Phase 2** of a *partially mixed sequential equal status research design*, a mixed methods approach in which qualitative and quantitative phases take place sequentially with each having equal weight (Leech and Onwuegbuzie 2009).



Phase 1: PathTech Tampa Bay

Successful Academic and Employment Pathways in Advanced Technologies

- ▶ NSF Advanced Technological Education (ATE)
 - ▶ 4 years, \$1,196,790; Sept 2011-Aug 2015
- ▶ **Goal:** To examine the progression of students from high schools and the local workforce into engineering technology (ET) community college programs and careers



Engineering vs. Engineering Technology (ET)

Engineering

- Planning, innovating
- Theoretical, concept-oriented
- Calculus based

Engineering Technology

- Doing, implementing
- Practical and “hands-on,” application-oriented
- Algebra based

(From Hillsborough Community College ET website)



Community College Engineering Technology Students

- ▶ Completing coursework toward certificates or AS/AAS degrees in engineering technology at one of four community colleges
 - ▶ Primarily non-traditional students (ranging 25-60 years old)
 - ▶ Mostly men (6 women)
 - ▶ Includes veterans, incumbent workers, long-term unemployed
 - ▶ Mix of relevant work experiences



PathTech Tampa Bay Methods

- ▶ Interviews asked community college ET students:
 - ▶ How they came to learn about ET programs
 - ▶ Factors influencing their decision to enroll in ET programs
 - ▶ Prior education (high school, university, technical colleges)
 - ▶ Their perceptions of the job market

Interviews were approximately 20-30 minutes
Transcripts coded and thematically analyzed
All names used here are pseudonyms

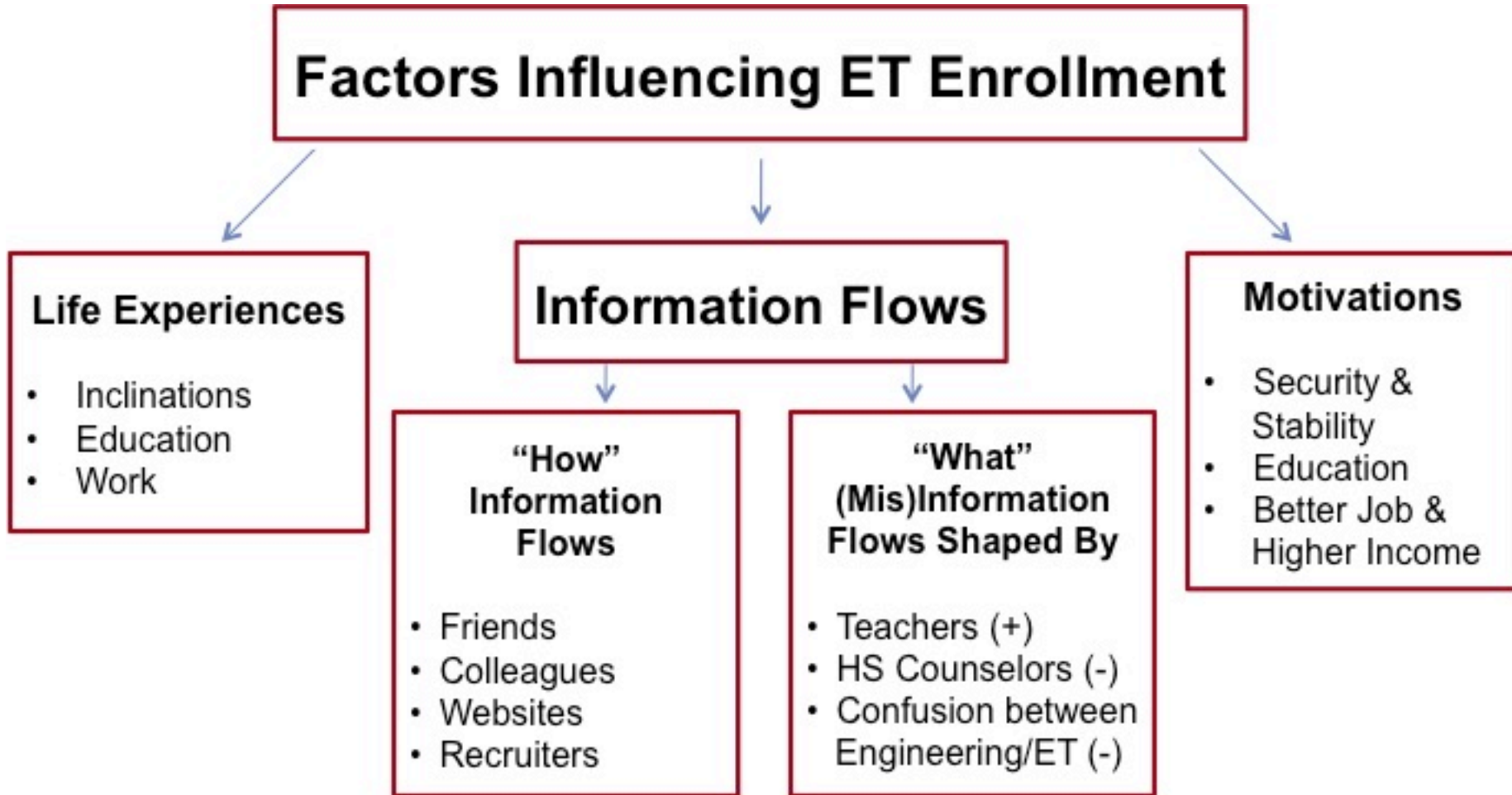


PathTech Tampa Bay Frameworks

- ▶ Factors Influencing Enrollment
- ▶ Student Motivations
- ▶ Cycling to Re-Skill
- ▶ Emerging Pathways



PathTech Frameworks: Influencing Enrollment



PathTech Frameworks: Motivations

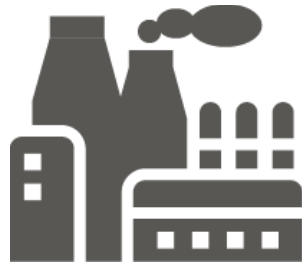
Learning



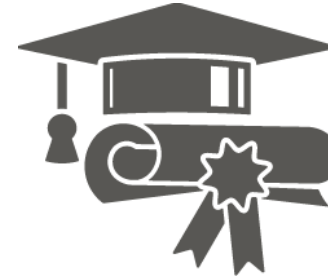
Credentialing



Re-skilling



Empowering



Motivations of Engineering Technology Students

LEARNING

1



2



3



4



- High school diploma or equivalent
- Enjoy working with their hands
- Have been indifferent towards schooling in the past
- Winding work history



Through ET classes, they have now found something that really interests them, and they are interested in going further in schooling—*perhaps the first time.*

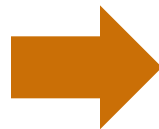


Motivations of Engineering Technology Students

CREDENTIALING



- At least a high school diploma and often some college.
- Describe themselves as good students in the past, but never exposed to ET in their earlier educational or work experiences.
- Stable work history



Aim to enter industry with the credentials/certifications from their ET programs

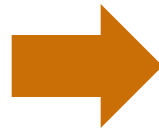


Motivations of Engineering Technology Students

RE-SKILLING



- Focused on re-skilling
- Eager to improve their job
- Prior careers in manufacturing or related fields; laid off after many years of employment



Taking ET courses and seeking certification in order to gain a new and more stable job that will be able to support their families.



Motivations of Engineering Technology Students

EMPOWERING

1



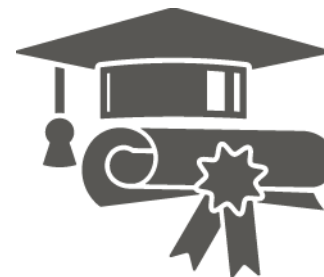
2



3



4



- Degree-seeking
- Hope to empower themselves and gain the respect of others



Higher education degree has often been a life-long dream, and ET provides a pathway



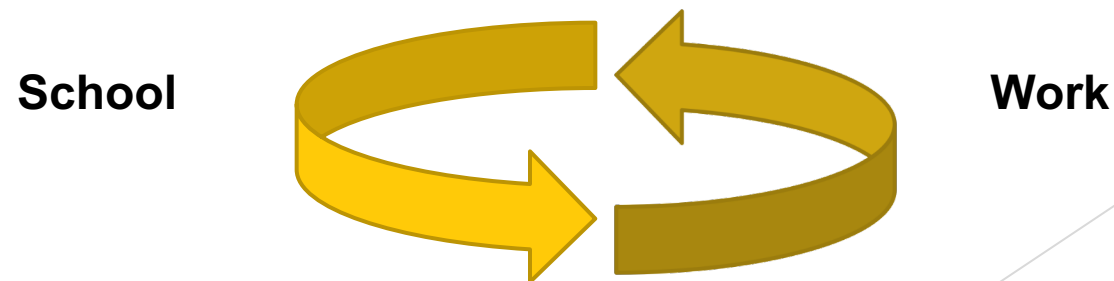
PathTech Frameworks: Pipeline or Cycling?

Pipeline: linear progression from school to work

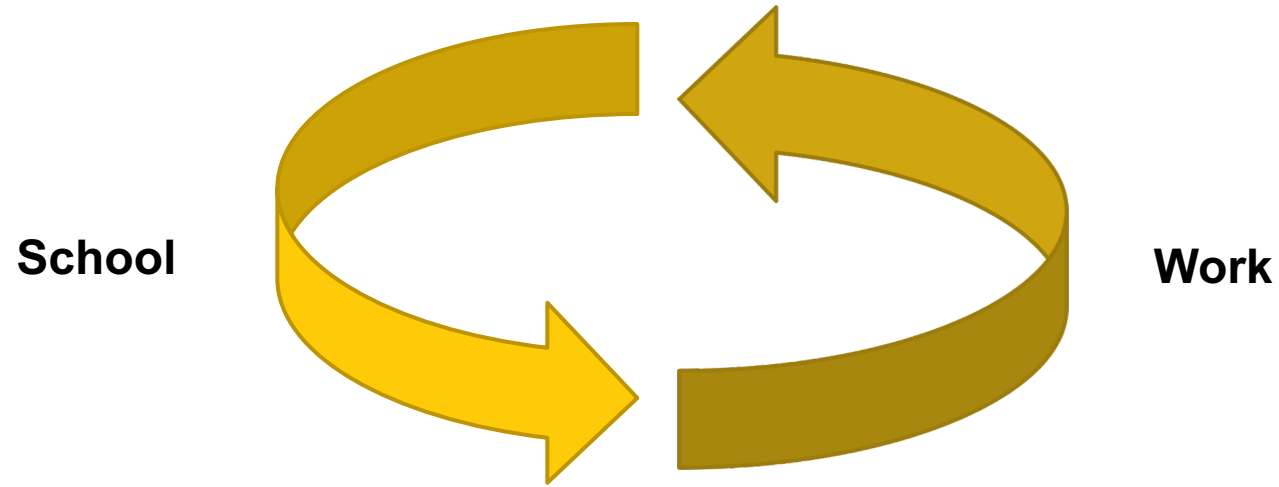


However, fewer and fewer students are experiencing linear progressions from school to work. Also, students experience other life transitions in addition to 'school-to-work.'

