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## Preview of Award 1501999 - Final Project Report

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### Cover

Federal Agency and Organization Element to Which Report is Submitted:	4900
Federal Grant or Other Identifying Number Assigned by Agency:	1501999
Project Title:	PathTech LIFE: Constructing a National Survey of Engineering Technology Students through Regional and Statewide Testing
PD/PI Name:	William T Tyson, Principal Investigator Edward C Fletcher, Co-Principal Investigator Danielly Orozco, Co-Principal Investigator
Recipient Organization:	University of South Florida
Project/Grant Period:	09/15/2015 - 08/31/2019
Reporting Period:	09/01/2018 - 08/31/2019
Submitting Official (if other than PD\PI):	N/A
Submission Date:	N/A
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	N/A

### Accomplishments

#### \* What are the major goals of the project?

The overall goal of this project was to develop a national survey of individuals completing coursework, certification, and AS/AAS degrees in advanced technologies at community colleges. The purpose of this survey was to determine how student pathways, career goals, and school-work-life balance influence program recruitment and retention. Because a large majority of participants are expected to be adults with numerous and complex life challenges (i.e., family, personal, school, and work), an investigation into their lived experiences is necessary to inform institutional efforts to support their success.

The major goals in Year 3 were to complete data collection for the PathTech LIFE national survey and apply for supplemental funding to extend data collection into Spring 2018 and extend the project to allow for analysis. The timeline in the attached Appendix document details the primary activities of the project.

**\* What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?**

Major Activities:

Year 1:

The research team constructed an online pilot survey based on the PRiSM Decision Model for Adult Enrollment, Schlossberg's Transition Theory, and explanatory models from the recently completed PathTech Tampa Bay study (DUE #1104214). We compiled an expert panel made up of two persons each from FLATE, our six ATE Center partners, and our external evaluator, ICF, to review the online pilot survey using the Delphi Method. The objective of the Delphi Method was to use three rounds of review to establish a consensus (80% agreement) for which items should be included in the final pilot survey to be sent out to community college students.

- Round 1 – The expert panel filled out a survey asking them for each item if they agree with the wording and if not, to describe their concern and recommend changes. We revised the survey based on their feedback.
- Round 2 – The expert panel used feedback from other members of the panel and responded to changes to the survey. At this point, all survey items on which 80% of the panel approved were slated to be included in the pilot survey.
- Round 3 – We solicited feedback from the expert panel on the remaining four questions that did not reach 80% agreement.

From there, we completed the survey and distributed it to the ATE Center partners to distribute at their institution or a partner institution. We sent the ATE Center partners solicitation emails with links to the survey. We received feedback from partners on how to word the email and sent several solicitation emails over a three-week period from May 6 to May 27. We closed the first pilot survey on May 31 with 97 participants.

Year 2:

The two major activities during Project Year 2 (Sept 2016-Aug 2017) were (1) a second pilot survey distributed in November 2016 and (2) Round 1 of the PathTech LIFE Survey in April 2017.

The research team conducted a second pilot survey in November 2016. The purpose of this second pilot was to test the distribution methods of the survey in response to challenges identified during the first pilot of the survey instrument in May 2016. The first round received 97 responses from students at 13 colleges. The second pilot received 147 responses from students at 19 colleges.

We made several changes to the survey instrument and distribution methods for the Wave 1 survey in April 2017 in response to problems we encountered during the first two pilots. Most notably we shortened the survey from 25 to 15 minutes at the recommendation of college partners. The Wave 1 survey received 528 responses from students at 26 colleges including 14 with a response rate of 50% or above.

The common problem that remained among all three surveys were that the research team spent most of the semester revising the survey which pushed the survey to the last weeks of the semester.

Year 3:

We distributed Round 2 of the PathTech LIFE Survey from October to December 2017 to 1344 respondents at 59 colleges. We distributed Round 3 of the PathTech LIFE Survey from March to June 2018 to 1443 respondents at 65 colleges. At this point, data collection was completed with a total of 3216 respondents at 96 colleges.

