Preview of Award 1501999 - Annual Project Report

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 - 08/31/2018
Reporting Period:	09/01/2016 - 08/31/2017
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 goal of this project is 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 is 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 of Year 2 were to:

- Conduct a second pilot survey to test distribution methods of the survey in Fall 2016.
- Conduct Wave 1 of the PathTech LIFE national survey in Spring 2017.

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

Major Activities: The two major activities during Project Year 2 (Sept 2016-Aug 2017) were (1) a second pilot survey distributed in November 2016 and (2) Wave 1 of the PathTech LIFE Spring 2017 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. We plan to distribute the Wave 2 survey in mid-September with very minor revisions to the Wave 1 survey.   This will result in a 2 ½ month survey window.

Specific Objectives: 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 Wave 1.

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 form 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.

Significant Results:	Pilot 2 Survey and full Wave 1 Survey results can be found under Products.
Key outcomes or Other achievements:	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 survey period. We believe that distributing the survey in September will result in contacting more colleges and getting higher participation among colleges.

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. 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 Wave 1 Findings Report found in Products.

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

The project has not provided training and professional development opportunities to this point.

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

In Year 2, we have disseminated results of this study to community college faculty and administrators, local industry, and

education researchers at the following conferences and meetings.

September 2016 - Fall 2016 FLATE Florida Forum on Engineering Technology (ET Forum)

- Florida community college from advanced manufacturing and engineering technology program faculty and administrators

October 2016 - ATE Principal Investigators Conference

- Showcase session for ATE project personnel

November 2016 - STEMtech Conference coordinated by the League for Innovation in the Community College

- US community college advanced technology program faculty and administrators

April-May 2017 - American Educational Research Association

- US and international education researchers

June 2017 - Summer 2017 FLATE Industry Advisory Council

- FLATE personnel, Tampa Bay area technical school and college faculty and administrators, and industry partners

July 2017 - 2017 High Impact Technology Exchange Conference (Hi-TEC)

- US community college advanced technology program faculty and administrators

In addition, we distributed the following reports to audiences of interest.

August 2017 - Summer 2017 Findings Report

- All colleges who participated in the Wave 1 survey

August 2017 - College Findings Reports

- Individual reports for colleges with a 70% response rate or higher

* What do you plan to do during the next reporting period to accomplish the goals?

We plan to make minor edits to the Wave 1 survey to correct problems for Wave 2.

We are currently seeking supplemental funding to hire a Qualtrics project manager to manage the Wave 2 survey and conduct additional strategies to help increase the likelihood of survey completion. This funding will allow us to maintain the ECC position for Wave 2 using funds from the existing budget. By adding an ECC, we have increased our capacity to recruit colleges who are not affiliated with an ATE Center. We will reach beyond the ATE Centers in our recruitment. Based on his outreach to colleges, Reid also authored a report detailing problems colleges face when surveying their students. This report can be found under Products. We anticipate this report will be helpful when planning Wave 2. It will also help serve other ATE projects.

Products

Books

Book Chapters

Inventions

Journals or Juried Conference Papers
Will Tyson Edward C. Fletcher (2017). Examining Enrollment Decisions and Life Challenges of Adult Learners in Engineering Technology. *American Educational Research Association*.   . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Will Tyson (2016). Survey Development Challenges: Examining Student Retention in STEM Programs. *STEMtech*

Conference.   . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Will Tyson (2017). PathTech LIFE: Preliminary Findings for a National Survey of Advanced Technology Students. *High Impact Technology Exchange Conference.*   . Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Licenses

Other Conference Presentations / Papers

Will Tyson Edward C. Fletcher (2016). *PathTech LIFE Update*. Florida Forum on Engineering Technology. Daytona Beach, 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	5
Fletcher, Edward	Co PD/PI	2
Orozco, Danielly	Co PD/PI	1
Jayaram, Lakshmi	Other Professional	1
Smith, Chrystal	Other Professional	3
Reid, Benjamin	Consultant	2

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: 5

Contribution to the Project: Dr. Tyson leads all research effort in this project including leading the USF based research team. Dr. Tyson administers the survey and leads revision efforts and data analysis. He also is the primary contact with Qualtrics and the ECC.