Cycling addresses this disconnect and speaks to non-linear school-to-work transitions.



Cycling in Order to Re-Skill



‘Re-Skilling’: pathways characterized by fluid movement between school to work and work to school

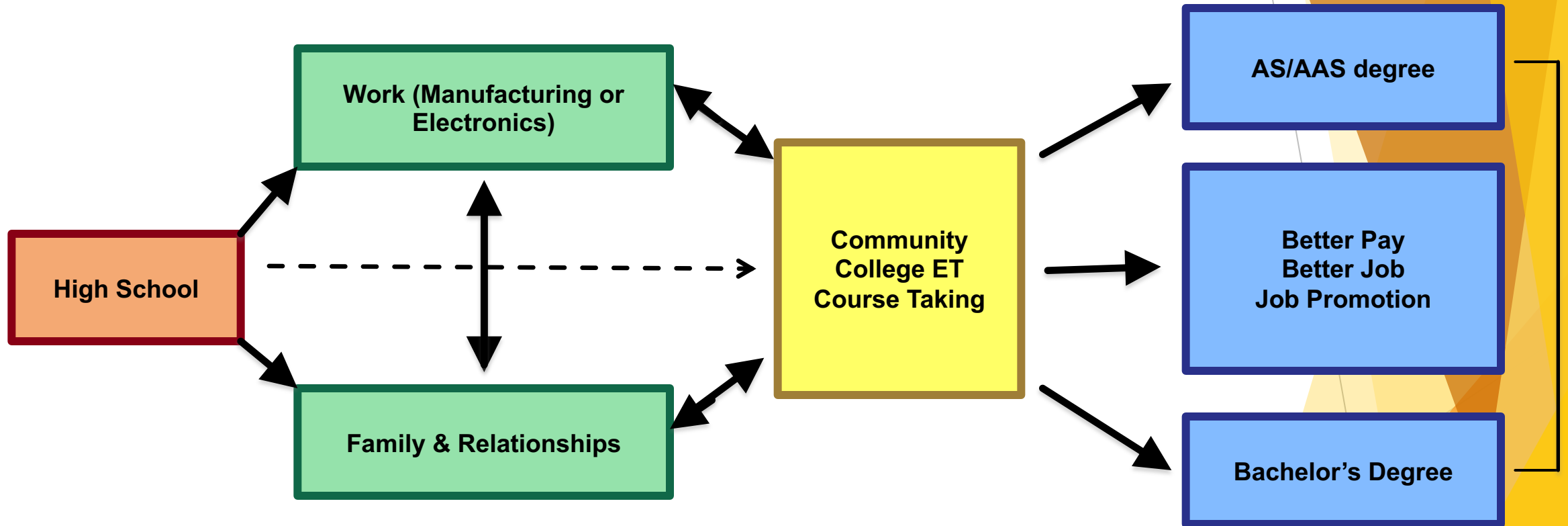
- Re-skilling has become necessary to survive in the current economy and its demands for a highly skilled workforce

‘Cycling’: fluid system of transitions between school, work and family

- Contemporary economy requires re-skilling of technician workforce
 - Community college- not just a destination with a simple entrance and exit
 - Pathways between school and work are necessitated by broader market demands and personal life histories



Frameworks: Emerging Pathways



Pilot Survey Construction

- ▶ Demographic Background
- ▶ Academic Background
- ▶ Employment Experiences
- ▶ PRiSM Decision Model for Adult Enrollment (Stein & Wanstreet, 2006)
 - ▶ Pathway to a better life
 - ▶ Reflective learner
 - ▶ Synchronizing Learning, Earning, and Living
 - ▶ Match with an Academic Life
- ▶ Schlossberg's Transition Theory (Schlossberg, 1984)



Pilot Survey Development

- ▶ Partnerships with Community College Faculty and Administrators
- ▶ Seven ATE Centers specializing in four technological fields:
 - ▶ Micro and Nano Technologies
 - ▶ Engineering Technologies
 - ▶ Advanced Manufacturing Technologies
 - ▶ Energy and Environmental Technologies
- ▶ Delphi Study with 16 member expert panel
 - ▶ Three rounds of feedback seeking 80% agreement per question.



Pilot Survey Distribution

- ▶ Distributing survey through ATE Center partners
- ▶ Seeking 50 respondents per center (350 total)
- ▶ At the discretion of center using their own networks
 - ▶ Most likely sending email to students in 3 or 4 core courses
- ▶ All respondents receive \$25 electronic gift card.
- ▶ Each center receives \$5,000 for their help in survey development and distribution.



PathTech



Survey Development Challenges: Examining Student Retention in STEM Programs

Will Tyson

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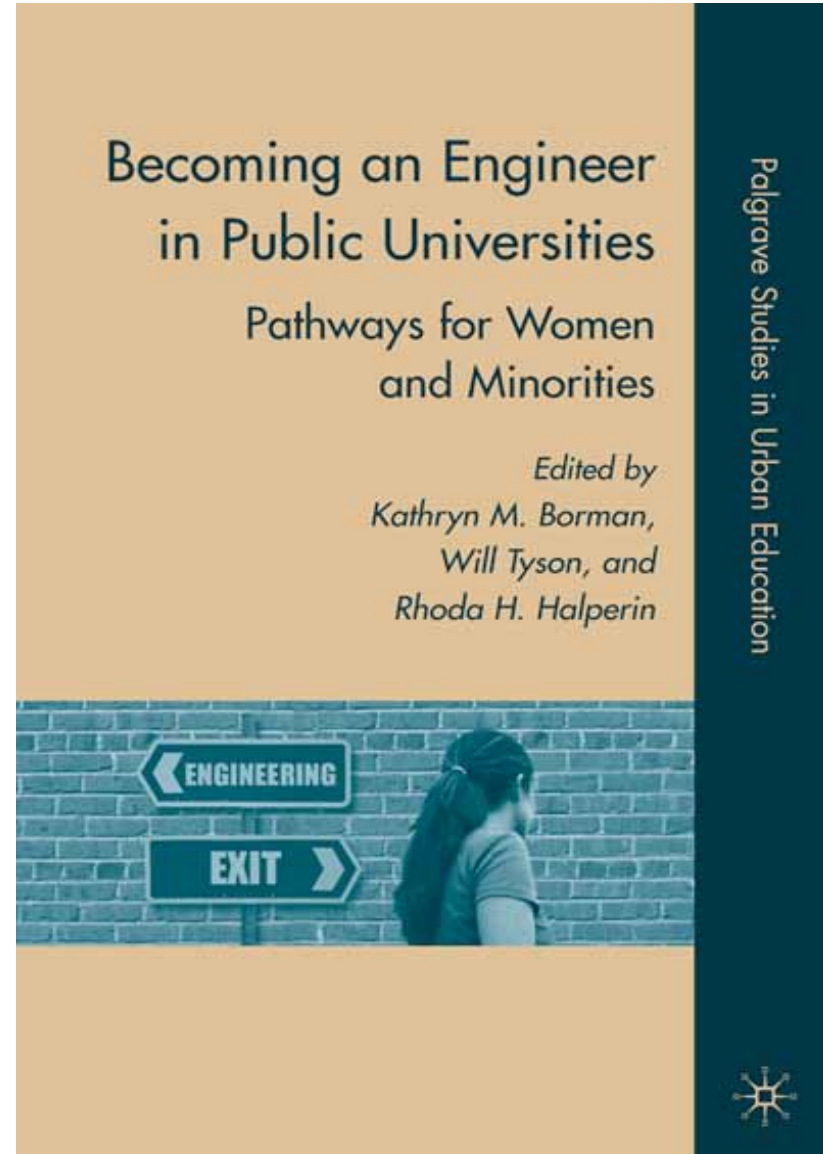
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Introduction

- Grantsmanship
 - Served on 7 grants over 12 years (5 grants over \$900,000)
 - Post-doc (1 award)
 - Senior personnel (3)
 - Co-Principal Investigator (1, \$996,966)
 - Principal Investigator (2, \$2 million)



Research Focus

Journal of Engineering Education
October 2011, Vol. 100, No. 4, pp. 760–777
© 2011 ASEE. <http://www.jee.org>

Modeling Engineering Degree Attainment Using High School and College Physics and Calculus Coursetaking and Achievement

WILL TYSON
University of South Florida

NEGATIVE IMPACT OF EMPLOYMENT ON ENGINEERING STUDENT TIME MANAGEMENT, TIME TO DEGREE, AND RETENTION: FACULTY, ADMINISTRATOR, AND STAFF PERSPECTIVES

WILL TYSON
University of South Florida

Research in Social Stratification and Mobility 41 (2010) 124–130



www.elsevier.com

Research in Social Stratification and Mobility

journal homepage: <http://www.elsevier.com/locate/jssm>

How schools structure opportunity: The role of curriculum and placement in math attainment

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“WE’VE ALL LEARNED A LOT OF WAYS NOT TO SOLVE THE PROBLEM”: PERCEPTIONS OF SCIENCE AND ENGINEERING PATHWAYS AMONG TENURED WOMEN FACULTY

Will Tyson^{1,*} & Kathryn M. Borman²

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²Alliance for Applied Research in Education and Anthropology, Department of Anthropology, University of South Florida, Tampa, Florida 33647, USA

PathTech Research Agenda

- Awards
- Funding Program
- Community College/University Partnerships
- Community Engagement
- Philosophy
- Holistic Approach to Pathways
- Relevance
- Methods



PathTech Projects

- PathTech Tampa Bay
 - *Successful Academic and Employment Pathways in Advanced Technologies* (NSF #1104214)
 - \$1.2 million over 4 years (2011-2015)
 - Examination of educational and employment pathways through interviews and observation in local high schools, community colleges, and industry

PathTech Projects

- PathTech LIFE (Learning, Interests, Family, Employment)
 - *PathTech LIFE: Constructing a National Survey of Engineering Technology Students through Regional and Statewide Testing (#1501999)*
 - \$778,031 over 3 years (2015-18)
 - National survey of community college students in advanced technology fields in collaboration with a national network of colleges