Specific Objectives:

Year 1:

The primary objectives of Year 1 were to distribute a pilot survey, analyze the data, and use the analyses to construct a national survey to distribute in Year 2. At this point, we

have incorporate project findings and feedback from our external evaluators and expert panel to construct a near final draft of the 2016-17 PathTech LIFE survey.

We also conducted a principal components analysis (PCA) to establish construct validity of items derived from the PRiSM Decision Model for Adult Enrollment. Analyses of pilot data determined the extent to which items reliably measure each theme and the extent to which each theme influenced participants' decision to enroll that semester. We used the PCA to narrow down the four main themes of the PRiSM model to four items each for a total of 16 items for the national survey.

#### Year 2:

The primary objective for Year 2 was to optimize the survey for Wave 1 distribution in the Spring based on feedback from college partners. We accomplished this objective by shortening the survey from a median time of 25 minutes in both pilot surveys to 15 minutes in Wave 1.

The median time to complete the survey across both pilot surveys was around 25 minutes. Each survey respondent was paid \$25 for completing the survey. Pilot survey solicitation emails promoted the opportunity to earn \$25 in 25 minutes. Community college faculty felt that \$25 was a generous incentive, but they could recruit more students to complete a shorter survey.

We were able to hire the online survey host, Qualtrics, to help shorten the survey. Through rigorous testing from January to March 2017, we were able to accomplish this object. Based on Qualtrics algorithms, the estimated completion time for the entire survey was 15 minutes. We advertised the survey to colleges and students as a 15 minute survey. The median survey completion time was 15 minutes, 4 seconds. We believe this was an important factor in the increase in response rates and total responses from the pilot to Round 1. The mean and median survey completion times for Rounds 1-3 were under 15 minutes.

Qualtrics is a research services company with extensive expertise preparing surveys and hosting for use in business and academia. Both PathTech LIFE pilot surveys were hosted on the Qualtrics platform licensed by USF. We hired Qualtrics to give the project guidance on survey design with the goal of reducing completion time and improving response rate. Qualtrics subject matter experts recommended changing question types to make them more palpable to respondents and to deliver more accurate responses. Qualtrics also recommended reprogramming the survey with Display Logic that customized the survey experience for each respondent and dynamically adapted to respondents' answers. Qualtrics programmers also continually updated the survey to include Piped Text to display Embedded Data in survey questions. For example, in the two pilot surveys, respondents wrote out the name of their college. This resulted in a hodge-podge of data resulting from respondents who misspelled college names or used acronyms. To address this problem, Qualtrics populated the survey with a drop down menu of participating colleges. This made the process easier for the respondent and made it easier to clean and analyze data. In addition, the survey include the name of the college in future questions. This was helpful in specifying the college and program for students enrolled in multiple institutions.

#### Year 3:

There were no changes in data collection from Round 1 to Rounds 2 and 3 except for adding a few questions from the pilot survey back into the survey. The questions dealt

with knowledge and utilization of campus resources. Related presentations and a manuscript in progress are included under Products.

Year 4:

We coordinated with external communications coordinator Ben Reid to distribute college reports to the colleges with a 50% or higher response rate.

Significant Results: Results are included under Products.

Key outcomes or Other achievements: Year 1:

A key Year 1 outcome was developing connections between the USF research team and ATE Center partners. Co-PI Danielly Orozco and FLATE PI Marilyn Barger contacted potential the PIs of potential ATE Center partners on behalf of the entire PathTech LIFE research team in order to gauge their interest in participating in the project. They also set up face-to-face meetings between interested PIs and PathTech LIFE PI Will Tyson and Co-PI Eddie Fletcher at the ATE Principal Investigators Conference in October 2015. We secured commitments from PIs at this stage.

Over the course of Year 1, the project team remained in contact with at least two personnel from each ATE Center. These personnel participated in the Delphi Study used to select questions for the pilot survey and helped distribute both pilot surveys.