Funding Support: N/A

Edward C Fletcher
Email: ecfletcher@usf.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 2

Contribution to the Project: Dr. Fletcher assists Dr. Tyson in overseeing all project activity. Dr. Fletcher wrote the initial draft of the PathTech LIFE Pilot Survey and led efforts to revise pilot surveys. Dr. Fletcher co-authored conference papers from the project.

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

International Collaboration: No
International Travel: No

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: Ms. Orozo is supported by the PathTech LIFE award and the FLATE ATE Center award.

International Collaboration: No
International Travel: No

Lakshmi Jayaram
Email: ljayaram@usf.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Dr. Jayaram joined the project in August 2017 as a Research Associate. She will assist 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

Chrystal Smith
Email: chrystal.smith@uconn.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 3

Contribution to the Project: Dr. Smith consults the project on survey construction and leads qualtiative analysis.

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

Benjamin Reid
Email: ben@impactallies.com
Most Senior Project Role: Consultant
Nearest Person Month Worked: 2

Contribution to the Project: Mr. Reid serves as External Communications Coordinator. He maintains contact with colleges to aid recruiting efforts. He facilitates communication between Dr. Tyson and college partners.

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?

Name	Type of Partner Organization	Location
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.

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.

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.

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.

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.

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.

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.

What other collaborators or contacts have been involved?

Emma Perk assisted in preparing data visualization for the findings reports and Hi-TEC presentation.

Impacts

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

Findings provide two-year college administrators and faculty with a better understanding of the students they serve in terms of their backgrounds/demographics, unique lived experiences and challenges as they navigate the postsecondary education landscape as a path to a better life. Further, this research makes theoretical contributions to STEM program research by introducing concepts from the adult education literature to explore the lived experiences of adult learners. Results of our study have the potential to provide institutional knowledge regarding the backgrounds and challenges of students pursuing two-year degrees/certificates in advanced technologies. As such, institutions can begin to provide supports to accommodate their diverse student population and to assist with their persistence in completing courses, degrees, and certificates.

What is the impact on other disciplines?

With the development of the PRiSM instrument, researchers in other disciplines can adapt to use within their own fields or disciplines. Researchers and practitioners can use the instrument to identify the backgrounds/demographics, reasons for enrollment, challenges, and unique lived experiences of students in any field/discipline. Results could provide institutional knowledge to accommodate student populations and assist with their persistence and retention.

What is the impact on the development of human resources?

We presented our findings at two Engineering Technology Forums sponsored by the Florida Advanced Technological Education (FLATE) Center, Hillsborough Community College. The presentations provided instructors and administrators of advanced technology programs with knowledge needed 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?

Results of our study could help to provide access to, serve the needs of, and promote the success of racial and ethnic minority students as a pathway to produce skilled workers in STEM fields.

Changes/Problems

Changes in approach and reason for change

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.

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

The primary problems we have faced in this study are described under accomplishments.

The anticipated problem we face is the consistent problem that we spend 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 plan to resolve 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 will host a webinar on August 30 for colleges interested in participating in the Wave 2 survey. This will jumpstart recruitment.
- The External Communications Coordinator will start recruitment in mid-August and continue through the webinar.
- Dr. Lakshmi Jayaram has been hired as a full-time research associate. We will be able to devote her full-time to working on the survey. Dr. Tyson, Fletcher, and Smith all have teaching and service responsibilties in the Fall and Spring semesters that make it difficult to focus on PathTech LIFE project tasks especially in the first month of the semester.
- We are only making minor edits to the Wave 1 survey for Wave 2. This is in contract 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 have 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 PathTech LIFE and other survey research within ATE.

Changes that have a significant impact on expenditures

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. We have submitted a supplemental funding request to hire Dr. Lakshmi Jayaram as a full-time research associate for Year 3 and to hire a Qualtrics program manager to manage communication with students to aid recruitment. If the supplemental funding request is rewarded, this will also free up funds to hire Ben Reid as ECC through Fall 2017 data collection.

Significant changes in use or care of human subjects

Changes to the survey and recruitment described above could be considered changes in use or care of human subjects.

Significant changes in use or care of vertebrate animals
Nothing to report.

Significant changes in use or care of biohazards
Nothing to report.

Special Requirements

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

Nothing to report.