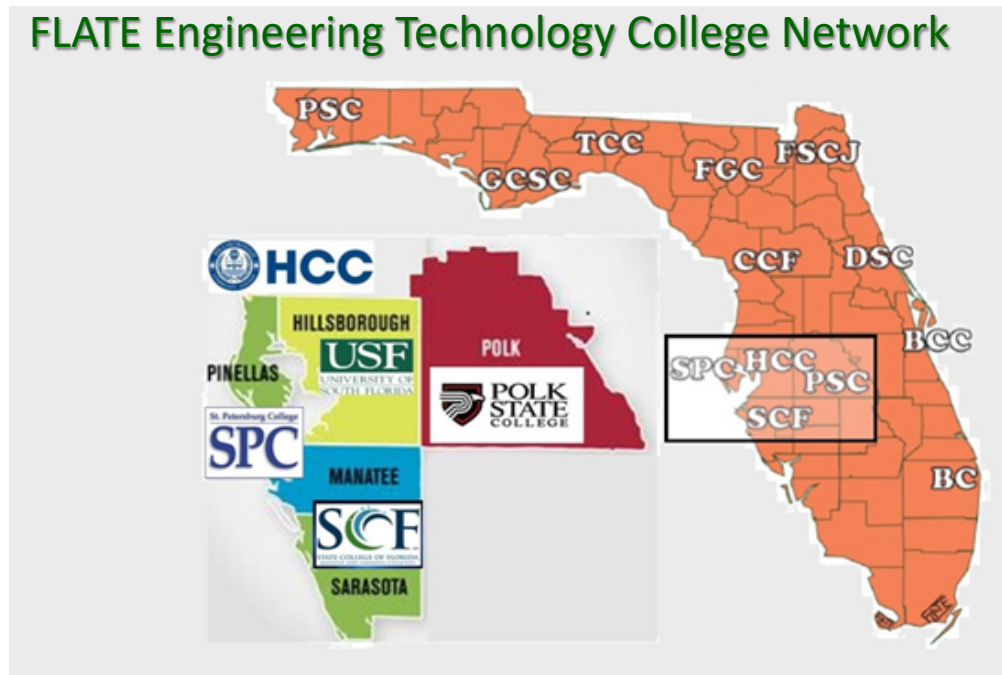
NSF ATE – Advanced Technological Education

- **ATE Mission** (from program solicitation *emphasis added*)
 - ATE supports targeted research on technician education, changing roles of technicians in the workplace, and topics that **advance the knowledge base** needed to make technician education programs more effective and more forward-looking.
 - Results **inform** practices in technician education programs, emphasizing dissemination to practitioners.
 - Projects represent a **true collaboration**--reflected in the activities, the leadership, and the budget--between well-qualified **researchers, two-year college educators** and other stakeholders.

Community College Partners

PathTech partnerships with FLATE, including program faculty and administrators help researchers connect with:

- Colleges
- High schools
- Industry partners



Community Engagement



Presenting to college stakeholders



Meeting with college administrators



Industry tours

Philosophy

PathTech aims to conduct targeted research on educational and employment pathways into advanced technology degree programs and careers in conjunction with high schools and community colleges.

PathTech



As the need for a skilled technology workforce continues to grow, understanding pathways to and from technician education programs and the technology workforce is vital to sustain workforce development, improve student/worker life chances, and stabilize local economies.

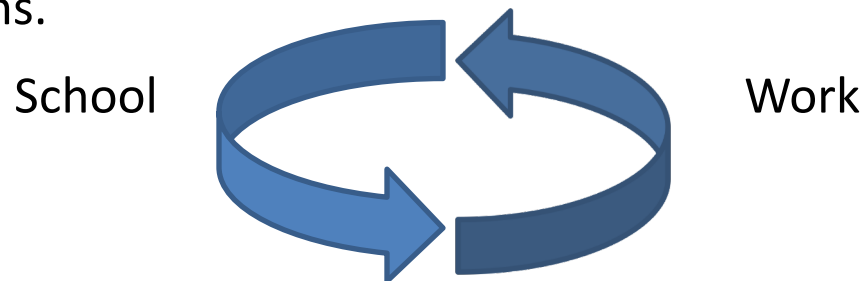
Holistic Approach to Pathways

Pipeline: linear progression from school to work

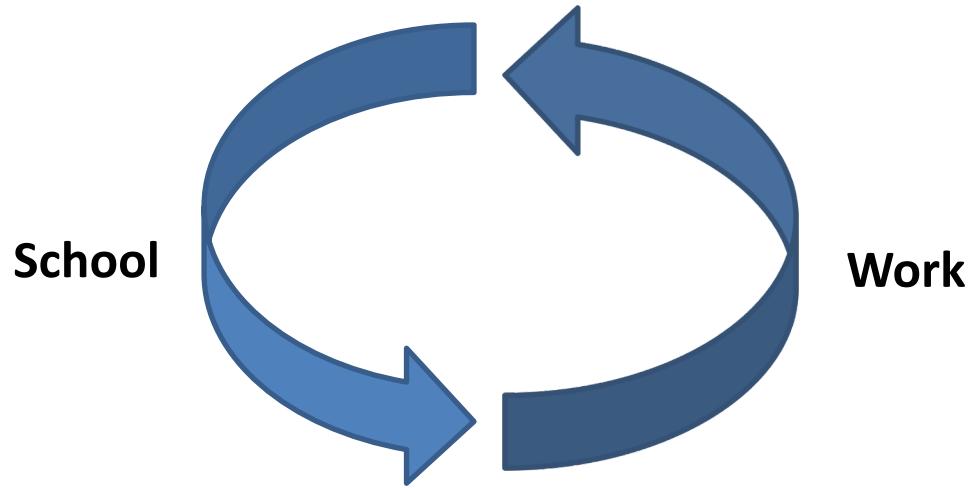


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Cycling addresses this disconnect and speaks to non-linear school-to-work transitions.



Holistic Approach to Pathways



‘Re-Skilling’: pathways characterized by fluid movement between school to work and work to school

- Re-skilling has become necessary to survive in the current economy and its demands for a highly skilled workforce

‘Cycling’: fluid system of transitions between school, work and family

- Contemporary economy requires re-skilling of technician workforce
 - Community college- not just a destination with a simple entrance and exit
 - Pathways between school and work are necessitated by broader market demands and personal life histories

Pathways Research

- Understanding the confluence of pathways and social forces gives leaders and policymakers the tools to:
 - support education and employment in technician education programs, emphasizing dissemination to practitioners
 - improve the life chances and well-being of the citizenry
 - foster progress as an educated and skilled nation

Findings

Factors Influencing Enrollment

Life Experiences

- Inclinations
- Education
- Work

Information Flows

“How” Information Flows

- Friends
- Colleagues
- Websites
- Recruiters

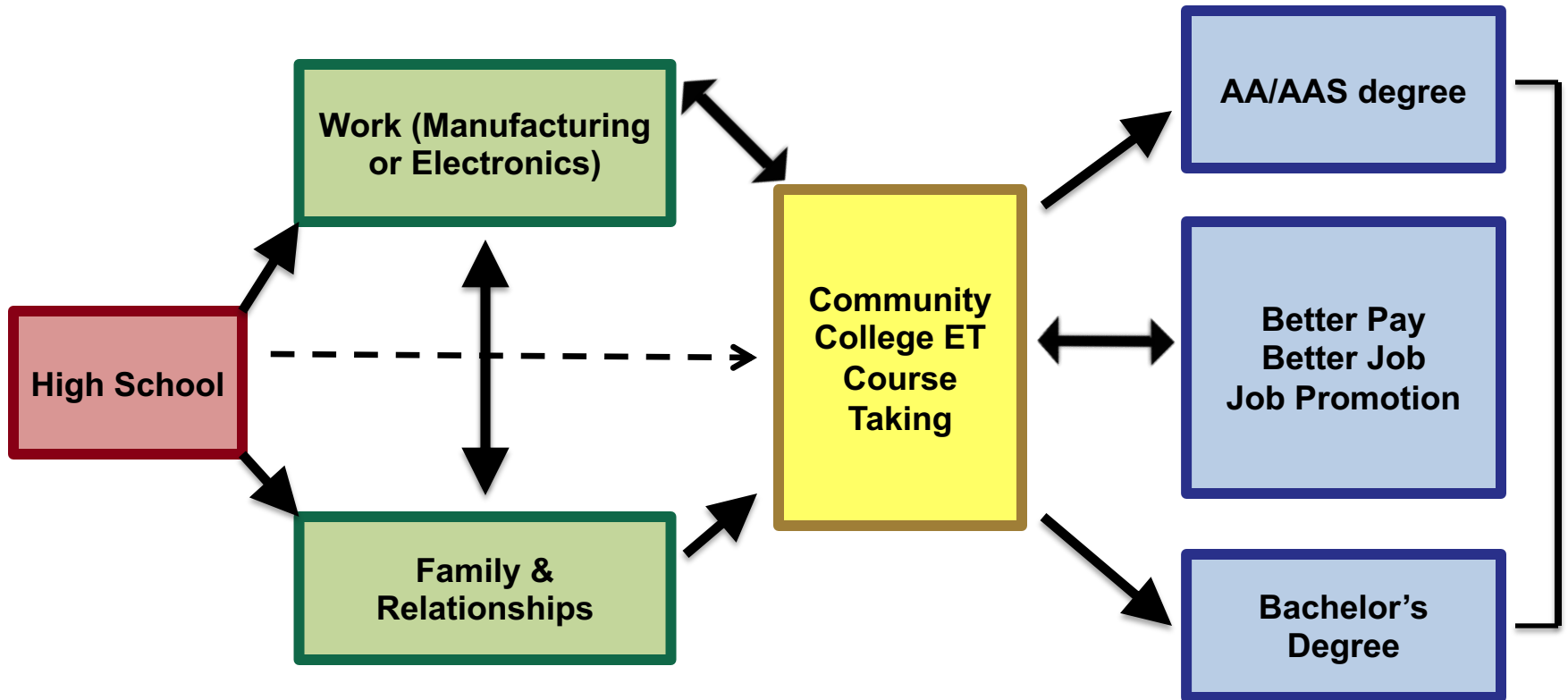
“What” (Mis)Information Flows Shaped By

- Teachers (+)
- HS Counselors (-)
- Confusion between Engineering/ET (-)

Motivations

- Security & Stability
- Education
- Better Job & Higher Income

Emerging Pathways



Motivations of Engineering Technology Students

Learning



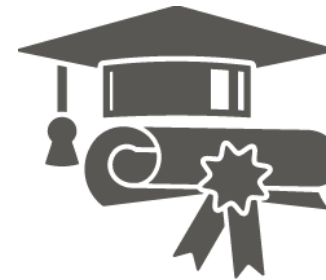
Credentialing



Re-skilling



Empowering



PathTech LIFE Purpose

- ▶ To understand the LIFE experiences that influence enrollment, retention, and persistence toward advanced technology certificates and degrees
 - ▶ Learning
 - ▶ Interests
 - ▶ Family
 - ▶ Employment

PathTech LIFE Purpose

- ▶ To identify the characteristics of students in advanced technology fields
 - ▶ Decision to enroll
 - ▶ Academic pathways
 - ▶ Career goals
 - ▶ School-work-life balance issues

PathTech LIFE Theoretical Framework

- ▶ Decisions to enroll in higher education:
 - ▶ PRiSM model (Stein and Wanstreet 2006)
 - ▶ *Pathways to a Better Life*
 - ▶ *Reflective Learner*
 - ▶ *Synchronizing Learning, Earning, and Living*
 - ▶ *Match with an Academic Life*

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 - ▶ **Match with an Academic Life**

PathTech LIFE Partnerships

- ▶ Partnership between USF and FLATE
- ▶ National ATE Center Partners in four fields:
 - ▶ Advanced manufacturing
 - ▶ **CARCAM** - Consortium for Alabama Regional Center for Automotive Manufacturing (Gadsden, AL)
 - ▶ **RCNGM** - Regional Center for Next Generation Manufacturing (Farmington, CT)
 - ▶ Engineering technologies
 - ▶ **MatEdU** - National Resource Center for Materials Technology Education (Lynnwood, WA)
 - ▶ Micro and nano technologies
 - ▶ **NEATEC** - Northeast Advanced Technological Education Center (Troy, NY)
 - ▶ Energy & environmental technologies
 - ▶ **CREATE** - California Regional Consortium for Engineering Advances in Technological Education (Santa Clara, CA)
 - ▶ **RCNET** - Regional Center for Nuclear Education and Training (Fort Pierce, FL)

Roles of ATE Center Partners

- ▶ Each center receives a \$5000 stipend in Years 1 and 2.
- ▶ Two leaders from each center reviewed the pilot survey over three phases to establish a consensus on the questions.
- ▶ Distributed pilot survey in May 2016.
- ▶ Will distribute final survey to at least five partner colleges.