Year 2:

The key challenge of this project was figuring out how to recruit and distribute surveys to community college students from across the country. In order to meet this challenge in Year 2, we expanded our recruitment plan to (1) communicate directly with colleges and (2) offer incentives.

Our original recruitment plan was to ask six ATE centers (along with our FLATE partners) to recruit five colleges each with the goal of recruiting 400 students each over two semesters. Across both pilot surveys, students from only 20 colleges participated. We were also unable to get valuable information about program headcount and/or course enrollment in order to calculate response rates for each college.

We determined four flaws with this strategy of coordinating solely with centers:

- (1) The method was too causal and not as deliberate as necessary to ensure cooperation
- (2) Centers may not be able to devote the time and effort needed to coordinate participation among partner colleges despite receiving a \$5000 incentive
- (3) A "one size fits all" recruitment strategy does not account for unique program characteristics that may hinder survey participation
- (4) Working only with centers did not allow us to recruit interested colleges unaffiliated with partner ATE centers.

We attempted to address these flaws by developing a more formal method of distributing the survey and foster direct communication between the USF PathTech LIFE research team and participating colleges. The most important step was to hire Benjamin Reid, Principal Consultant of Impact Allies to assist with Strategic Development and serve as External Communications Consultant (ECC) for the project. Reid is the evaluator of RCNET, an ATE Center partner. He served on our expert panel that assisted with survey development in Year 1 and handled RCNET's project role as a partner college.

As ECC, his primary objectives are the following:

1. Strategize with PathTech LIFE and FLATE on how to best achieve the end goal of receiving the desired student response rate from each college.
  2. Continually evolve the strategy as new information comes to light from communications with administration and faculty at partner colleges.
  3. Be the “point of contact” for PathTech LIFE and FLATE in order to coordinate communication with partner centers and colleges in order to achieve desired goals including
  4. Distribute surveys and other information to partner centers and colleges as needed.
- Ben Reid was able to make and sustain contact with over 40 colleges during and before the Round 1 survey period. We also directly incentivized colleges to participate in the survey. To this point, we had not offered a compelling reason for colleges to distribute the survey to their students. In his role as ECC, Ben Reid recommended a comprehensive incentive plan based on his interactions with college program heads. We settled on providing colleges a small stipend of \$250 and a report on findings unique to their own college if they delivered a 70% response rate. Colleges received the college findings report if they had a 50% response rate. Response rate was calculated as the total number of students who completed the survey divided by the number of students who were given a flyer with information about the survey as reported to the ECC by a program administrator.

As a result of this strategy, we received responses from students at 26 colleges and a response rate of 50% or above at 14 colleges. Seven of 26 colleges reached the 70% response rate. Each of those colleges received a \$250 stipend and received a findings report specific to the college. All participating colleges have received a copy of the Round 1 Findings Report found in Products.

Year 3:

The new direct recruitment strategy and incentives helped increase participation in Rounds 2 and 3.

Year 4:

We have maintained contact with participating colleges and plan to distribute findings from PathTech LISTEN and future PathTech projects.

#### **\* What opportunities for training and professional development has the project provided?**

During Spring 2019, Dr. Will Tyson and Dr. Lakshmi Jayaram co-taught a graduate research practicum, “Issues in Higher Education Practicum: Mixed Methods Research and Grantsmanship.” The course involved four objectives: 1) introduce mixed-methods research designs, 2) review substantive issues in higher education, 3) learn to write a grant proposal, and 4) gain hands-on experience analyzing quantitative and qualitative data from PathTech LIFE and PathTech Tampa Bay (DUE #1104214). In this course, we focused on how to integrate qualitative and quantitative methods into a cohesive research design. This course was particularly useful for students with training in qualitative and/or quantitative methods who want to develop a working appreciation for other sets of methods and learn how to collaborate with scholars of diverse methodological backgrounds.