Recruiting Student Participants

- ▶ Each student receives \$25.
- ▶ Participating colleges with a 70% response rate will receive a findings report for their college and a \$500 technology stipend.

PathTech LIFE Survey Format

- ▶ Employment and Educational Background
- ▶ Educational Experiences
- ▶ Motivations
- ▶ Program Experiences
- ▶ Future Plans
- ▶ Demographics

PathTech LIFE Research Timeline

Timeline for PathTech LIFE Survey Validation

September 2015 – January 2016	Developed initial survey
February 2016 – April 2016	Sent survey to panel of experts from each ATE Center using Delphi technique (three iterative rounds)
April 2016	Revised survey accordingly
April 2016 – May 2016	Sent out pilot survey to two-year advanced technology students
June – August 2016	Analyzed and revised survey accordingly
September 2016	Conduct think-aloud with 6 ET students
October 2016	Revise survey accordingly
November 2016 – December 2017	Send out national survey
December 2017 – August 2018	Analyze data, prepare reports, publications and presentations

Preliminary Findings

- ▶ **97** participants for pilot
 - ▶ From 13 two-year colleges
- ▶ Pilot demographic characteristics compared to national sample

	PathTech LIFE Pilot Survey	NSB S&E Indicators 2012
White	71%	72%
Black	9%	9%
Hispanic	11%	8%
Asian	7%	4%
Other/Unknown	2%	7%
Male	84%	86%
Female	16%	14%

Preliminary Findings (cont.)

- ▶ Average age was **27**
- ▶ **40%** were employed part-time
- ▶ **34%** enrolled in high school CTE programs
- ▶ **78%** were enrolled in school full-time
- ▶ Average GPA was **3.5**

Preliminary Findings (cont.)

- ▶ **89%** were working toward degree and 21% toward a certificate
- ▶ **85%** believed their program would help them secure a higher paying job
- ▶ **80%** believed their program would provide them with personal fulfillment
- ▶ **71%** planned to earn a baccalaureate degree

Theoretical Framework

- ▶ Factors influencing decisions to enroll based on **PRiSM** model (on 1-4 scale):
 - ▶ *Pathways to a Better Life* (3.20)
 - ▶ *Reflective Learner*
 - ▶ Prior academic success (3.27)
 - ▶ Inclination (2.70)
 - ▶ *Synchronizing Learning, Earning, and Living* (2.24)
 - ▶ *Match with an Academic Life*
 - ▶ Institutional support (2.60)
 - ▶ Program fit (3.12)

Discussion

- ▶ Based on preliminary findings:
 - ▶ Advanced technology programs suffer from shortage of females and ethnic and racial minorities
 - ▶ The vast majority of participants plan to transfer to baccalaureate degree programs
 - ▶ Participants rated “past academic success” as the highest reason for enrolling
 - ▶ Participants rated “synchronizing learning, earning, and living” as lowest reason for enrolling

PathTech



Successful Academic & Employment Pathways
in Advanced Technologies

Examining Enrollment Decisions and Life Challenges of Adult Learners in Engineering Technology



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Edward Fletcher
Co-Principal Investigator
Associate Professor
Career and Workforce Education
University of South Florida



Danielly Orozco
Co-Principal Investigator
FLATE
Hillsborough Community
College



PathTech Projects

- PathTech Tampa Bay
 - *Successful Academic and Employment Pathways in Advanced Technologies (NSF #1104214)*
- PathTech LIFE (Learning, Interests, Family, Employment)
 - *PathTech LIFE: Constructing a National Survey of Engineering Technology Students through Regional and Statewide Testing (#1501999)*
- NSF Advanced Technological Education (ATE)
 - Targeted Research in Technician Education

NSF ATE - Advanced Technological Education

▶ **ATE Mission** (from program solicitation *emphasis added*)

- ▶ ATE supports **targeted research on technician education**, changing roles of technicians in the workplace, and topics that **advance the knowledge base** needed to make technician education programs more effective and more forward-looking.
- ▶ Results **inform practices** in technician education programs, emphasizing dissemination to practitioners.
- ▶ Projects represent a **true collaboration**--reflected in the activities, the leadership, and the budget--between well-qualified **researchers, two-year college educators** and other stakeholders.

PathTech Projects

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 - \$1.2 million over 4 years (2011-15)
 - Examination of educational and employment pathways through interviews and observation in local high schools, community colleges, and industry

PathTech Tampa Bay (2011-2015)

- ▶ Interviews with students, faculty, and administrators in Tampa Bay
 - ▶ High schools
 - ▶ Two-year colleges
 - ▶ Local employers
- ▶ Findings:
 - ▶ ET courses/credentials enhanced career prospects and was transformative in their lives
 - ▶ Enrolled based on inclination for hands-on work
 - ▶ Life challenges: school, employment, and family

PathTech Projects

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PathTech LIFE Purpose

- ▶ To understand the LIFE experiences that influence enrollment, retention, and persistence toward advanced technology certificates and degrees
 - ▶ Learning
 - ▶ Interests
 - ▶ Family
 - ▶ Employment

PathTech LIFE Problem Statement

- ▶ Engineering technicians earn above average wages, secure stable employment, and achieve middle-class status (Carnevale, Smith, & Strohl, 2010).
- ▶ The majority of students completing ET courses, certifications and degrees at two-year colleges are adults with complex lives.
 - ▶ Balance employment, health, children, etc.
- ▶ ET students cycle between school and work to re-skill (Adkisson & Monaghan, 2014).

PathTech LIFE Purpose

- ▶ To identify the characteristics of students in advanced technology fields
 - ▶ Backgrounds and Demographic Information
 - ▶ Decisions to enroll
 - ▶ School-work-balance issues
- ▶ Research Questions
 - ▶ 1. What are the characteristics of ET students?
 - ▶ 2. Why do ET students decide to enroll in higher education?
 - ▶ 3. What factors (background, decisions to enroll) influence the commitment of students to pursue ET occupations?

PathTech LIFE Research Collaboration

- ▶ Partnership between USF and Florida Advanced Technological Education Center (FLATE)
- ▶ Other national ATE Center Partners in four fields:
 - ▶ Advanced manufacturing
 - ▶ **CARCAM** - Consortium for Alabama Regional Center for Automotive Manufacturing (Gadsden, AL)
 - ▶ **RCNGM** - Regional Center for Next Generation Manufacturing (Farmington, CT)
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PathTech LIFE Research Timeline

Timeline for PathTech LIFE Survey Validation

September 2015 – January 2016	Developed initial survey
February – April 2016	Sent survey to panel of experts from each ATE Center using Delphi technique (three iterative rounds)
April 2016	Survey revisions; IRB modification
April 2016 – May 2016	Wave 1 pilot survey to advanced technology students at six colleges (97 respondents)
June – August 2016	Analyzed and revised survey accordingly
September 2016	Conduct think-aloud exercise with four students
October 2016	Survey revisions; IRB modification
November – December 2016	Wave 2 pilot survey to advanced technology students (245 respondents)
January – March 2017	Shortened survey from 25 to 15 minutes; revised distribution plan to include direct communication with colleges; IRB modification
April 2017	Wave 1 national survey (>500 respondents)
May – August 2017	Analyze Wave 1 national data, prepare reports, publications and presentations
September 2017 – October 2018	Wave 2 (Fall 2017) and Wave 3 (Spring 2018) national surveys; ongoing analyses, preparing reports, publications, and presentations

Methods

- ▶ Survey Research design
 - ▶ Hosted on Qualtrics survey platform
 - ▶ Established content validity through panel of experts
 - ▶ Established reliability of sub-scales using Chronbach's alpha
- ▶ 97 participants (Wave 1 pilot)
 - ▶ Two-year college students - each paid \$25 for completing survey
- ▶ Simultaneous multiple regression
 - ▶ Independent variables: Demographic characteristics and decisions to enroll in ET program
 - ▶ Dependent variable: Commitment to pursuing ET as an occupation

Conceptual Framework

- ▶ Factors influencing decisions to enroll based on PRiSM model (Stein & Wanstreet, 2006)
 - ▶ Based on a 4 point scale:
 - ▶ Pathway to a Better Life (3.20) - .88
 - ▶ Reflective Learner
 - ▶ Prior academic success (3.27) - .79
 - ▶ Internal interests (2.70) - .78
 - ▶ Synchronizing Learning, Earning, and Living (2.24) - .79
 - ▶ Match with an Academic Life
 - ▶ Institutional support (2.60) - .91
 - ▶ Program fit (3.12) - .72

PathTech LIFE Questionnaire

▶ Example items:

▶ Pathway to a Better Life

- ▶ I enrolled the program because I want to *advance in my current job.*

▶ Reflective Learner

▶ Prior academic success

- ▶ I decided to enroll in this program because I have *done well in school before.*

▶ Internal interests

- ▶ I decided to enroll in this program because I have always *liked to build and fix things with my hands.*

PathTech LIFE Questionnaire (continued)

▶ Example items:

▶ Synchronizing Learning, Earning, and Living

- ▶ The time was right to enroll this term due to a *decrease in financial concerns*.

▶ Match with an Academic Life

▶ Institutional support

- ▶ My decision to enroll this term was based on the *support I receive from my teacher(s)*.

▶ Program fit

- ▶ My decision to enroll this term was based on my *fit within the institution*.

Research Question 1: Demographic Characteristics

- ▶ **97** participants for pilot
 - ▶ From 13 two-year colleges

- ▶ Participant characteristics

	NSB	PathTech LIFE
	S&E Indicators	Pilot Survey
White	72%	71%
Black	9%	9%
Hispanic	8%	11%
Asian	4%	7%
Other/Unknown	7%	2%
Male	86%	84%
Female	14%	16%

Research Question 1: Demographic Characteristics (continued)

- ▶ Average age was **27**
- ▶ **40%** were employed part-time
- ▶ **34%** enrolled in high school CTE programs
- ▶ **78%** were enrolled in school full-time
- ▶ Average GPA was **3.5**

Research Question 2: Decisions to Enroll

- ▶ **89%** were working toward degree and 21% toward a certificate
- ▶ **85%** believed their program would help them secure a higher paying job
- ▶ **80%** believed their program would provide them with personal fulfillment
- ▶ **71%** planned to earn a baccalaureate degree

Research Question 3: Commitment to ET as an Occupation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.476 ^a	.227	.125	.536



Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.579	.761		.760	.450
	Full_time_Student	.289	.148	.206	1.961	.054
	Q11_GPA	.309	.144	.230	2.142	.035
	Reflective_Internal	.424	.204	.275	2.077	.041
	Reflective_Prior	-.040	.141	-.038	-.282	.779
	Pathway	-.020	.140	-.019	-.140	.889
	Match_Support	-.007	.090	-.009	-.079	.937
	Match_Fit	.092	.085	.128	1.087	.280
	Synchronizing	.015	.084	.020	.184	.855
	Male_New	.372	.161	.253	2.311	.024
	Q40_Age	-.004	.006	-.064	-.613	.542

a. Dependent Variable: Q36_Commitment

Conclusions

- ▶ Based on preliminary findings
 - ▶ Engineering technology programs suffer from a shortage of females and ethnic and racial minorities
 - ▶ The majority of participants plan to transfer to baccalaureate degree programs
 - ▶ Participants rated “past academic success”, “pathway to a better life”, and “program fit” as the highest reasons for enrolling
 - ▶ Participants rated “synchronizing learning, earning, and living” as lowest reason for enrolling

Conclusions (continued)

- ▶ GPA and gender were significantly related to commitment to the ET field
- ▶ Reflective learners who had internal interests in participating in ET programs were significantly more likely to commit to the field

Discussion

- ▶ There is a national focus on providing access to, serving the needs of, and promoting the success of racial and ethnic minority students for STEM fields (Hernandez-Gantes & Fletcher, 2013).
 - ▶ Programs such as ET suffer from a large shortage of females and ethnic and racial minorities (Digest of Educational Statistics, 2009).
 - ▶ More research is needed to explore the unique lived experiences of underrepresented students in ET programs.
- ▶ The PRiSM model has promise in helping determine *why* adult learners enroll in ET programs (Stein & Wanstreet, 2006).
 - ▶ *Reflective learner* - adults' commitment to the ET field may be dependent on their own perceptions of competence, self-efficacy, and interests needed to complete the program (Hensley & Kinser, 2011).
 - ▶ Adults often cycle in and out programs as they contemplate and reflect on their own abilities and the degree to which their pathway to a better life is an attainable goal.
- ▶ PathTech LIFE instrument has the opportunity to capture the life challenges and characteristics of students in ET two-year college programs.
 - ▶ Qualitative research is needed to explore their lived experiences.

PathTech LIFE



Understanding **pathways** in advanced **technologies**.

Summer 2017 Survey Findings Report

HI-TEC Conference 2017



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PROJECT OVERVIEW

- National Science Foundation (NSF) funded Advanced Technological Education (ATE) Targeted Research in Technician Education
- Partnership between University of South Florida, Florida Advanced Technological Education Center (FLATE) at Hillsborough Community College and national ATE Center Partners
- National survey of community college students in advanced technology fields in collaboration with a national network of colleges.
- PathTech LIFE 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.

BACKGROUND – PathTech Tampa Bay

- Successful Academic and Employment Pathways in Advanced Technologies (NSF #1104214)
- \$1.2 million over 4 years (2011-2015)
- Examination of educational and employment pathways through interviews and observation in local high schools, community colleges, and industry

TIMELINE

September 2015 – January 2016	Drafted initial survey
February – April 2016	Received input from panel of experts made up of two people from each ATE Center using Delphi technique (three iterative rounds)
April 2016	Completed survey revisions Completed IRB modification
April – May 2016	Distributed Wave 1 pilot survey to students at six colleges (97 respondents)
June – August 2016	Analyzed data Revised survey based on findings
September 2016	Conducted one-on-one interviews with four students while taking survey
October 2016	Completed survey revisions Completed IRB modification
November – December 2016	Distributed Wave 2 pilot survey to students at 18 colleges (147 respondents)
January – March 2017	Shortened survey from 25 to 15 minutes Revised distribution plan to include direct communication with colleges Completed IRB modification
April 2017	Distributed Wave 1 national survey to students at 26 colleges (534 respondents)
May – August 2017	Analyze Wave 1 national data, prepare reports, publications and presentations
September 2017 – August 2018	Distribute Wave 2 (Fall 2017) and Wave 3 (Spring 2018, tentative) national surveys Conduct ongoing analyses, prepare reports, publications, and presentations

SURVEY TOPICS

- Academic Background
- College Experiences
- Employment Background
- Employment Status
- Motivation for Enrollment
- Program Evaluation
- Academic Goals
- Career Goals
- Demographics

RECRUITING

- Recruited colleges through ATE Centers
- Offered colleges \$250 + findings report for their college if they delivered a 70% response rate
- All student respondents received \$25
- Survey took 15 minutes

2017 SURVEY RESULTS

SURVEY INFORMATION

SURVEY LOGISTICS

Opened: April 3, 2017

Closed: May 2, 2017

Send to: 26 Colleges

Total Respondents: 528 students

SAMPLE SIZE

387 students

14 colleges

Total survey responses included 528 students at 26 institutions. The representative sample of 387 is based on students colleges that had a response rate of 50% or higher.

PROGRAM SELECTION

Programs who participated as identified by students*:



ENGINEERING
TECHNOLOGY
(58%)



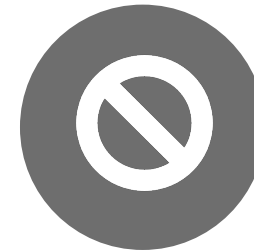
ENERGY AND
ENVIRONMENTAL
TECHNOLOGY (28%)



ADVANCED
MANUFACTURING
(14%)



MICRO AND NANO
TECHNOLOGY
(2%)

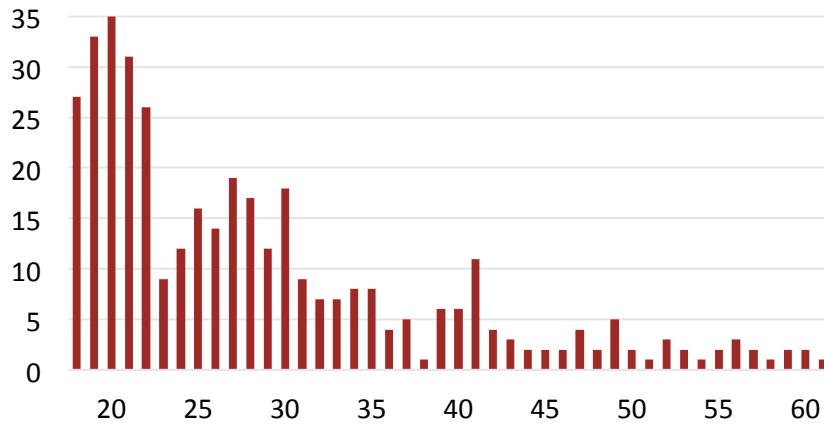


NONE OF
THE ABOVE
(13%)

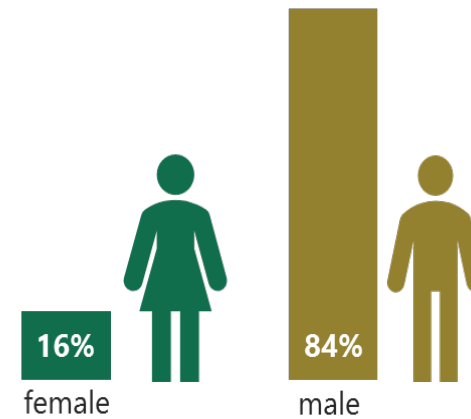
*Students selected all that apply therefore percentages add up to more than 100%

DEMOGRAPHICS

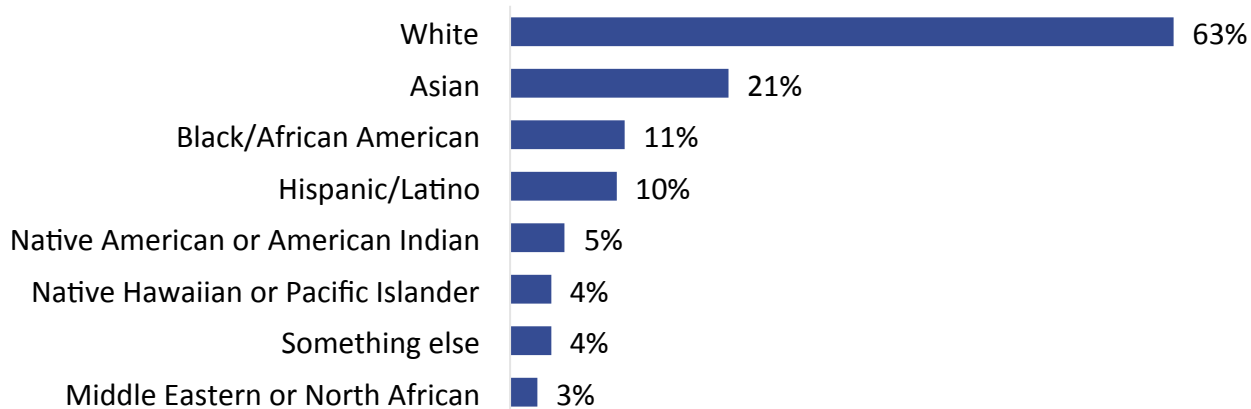
The majority of the 387 respondents were between the ages of 18-30.



84% of the 385 respondents were male.



243 (63%) of the 387 respondents indicated that they were white.*



*Students selected all that apply therefore percentages add up to more than 100%

ENROLLMENT/EMPLOYMENT/JOB STATUS

More full-time students are employed part-time, and more part-time students are employed full-time. Only **34% of full-time students** have jobs related to their field, compared to **48% of part-time students**.

		Full-Time Student	Part-Time Student
Employment Status	Full-Time Employed (>35 hr.)	23%	28%
	Part-Time Employed (<35 hr.)	39%	36%
	Not Employed	34%	30%
Job related to program	Yes	34%	48%
	No	66%	52%

*Table does not include seasonal workers, or military.

MOTIVATION FOR ENROLLING

Which factor would you say is the most important reason why you chose to enroll this semester?