Through this course, students: (1) learned research methods used to examine current debates in higher education, (2) developed unique research agendas to address these issues and learn the process of gaining external funding for this research, and (3) engaged in a practicum experience working on PathTech LIFE and PathTech LISTEN. Students developed their own mixed-methods project using project data that ranged from examining the experiences of students with disabilities,

parent-students, and women technicians, the impact of taking career and technical education classes, the role of advising, the knowledge and utilization of campus resources, as well as the experiences of first-generation students.

#### **\* How have the results been disseminated to communities of interest?**

We have disseminated results of this study to community college faculty and administrators, local industry, and education researchers at the following conferences and meetings. The list of conferences can be found under Products.

We also distributed Findings Reports to all participating colleges and Findings Reports specific to the colleges with a 50% response rate or higher.

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## Products

### Books

### Book Chapters

### Inventions

### Journals or Juried Conference Papers

Danielly Orozco Will Tyson Lakshmi Jayaram Marilyn Barger (2018). PathTech LIFE (Learning, Interests, Family and Employment): Understanding Advanced Technology Students. *American Society for Engineering Education Southeastern Section Conference*. . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Edward C. Fletcher Will Tyson (2020). Examining Enrollment Decisions and Life Challenges of Adult Learners in Advanced Technologies Programs. *Journal of Vocational Education and Training*. . Status = AWAITING\_PUBLICATION; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Will Tyson Lakshmi Jayaram Marilyn Barger (2019). PathTech LIFE: Overview of Findings from National Survey of Technician Education Students. Conference Proceedings. *American Society for Engineering Education*. . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

### Licenses

### Other Conference Presentations / Papers

Edward C. Fletcher Will Tyson (2018). *An Exploratory Analysis of Characteristics and Participation Factors for Two-Year College Students in Advanced Technology*. American Education Research Association. New York, NY. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson Lakshmi Jayaram Danielly Orozco (2018). *Applied Research 101 – PathTech LIFE and LISTEN Research in Action*. ATE Principal Investigators' Conference. Washington, DC. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson Kristopher Oliveira (2019). *Community College Technician Education Student Knowledge and Use of Student Resource Centers*. Society for Applied Anthropology. Portland, OR. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Lakshmi Jayaram (2019). *Educational Background and Future Aspirations of Technician Students in Two-Year Programs: Emerging Findings from PathTech LIFE*. American Sociological Association. New York, NY. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson Edward C. Fletcher (2017). *Examining Enrollment Decisions and Life Challenges of Adult Learners in Engineering Technology*. American Educational Research Association. San Antonio, TX. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson Lakshmi Jayaram (2019). *Knowledge and Utilization of Campus Resources and Program Satisfaction Among Community College Technician Education Students*. Southern Sociological Society. Atlanta, GA. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson Lakshmi Jayaram (2019). *PathTech LIFE and LISTEN: Annual Report of Research on Technician Education Students*. High Impact Technology Exchange Conference. St. Louis, MO. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson (2016). *PathTech LIFE: Constructing a National Survey of Diverse Community College STEM Students*. Southern Sociological Society. Atlanta, GA. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson Lakshmi Jayaram (2018). *PathTech LIFE: Findings from a National Survey of Advanced Technology Students*. High Impact Technology Exchange Conference. Miami, FL. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson Edward C. Fletcher Lakshmi Jayaram (2017). *PathTech LIFE: Informing Targeted Research and Best Practices*. ATE Principal Investigators' Conference. Washington, DC. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson (2017). *PathTech LIFE: Preliminary Findings for a National Survey of Advanced Technology Students*. High Impact Technology Exchange Conference. Salt Lake City, UT. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson Lakshmi Jayaram (2018). *Personal and Professional Motivations of Enrollment in Community College Advanced Technology Programs*. Southern Sociological Society. New Orleans, LA. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson (2016). *Survey Development Challenges: Examining Student Retention in STEM Programs*. STEMtech. Philadelphia, PA. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Will Tyson Lakshmi Jayaram (2018). *Technician Students, Diversity, and Program Satisfaction: Findings from the PathTech LIFE Survey*. Florida Educational Research Association. St. Petersburg, FL. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