PRiSM Decision Model for Adult Enrollment

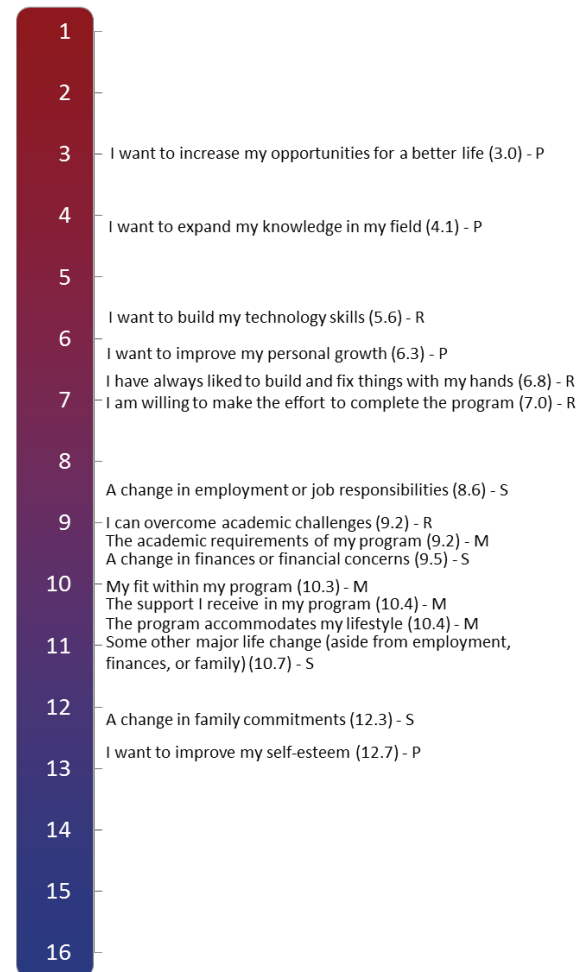
(Stein & Wanstreet, 2006):

Pathway to a Better Life - adults' assessments of the extent to which their own cognitive and economic conditions might be enhanced as a result of participation in a higher education program.

Reflective Learner - how students attempt to evaluate their own academic abilities and academic readiness to pursue a degree.

Synchronizing Learning, Earning, and Living - emphasis on their particular life stage as well as their abilities to balance learning, earning, and living as critical determinants in their decisions to pursue enrollment in higher education.

Match with an Academic Life - importance of adults seeking a fit with the academic program's curriculum, policies, requirements, support, and accommodation with adult learners.



MOTIVATION FOR ENROLLING

- 3 – I want to increase my opportunities for a better life (3.0) - P
- 4 – I want to expand my knowledge in my field (4.1) - P
- 5 – I want to build my technology skills (5.6) - R
- 6 – I want to improve my personal growth (6.3) - P
- 7 – I have always liked to build and fix things with my hands (6.8) - R
I am willing to make the effort to complete the program (7.0) - R
- 8 – A change in employment or job responsibilities (8.6) - S
- 9 – I can overcome academic challenges (9.2) - R
The academic requirements of my program (9.2) - M
A change in finances or financial concerns (9.5) - S
- 10 – My fit within my program (10.3) - M
The support I receive in my program (10.4) - M
The program accommodates my lifestyle (10.4) - M
- 11 – Some other major life change (aside from employment, finances, or family) (10.7) - S
- 12 – A change in family commitments (12.3) - S
- 13 – I want to improve my self-esteem (12.7) - P

Pathway to a Better Life

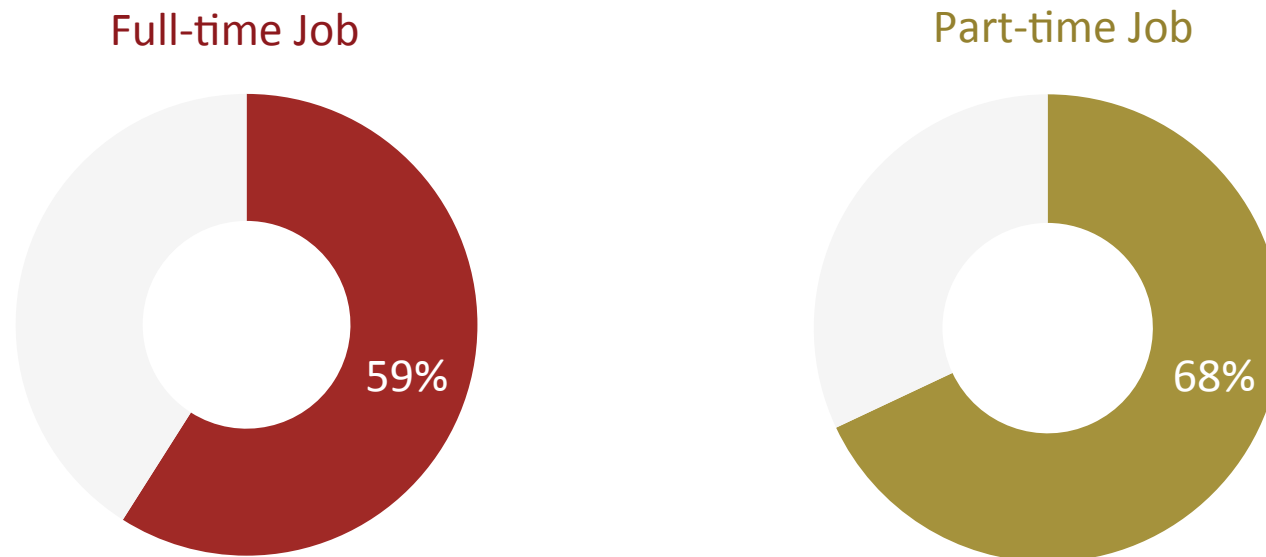
Reflective Learner

Synchronizing Learning, Earning, and Living

Match with an Academic Life

EMPLOYMENT STATUS AND GPA

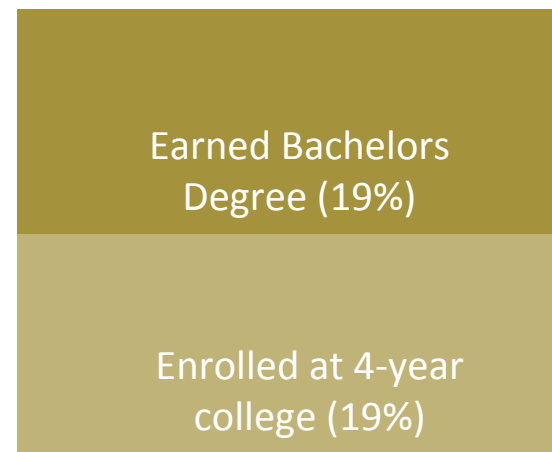
Among students with a job related to their field, a higher percentage of students with **part-time jobs (68%)** have GPAs 3.5 and above compared to those students who have **full-time jobs (59%)** related to their field.



Highlighted includes students with GPAs 3.5 and above.

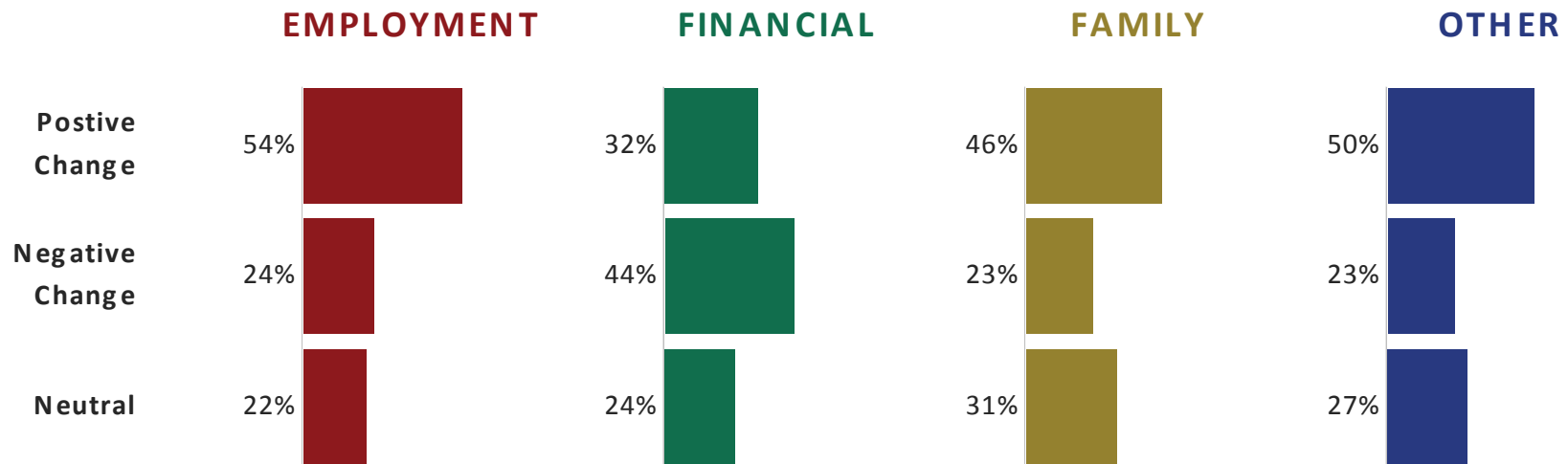
EDUCATIONAL BACKGROUND

Prior to beginning the program, 51% of students had not enrolled in a 2-year or 4-year institution. More students had previously enrolled at a **2-year college (34%)** compared to those who enrolled in at a **4-year college (19%)**. Five percent of students had enrolled in both. Among the 113 students who had enrolled in a 2-year college, **30% had earned an associate degree**. Among the 73 students who had enrolled in a 4-year university, **19% earned a bachelors degree**. Six students had earned an associate's and bachelors.



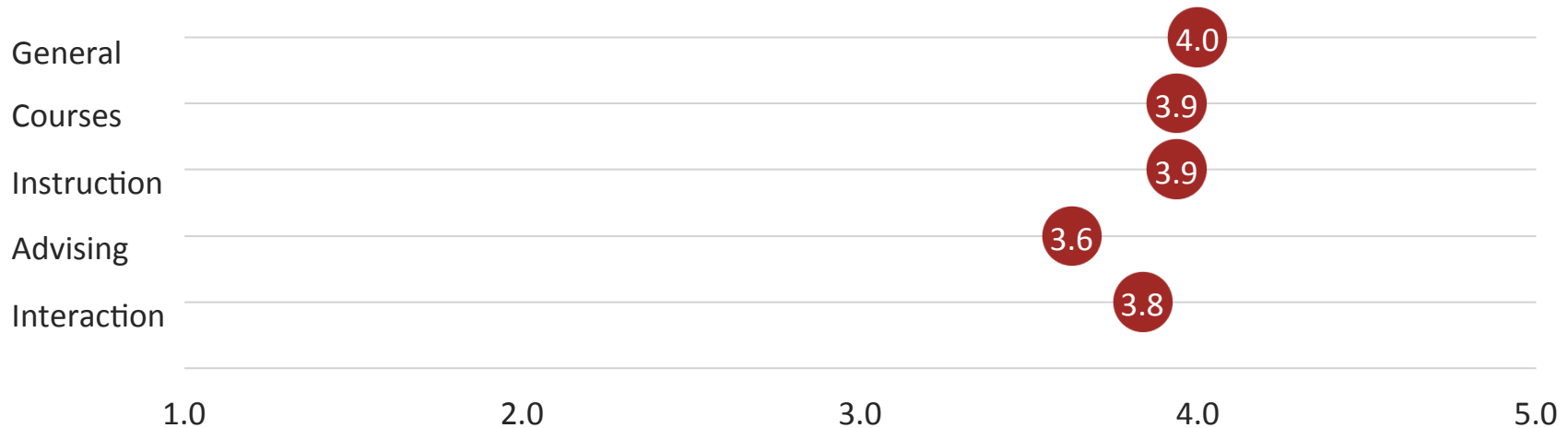
LIFE CHANGES

The majority of students experienced a **positive change** on **employment** and **other major life events** in the 12 months before enrolling in the program. Fewer than 25% of students experienced a negative change in **employment**, **family**, and **other major life events**. Though, **44% of students** reported experiencing a **negative change** in their **financial situation** before enrolling.



SATISFACTION & PROGRAM ACCOMODATIONS

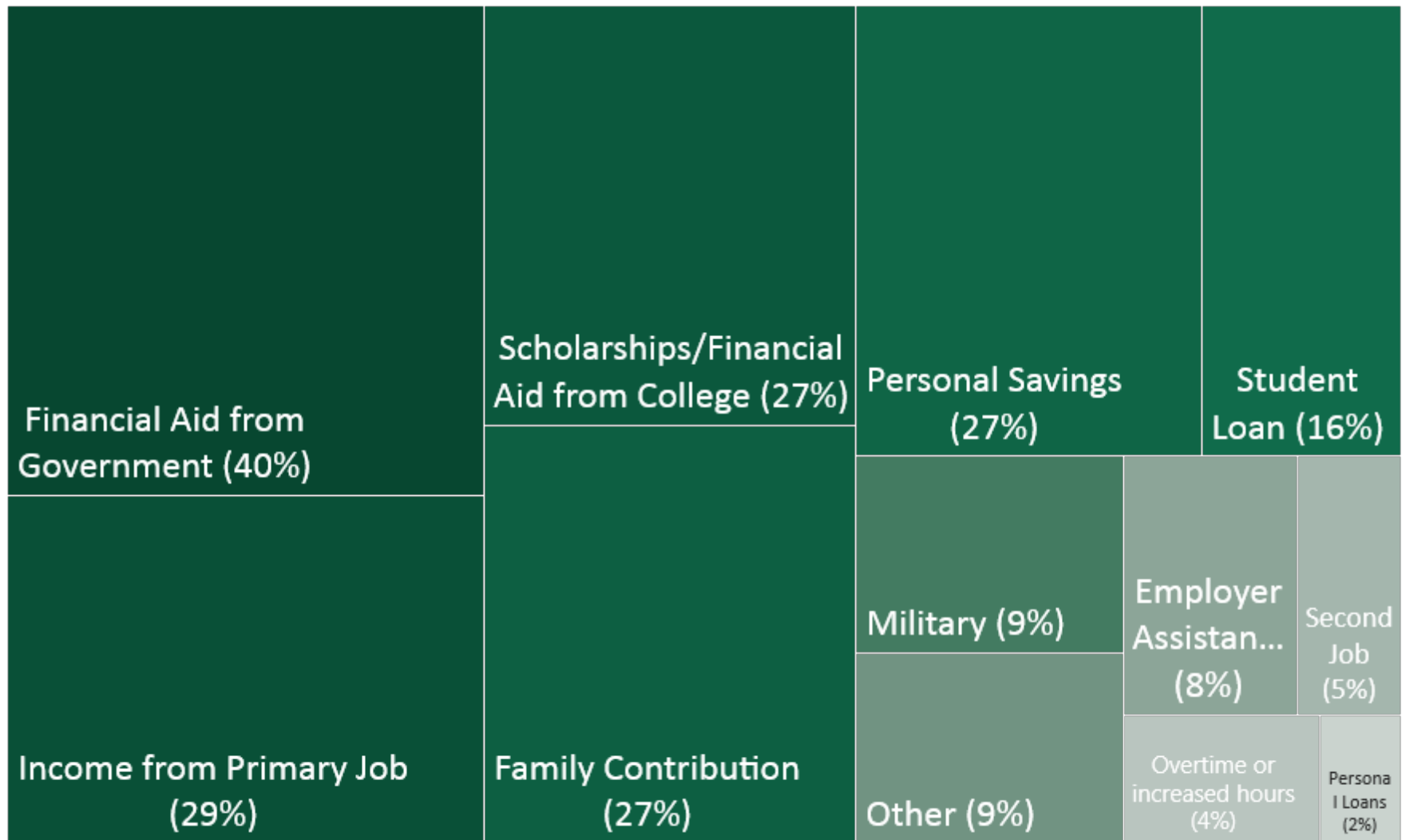
Students were very satisfied with their programs. Overall the average for all categories was 3.84 out of 5. Advising was scored the lowest at 3.6 and general received the highest satisfaction at 4.0 out of 5.



Over half of the students reported that the program accommodated their work schedule and lifestyle choices very or extremely well. Only 3% indicated that the program was not accommodating in these areas.



HOW STUDENTS PAY FOR COLLEGE

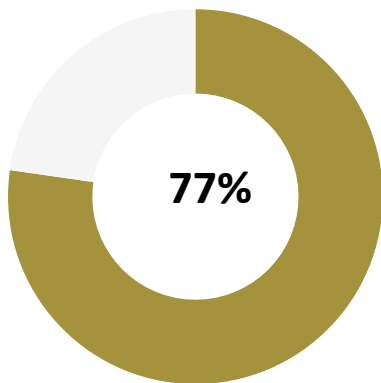


Percentages represent average response, not total count.

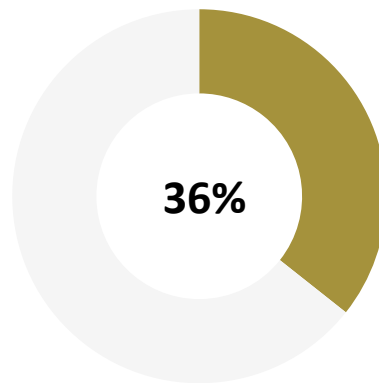
TARGET CREDENTIALS

Most students were planning to obtain a **associate's degree**. Only 12% were aiming to get **continuing credit** or **other** credentials.

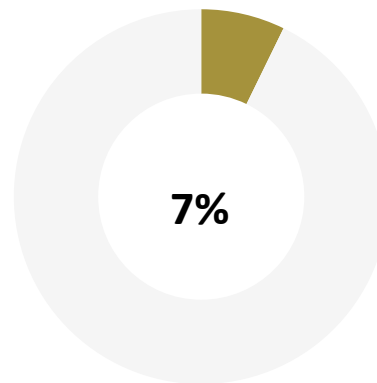
Associate's Degree



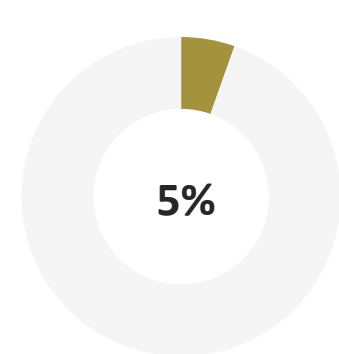
Certificate



Continuing Credit

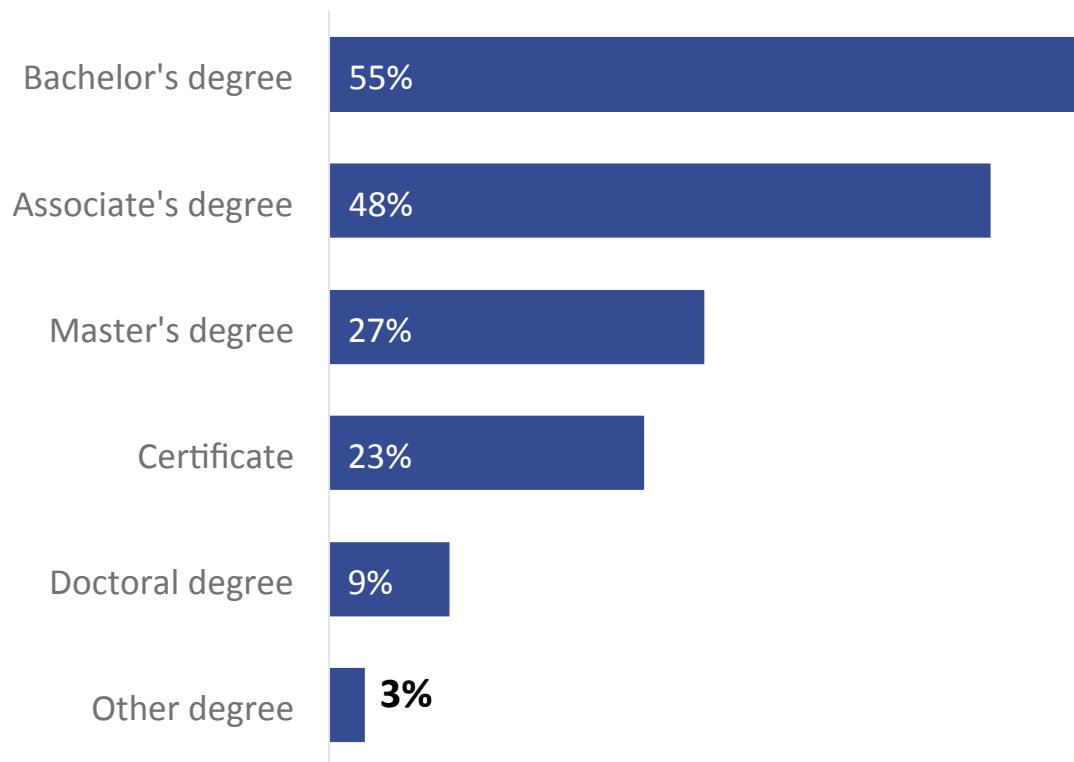


Other



LONG-TERM GOALS

55% of students reported that their goal was to obtain a bachelor's degree. 48% planned to earn an associate's degree. Nine percent of students indicated their goal was to get a doctoral degree.