## Other Products

## Other Publications

## Patents

## Technologies or Techniques

## Thesis/Dissertations

## Websites

## Participants/Organizations

### What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Tyson, William	PD/PI	1
Fletcher, Edward	Co PD/PI	0
Orozco, Danielly	Co PD/PI	1
Jayaram, Lakshmi	Other Professional	12
Smith, Chrystal	Other Professional	0
Reid, Benjamin	Consultant	1

### Full details of individuals who have worked on the project:

#### William T Tyson

**Email:** wtyson@usf.edu

**Most Senior Project Role:** PD/PI

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Dr. Tyson leads all research effort in this project including leading the USF based research team. Dr. Tyson administered the survey and led revision efforts and data analysis. He was also is the primary contact with Qualtrics and the ECC. Dr. Tyson leads data analyses and created the Findings Reports.

**Funding Support:** PathTech LIFE

**International Collaboration:** No

**International Travel:** No

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**Edward C Fletcher**

**Email:** fletcher.158@osu.edu

**Most Senior Project Role:** Co PD/PI

**Nearest Person Month Worked:** 0

**Contribution to the Project:** Edward C. Fletcher was not active on the project during Year 4 of the project.

**Funding Support:** N/A

**International Collaboration:** No

**International Travel:** No

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**Danielly Orozco**

**Email:** dorozco2@hccfl.edu

**Most Senior Project Role:** Co PD/PI

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Ms. Orozco represents FLATE in their partnership with USF. She helps coordinate communication between the USF based research team and partner ATE Centers. She is also part of the expert panel made up of ATE Center leadership.

**Funding Support:** PathTech LIFE

**International Collaboration:** No

**International Travel:** No

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**Lakshmi Jayaram**

**Email:** ljayaram@usf.edu

**Most Senior Project Role:** Other Professional

**Nearest Person Month Worked:** 12

**Contribution to the Project:** Dr. Jayaram joined the project in August 2017 as a Research Associate. She assists Drs. Tyson and Fletcher with publication and dissemination efforts.

**Funding Support:** Dr. Jayaram is supported by the PathTech LIFE award.

**International Collaboration:** No

**International Travel:** No

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**Chrystal Smith**

**Email:** chrystal.smith@uconn.edu

**Most Senior Project Role:** Other Professional

**Nearest Person Month Worked:** 0



**Contribution to the Project:** Dr. Smith consults the project on survey construction and qualitative analysis.

**Funding Support:** Dr. Smith is supported by the PathTech LIFE award.

**International Collaboration:** No

**International Travel:** No

### **Benjamin Reid**

**Email:** ben@impactallies.com

**Most Senior Project Role:** Consultant

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Mr. Reid serves as External Communications Coordinator and External Evaluator. He maintains contact with colleges to aid recruiting efforts. He facilitates communication between Dr. Tyson and college partners. Mr. Reid also conducts external evaluation on the project as of Year 3.

**Funding Support:** Mr. Reid is supported by the PathTech LIFE award.

**International Collaboration:** No

**International Travel:** No

### **What other organizations have been involved as partners?**

<b>Name</b>	<b>Type of Partner Organization</b>	<b>Location</b>
CARCAM	Academic Institution	Gadsden, AL
CREATE	Academic Institution	Santa Clarita, CA
ICF	Industrial or Commercial Firms	Washington, DC
MatEdU	Academic Institution	Lynnwood, WA
NEATEC	Academic Institution	Troy, NY
RCNET	Academic Institution	Fort Pierce, FL
RCNGM	Academic Institution	Farmington, CT