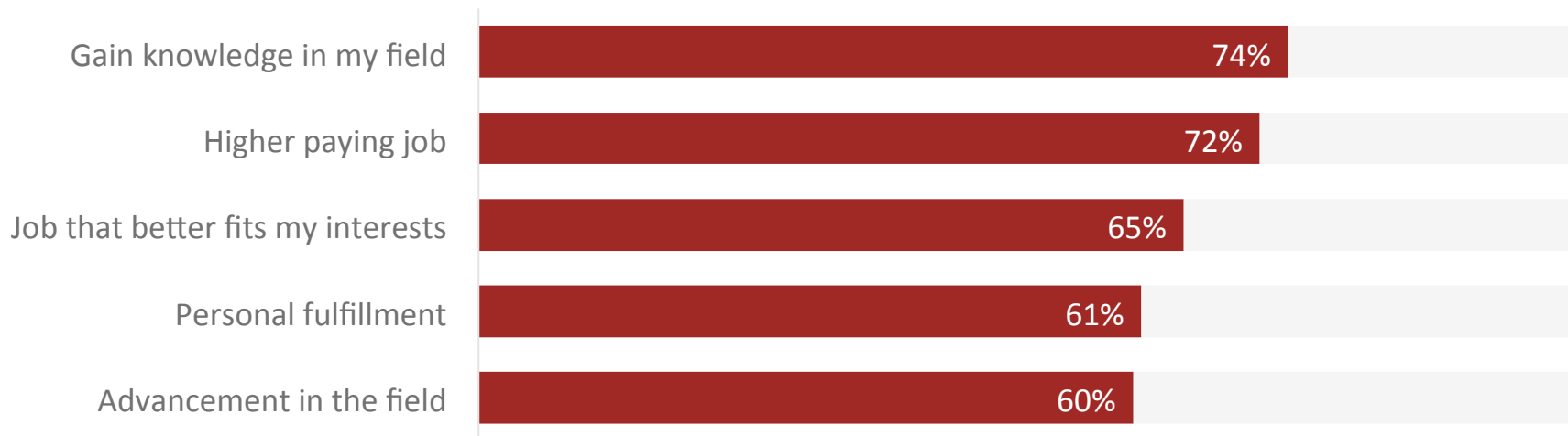
CAREER COMMITMENT AND CONTRIBUTION TO FUTURE

Most students are very committed to pursuing a career related to what they are studying in their ATE program.



On a scale of 1-5, 1 being the least committed and 5 being the most.

74% of students indicated that gaining knowledge in their field was the biggest contribution the program could have on their career.



Students ranked their top five selections, the five items above were the top ranking among students. "Gain respect from my colleagues" and "Some other way" were the lowest ranked and are not represented above.

n=387

MOTIVATION FOR ENROLLING

Students ranked 16 items based on **PRiSM Decision Model for Adult Enrollment** (Stein & Wanstreet, 2006) in response to the question:

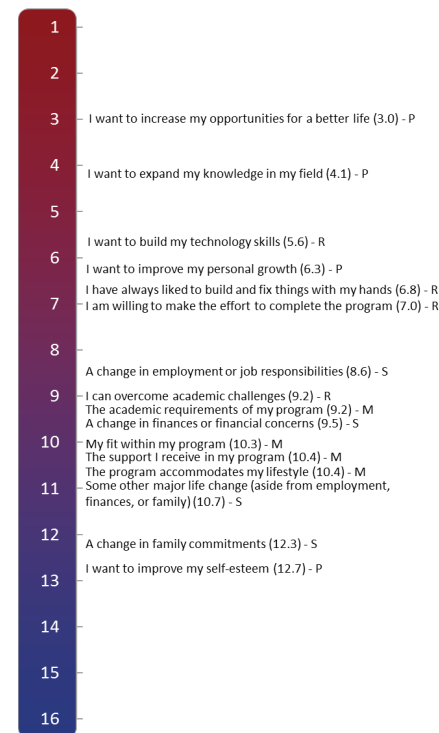
Which factor would you say is the **most important** reason why you chose to enroll this semester and which is the **least important** (or least applicable) reason for enrolling?

Pathway to a Better Life - adults' assessments of the extent to which their own cognitive and economic conditions might be enhanced as a result of participation in a higher education program.

Reflective Learner - how students attempt to evaluate their own academic abilities and academic readiness to pursue a degree.

Synchronizing Learning, Earning, and Living - emphasis on their particular life stage as well as their abilities to balance learning, earning, and living as critical determinants in their decisions to pursue enrollment in higher education.

Match with an Academic Life - importance of adults seeking a fit with the academic program's curriculum, policies, requirements, support, and accommodation with adult learners.



FIVE REASONS STUDENTS ENROLLED

Factor analyses identified five sets of reasons students enrolled:

- Personal Well-Being
- Academic Effort
- Skill Building
- Job and Financial Concerns
- Family and Other Concerns

MOTIVATION - PERSONAL WELL-BEING

4.7 out of 10 (mean score)

- No demographic differences
- Less important for part-time workers compared to full-time workers



“I want to improve my self-esteem”

“I want to improve my personal growth”

MOTIVATION - ACADEMIC EFFORT

5.6 out of 10 (mean score)

- More important for younger students
- Less important for Black students
- Less important for married students than single students
- Less important for students with Bachelor's degrees compared to students with no two-year or four-year college enrollments



“I can overcome academic challenges”

“I am willing to make the effort to complete the program”

MOTIVATION - SKILL BUILDING

6.9 out of 10 (mean score)

- Less important for women than men
- Less important for Black students compared to White students
- Less important for married students than single students
- Less important for seasonal workers than full-time workers



“I have always liked to build and fix things with my hands”

“I want to build my technology skills”

MOTIVATION - JOB AND FINANCIAL CONCERNS

4.9 out of 10 (mean score)

- Less important for women than men
- Less important for Black students compared to White students More important for students in relationships (married, separated, or cohabitating) than single and divorced students
- More important for part-time workers overall, but less important for part-time and full-time workers in jobs not related to their major field
- More important for students with a bachelor's degree



“A change in employment or job responsibilities”

“A change in finances or financial concerns ”

MOTIVATION - FAMILY AND OTHER CONCERNS

3.3 out of 10 (mean score)

- More important for older students
- More important for men
- More important for Black and Asian students
- Less important for Other race students
- Less important for students who are unemployed but not looking compared to full-time students



“A change in family commitments”

“Some other major life change (aside from employment, finances, or family)”

SUMMARY - AGE AND FAMILY

- Older students are more motivated by family changes and less motivated by the desire to face academic challenges.
- Married students are less likely to report enrolling to face academic challenges and to build technical skills, but more likely to enroll due to job and financial changes or family changes. In addition, cohabitating and separated students rate job and finances as reasons to enroll higher than single students. We find no effects due to having children or number of children or household income.

SUMMARY - GENDER AND RACE

- Men are more motivated by skill building, job and financial changes, and family changes than women.
- Black students are less likely to report enrolling to face academic challenges and to build technical skills. Black and Asian student are more likely to enroll due to job and financial changes.

SUMMARY - EDUCATION AND EMPLOYMENT

- There were no differences in motivation based on enrollment.
- Students with **bachelor's degrees (9%)** were less likely to list willingness to overcome academic challenges as a reason to enroll compared to students with **no enrollment (46%)**. They were far more likely to list financial concerns as a reason.
- Part-time workers are less likely to express personal growth as a reason for enrolling compared to full-time workers. Part-time workers are more likely to be motivated by financial concerns; however, this effect is countered by a negative association for those in a job not related to their major field.
 - This indicates that part-time workers in a related job were more likely to be motivated by financial concerns and full-time workers in an unrelated job were less likely.

NEXT STEPS – PathTech LIFE Year 3

- Additional survey data collection in Fall 2017
- August 30 webinar
- Analyses and Publications

NEXT STEPS – PathTech LISTEN: Longitudinal Interviews with Students in Technician EducationN (October 2017 proposal)

- Follow up interviews with 2017 PathTech LIFE Survey respondents
- Sample based on targeted groups who may be underrepresented in advanced technology programs and careers (i.e. women, underrepresented minorities, rural students, veterans, non-traditional students, senior citizens, married people, parents, single parents)
- Research Questions
 - How did students address challenges they faced in their advanced technology programs? What supports did they utilize?
 - Did students accomplish their short-term educational goals (coursework, certificate, degree)?
 - How did programs prepare or not prepare students for their current educational and/or employment status?

NEXT STEPS – Pathways Coordination Network (October 2018 proposal)

- Interdisciplinary network for colleges, industry, and researchers who want to study pathways and implement findings from research on pathways into and out of advanced technology programs

PathTech

LIFE



Understanding **path**ways in advanced **tech**nologies.

Will Tyson

Principal Investigator

Associate Professor

Department of Sociology

University of South Florida



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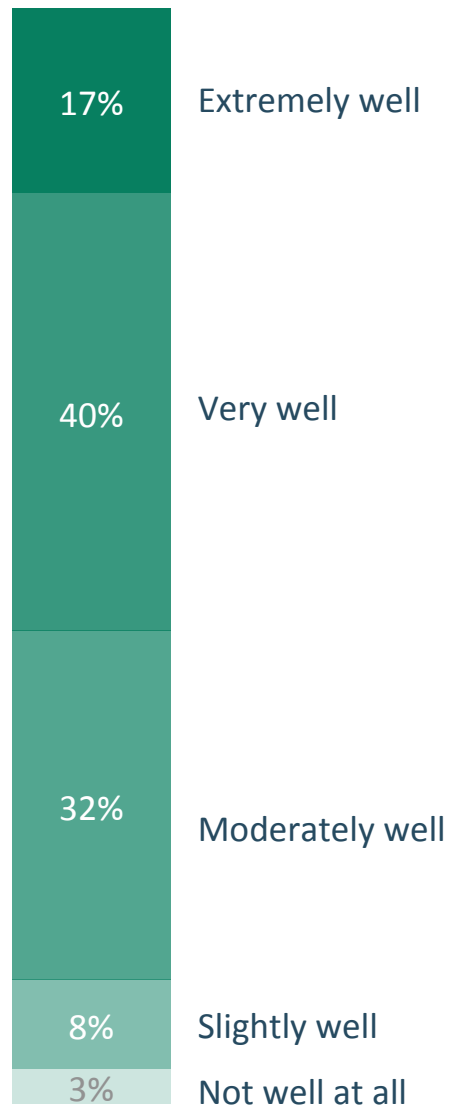
PROGRAM ACCOMODATIONS

Over half of the students reported that the program accommodated their work schedule and lifestyle choices well. Only 3% indicated that the program was not accommodating in these areas.

Not well



PROGRAM ACCOMODATIONS



Over half of the students reported that the program accommodated their work schedule and lifestyle choices well. Only 3% indicated that the program was not accommodating in these areas.

1

2

3

4

I want to expand my knowledge in my field (4.1) - P

5

I want to build my technology skills (5.6) - R

6

I want to improve my personal growth (6.3) - P

7

I have always liked to build and fix things with my hands (6.8) - R

I am willing to make the effort to complete the program (7.0) - R

8

A change in employment or job responsibilities (8.6) - S

9

I can overcome academic challenges (9.2) - R

The academic requirements of my program (9.2) - M

A change in finances or financial concerns (9.5) - S

10

My fit within my program (10.3) - M

The support I receive in my program (10.4) - M

The program accommodates my lifestyle (10.4) - M

11

Some other major life change (aside from employment, finances, or family) (10.7) - S

12

A change in family commitments (12.3) - S

13

I want to improve my self-esteem (12.7) - P

14

15

16