### **Full details of organizations that have been involved as partners:**

#### **CARCAM**

**Organization Type:** Academic Institution

**Organization Location:** Gadsden, AL

#### **Partner's Contribution to the Project:**

Collaborative Research

**More Detail on Partner and Contribution:** Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM) is an ATE Center. In consultation with our partners at FLATE, we decided the most efficient way to conduct a national survey of students enrolled in technician education programs at community colleges throughout the US is to partner with ATE Centers. Each center trains students to be production based tech in one of four technological areas: (1) Micro and Nano Technologies, (2) Engineering Technologies, (3) Advanced Manufacturing Technologies, and (4) Energy and Environmental Technologies. Each ATE Center agreed to complete the following Year 1 tasks as part of their

PathTech collaboration: (1) Two representatives from each center reviewed the pilot online survey and made recommendations over three stages using the Delphi method; (2) The center distributed the pilot online survey to students enrolled at the host institution or other institutions if necessary. The center received a \$5000 stipend for their cooperation.

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## CREATE

**Organization Type:** Academic Institution

**Organization Location:** Santa Clarita, CA

**Partner's Contribution to the Project:**

Collaborative Research

**More Detail on Partner and Contribution:** California Regional Consortium for Engineering Advances in Technological Education (CREATE) is an ATE Center. In consultation with our partners at FLATE, we decided the most efficient way to conduct a national survey of students enrolled in technician education programs at community colleges throughout the US is to partner with ATE Centers. Each center trains students to be production based tech in one of four technological areas: (1) Micro and Nano Technologies, (2) Engineering Technologies, (3) Advanced Manufacturing Technologies, and (4) Energy and Environmental Technologies. Each ATE Center agreed to complete the following Year 1 tasks as part of their PathTech collaboration: (1) Two representatives from each center reviewed the pilot online survey and made recommendations over three stages using the Delphi method; (2) The center distributed the pilot online survey to students enrolled at the host institution or other institutions if necessary. The center received a \$5000 stipend for their cooperation.

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## ICF

**Organization Type:** Industrial or Commercial Firms

**Organization Location:** Washington, DC

**Partner's Contribution to the Project:**

Collaborative Research

**More Detail on Partner and Contribution:** ICF is the external evaluator on this project. Two members of the ICF team reviewed the pilot survey along with personnel from partner ATE Centers. ICF assisted in pilot data analysis and made recommendations for revisions.

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## MatEdU

**Organization Type:** Academic Institution

**Organization Location:** Lynnwood, WA

**Partner's Contribution to the Project:**

Collaborative Research

**More Detail on Partner and Contribution:** National Resource Center for Materials Technology Education (MatEdU) is an ATE Center. In consultation with our partners at FLATE, we decided the most efficient way to conduct a national survey of students enrolled in technician education programs at community colleges throughout the US is to partner with ATE Centers. Each center trains students to be production based tech in one of four technological areas: (1) Micro and Nano Technologies, (2) Engineering Technologies, (3) Advanced Manufacturing Technologies, and (4) Energy and Environmental Technologies. Each ATE Center agreed to complete the following Year 1 tasks as part of their PathTech collaboration: (1) Two representatives from each center reviewed the pilot online survey and made recommendations over three stages using the Delphi method; (2) The center distributed the pilot online survey to students enrolled at the host institution or other institutions if necessary. The center received a \$5000 stipend for their cooperation.

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## NEATEC

**Organization Type:** Academic Institution

**Organization Location:** Troy, NY

**Partner's Contribution to the Project:**

Collaborative Research

**More Detail on Partner and Contribution:** Northeast Advanced Technological Education Center (NEATEC) is an ATE Center. In consultation with our partners at FLATE, we decided the most efficient way to conduct a national survey of students enrolled in technician education programs at community colleges throughout the US is to partner with ATE Centers. Each center trains students to be production based tech in one of four technological areas: (1) Micro and Nano Technologies, (2) Engineering Technologies, (3) Advanced Manufacturing Technologies, and (4) Energy and Environmental Technologies. Each ATE Center agreed to complete the following Year 1 tasks as part of their PathTech collaboration: (1) Two representatives from each center reviewed the pilot online survey and made recommendations over three stages using the Delphi method; (2) The center distributed the pilot online survey to students enrolled at the host institution or other institutions if necessary. The center received a \$5000 stipend for their cooperation.

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## RCNET

**Organization Type:** Academic Institution

**Organization Location:** Fort Pierce, FL

**Partner's Contribution to the Project:**

Collaborative Research

**More Detail on Partner and Contribution:** Regional Center for Nuclear Education and Training (RCNET) is an ATE Center. In consultation with our partners at FLATE, we decided the most efficient way to conduct a national survey of students enrolled in technician education programs at community colleges throughout the US is to partner with ATE Centers. Each center trains students to be production based tech in one of four technological areas: (1) Micro and Nano Technologies, (2) Engineering Technologies, (3) Advanced Manufacturing Technologies, and (4) Energy and Environmental Technologies. Each ATE Center agreed to complete the following Year 1 tasks as part of their PathTech collaboration: (1) Two representatives from each center reviewed the pilot online survey and made recommendations over three stages using the Delphi method; (2) The center distributed the pilot online survey to students enrolled at the host institution or other institutions if necessary. The center received a \$5000 stipend for their cooperation.

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## RCNGM

**Organization Type:** Academic Institution

**Organization Location:** Farmington, CT

**Partner's Contribution to the Project:**

Collaborative Research

**More Detail on Partner and Contribution:** Regional Center for Next Generation Manufacturing (RCNGM) is an ATE Center. In consultation with our partners at FLATE, we decided the most efficient way to conduct a national survey of students enrolled in technician education programs at community colleges throughout the US is to partner with ATE Centers. Each center trains students to be production based tech in one of four technological areas: (1) Micro and Nano Technologies, (2) Engineering Technologies, (3) Advanced Manufacturing Technologies, and (4) Energy and Environmental Technologies. Each ATE Center agreed to complete the following Year 1 tasks as part of their PathTech collaboration: (1) Two representatives from each center reviewed the pilot online survey and made recommendations over three stages using the Delphi method; (2) The center distributed the pilot online survey to students enrolled at the host institution or other institutions if necessary. The center received a \$5000 stipend for their cooperation.

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## What other collaborators or contacts have been involved?

Emma Leeburg helped prepare reports for the project.

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## Impacts

### What is the impact on the development of the principal discipline(s) of the project?

PathTech LIFE is a multi-disciplinary project, and as such, impacts individual disciplinary fields as well as makes interdisciplinary contributions. First, our work provides unprecedented information about the technician education student body, including data about their demographic background, employment, family, prior education, as well as their motivations for enrollment and future goals. Second, our work also represents an unprecedented and growing partnership between community college ATE programs and four-year institutions.

### What is the impact on other disciplines?

This study impacts engineering education by sharing information between college programs with representatives from other college programs beyond anecdotal evidence. This study impacts education by providing analyses of reasons why students enroll in two-year technician education programs. This study also impacts sociology through the application of life course perspective to higher education as part of an extended transition into and through adulthood, particularly among underserved groups such as underrepresented minorities, single parents, students who work full-time jobs, and LGBT students in STEM.

### What is the impact on the development of human resources?

We presented our findings at Engineering Technology Forums and at Hi-TEC conferences to community college technician education educators and administrators. We also provided national reports and findings reports specific to colleges. The presentations include knowledge key personnel can use to improve the retention and persistence of their students. The presentations also inform representatives from participating industry representatives about the work/life balance challenges that their employees face and possible strategies to improve retention.

### What is the impact on physical resources that form infrastructure?

Nothing to report.

### What is the impact on institutional resources that form infrastructure?

Nothing to report.

### What is the impact on information resources that form infrastructure?

Nothing to report.

### What is the impact on technology transfer?

Nothing to report.

### What is the impact on society beyond science and technology?

Colleges can use the results of this study to improve opportunities for people from various backgrounds and create pathways for these students into STEM fields.

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## Changes/Problems

### Changes in approach and reason for change

Year 1:

We originally planned to conduct a think-aloud activity in which we would observe students enrolled in engineering technology courses at HCC as they completed a draft of the first pilot survey. This was to be the last step before distributing the first pilot survey. We decided to distribute the first pilot survey before conducting the think-aloud because the Spring semester was ending at some of our partner institutions and we feared waiting any longer would reduce the pool of eligible students available to complete the survey.

#### Year 2:

We changed the survey instrument in response to findings and feedback from two rounds of pilot surveys. The most prominent change is that we reduced survey completion time from 25 to 15. We also changed the recruitment strategy for the project to make direct contact with colleges instead of relying on relationships through ATE Centers. These changes are explained in depth in the Accomplishments section.

#### Year 3:

The only change this year was the application for supplemental funding which resulted in a 6 month project extension. This change allowed the project to conduct a third round of data collection and pay for services of the External Communications Coordinator to aid in recruitment and Qualtrics to manage the data. The change also insured that we could pay all respondents and colleges. The change also allowed us to hire Dr. Jayaram as a full-time research associate.

#### Year 4:

We applied for a no cost extension in order to extend the project to from February 2019 to August 2019.

### **Actual or Anticipated problems or delays and actions or plans to resolve them**

#### Year 1

The Think Aloud activity was conducted over Skype in September 2016 at beginning of Year 2 after analysis of the first pilot survey data. Feedback from the Think Aloud was used to revise the pilot survey in October 2016 before distributing a second pilot survey in November-December 2016.

#### Year 2

The primary problems we have faced in this study are described under accomplishments. The anticipated problem we face is the consistent problem that we spent the first 2-3 months of each semester preparing the survey and recruiting colleges leaving only a month at the end of the semester to distribute the survey and collect data. We resolved this issue with the following strategies that should allow us to start Wave 2 data collection in mid- September and continue through early December. FLATE hosted a webinar for colleges interested in participating in the Round 2 survey in order to jumpstart recruitment. The External Communications Coordinator (ECC) started recruitment in mid-August and continue through the webinar and actively added interested programs to the project. We hired Dr. Lakshmi Jayaram has been hired as a full-time research associate.

We only made minor edits to the Round 1 survey for Round 2 by adding questions about knowledge and utilization of campus resources. The manuscript in progress based on these questions is included under Products. This is in contrast to major changes between Pilot 2 and the Wave 1 survey that reduced the completion time from 25 to 15 minutes. By adding an ECC, we increased our capacity to recruit colleges who are not affiliated with an ATE Center. Based on his outreach to colleges during Wave 1, Reid authored a report detailing problems colleges face when surveying their students. A PDF of this report can be found in the supplemental files under Products. We anticipate this report will be helpful when planning future targeted research projects.

#### Year 3 and Year 4

Supplemental funding and the no cost extension allowed us time to conduct analyses and prepare Findings Reports and manuscripts. We will continue to work on manuscripts.

## Changes that have a significant impact on expenditures

### Year 1

The budget for Participant Costs included \$5000 for seven ATE Center partners each for Year 1 and Year 2. We decided that recruiting six ATE Center partners was sufficient for the project, so the \$10,000 reserved for a seventh partner was used to provide \$250 research stipends for participating colleges with a 70% response rate or higher.

### Year 2

At the end of Year 2, we shifted a significant portion of our expenditures to hire Qualtrics for survey construction and management and Ben Reid to aid in recruitment.

### Year 3

We used funding from the supplemental funding request to hire Dr. Lakshmi Jayaram as a full-time research associate for Year 3 and hire Ben Reid as ECC through the end of data collection.

### Year 4

The supplemental funding and no cost extension extended the spending period to a 4th year.

## Significant changes in use or care of human subjects

Nothing to report.

## Significant changes in use or care of vertebrate animals

Nothing to report.

## Significant changes in use or care of biohazards

Nothing to report.

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## Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.