

Final Report Attachment 6

Evaluation Reports

- Year 1 Evaluation Report (August 2016)
- Participation in Targeted Research from the College Perspective – Lessons Learned (June 2017)
- Year 2 Evaluation Report (August 2017)
- Year 3 Evaluation Report: A Process Perspective in Conducting Targeted Research (August 2018)



Annual External Evaluation Report

PathTech LIFE: Constructing a National Survey of Engineering Technology Students through Regional and Statewide Testing

NSF Award #1501999

August 31, 2016

Submitted by:

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1. Overview of PathTech LIFE and the External Evaluation

1.1 About the PathTech LIFE Project

The Successful Academic and Employment Pathways in Advanced Technologies (PathTech) project is funded through a grant from the National Science Foundation (NSF) Directorate for Education and Human Resources (DEHR) under the Advanced Technological Education (ATE) program (NSF Award #1501999). The NSF ATE program promotes the improvement of education, particularly at two-year colleges, for science and engineering technicians entering into high-technology fields. The ATE program supports different types of activities, including the development of curriculum, educator professional development, career pathways, articulation between two-year and four-year programs for potential educators, and research to add to the understanding of various aspects of technician education.

The NSF ATE grant for the PathTech LIFE project was awarded to the University of South Florida (USF). This project is being conducted over three years between September 15, 2015 and August 31, 2018. Grant funds for this period total \$778,031. The primary goal of the project is to develop a national survey of students completing coursework, certification, and AS/AAS degrees in advanced technology programs at community colleges.

Dr. Will Tyson (USF) is the principal investigator, and Dr. Edward Fletcher (USF) and Dr. Dainelly Orozco (USF) are serving as co-principal investigators. In addition to ICF International serving as the external evaluator, this project is being aided by the following collaboration of ATE partners:

- Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM);
- California Regional Consortium for Engineering Advances in Technological Education (CREATE);
- National Resource Center for Materials Technology Education (MatEdU);
- Northeast Advanced Technological Education Center (NEATEC);
- Regional Center for Nuclear Education and Training (RCNET); and
- Regional Center for Next Generation Manufacturing (RCNGM).

1.1.1 PathTech Research Design and Methodology

The PathTech LIFE project contributes to a growing body of knowledge on advanced technician education and to the overall mission of the NSF ATE program by:

- increasing understanding of recruitment and pathways into engineering technology programs,
- providing information to improve the education of engineering technicians,
- discovering promising practices that increase the visibility of ET programs at community colleges, and
- providing information about practices that produce qualified science and engineering technicians to meet workforce demands.

RESEARCH QUESTIONS

The purpose of the PathTech LIFE project is to answer two broad research questions:

1. What factors contribute most to students' decision to enroll in engineering technology and other advanced technologies programs?
2. How do student pathways, career goals, and school-work-life balance influence recruitment and retention in engineering technology and other advanced technologies programs?

METHODOLOGY

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). An expert panel made up of two persons each from the Florida Advanced Technological Education Center (FLATE), six ATE Center partners, and the external evaluator reviewed the online pilot survey using the Delphi Method. The objective of the review was 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.

In Round 1, the Delphi panel concentrated on the wording of individual items. For each item panelist were asked to indicate whether each item seemed suitable for inclusion in the survey "as is" or whether and how it might be improved. In Round 2, the panelists further reviewed the revised list of items to check for clarity, conciseness, and completeness. Items that received at least 80% consensus by the panel were selected for inclusion in the pilot survey. In Round 3, researchers asked the panelists to again review the items which had not received 80% agreement. Round 3 items upon which panelists achieved 80% consensus were then added to the pilot survey. Once assembled, the pilot survey was sent to the ATE Center partners to distribute at their institution or a partner institution.

1.2 About the External Evaluation

The external evaluation of PathTech LIFE is being conducted by ICF International, led by Thomas Horwood as lead evaluator and supported by Dr. James Demery. The external evaluation is intended to complement and support the efforts of the PathTech LIFE research team. The approach to external evaluation involves: (1) monitoring the progress of the project; (2) providing objective reviews of project instruments, protocols, analysis plans, and reports; and (3) serving as an external resource for technical advice. Data for this report was collected through conversations with the PathTech LIFE project team and through review of project documents (e.g., grant application, research instruments, research protocols, reports).

2. Year 1 External Evaluation Findings

This report assesses the PathTech LIFE project team's progress during the first year of the grant. The Year 1 project period was September 15, 2015 to August 31, 2016. In Year 1 of the PathTech LIFE project, the research team set out to:

- Develop connections between the USF Research team and ATE partners;
- Tryout items for inclusion in the pilot survey;
- Revise items based on feedback from the expert panel;
- Conduct a think-aloud activity observing students completing the pilot survey;
- Administer the pilot survey; and
- Use the pilot study results to create an operational survey to be administered in Year 2.

Of the six Year 1 objectives, all but one were accomplished; the think-aloud activity will be conducted in September 2016. The qualitative and quantitative review of survey items which began with the Delphi technique and ended with the principal components analysis positioned the project particularly well for Year 2. For example, after the items were selected for the PathTech LIFE pilot survey, the research team sent it to ATE Center partners for distribution to students currently enrolled in advanced technologies degree/certificate programs. In the end, 97 students completed the survey. The research team then sent the results to the external evaluator to be analyzed.

The evaluation team conducted a principal components analysis to determine the construct validity of the instrument. The principal components analysis also served as a data reduction technique. Extracted components/scales (i.e., dimensions of the primary construct) were checked for internal consistency reliability. Items that would have resulted in scales not achieving .70 Cronbach's alpha internal consistency were removed from further analysis.

The evaluation team sent the results of the principal components analysis to the research team for review and further analysis which results in the following conceptual scales.

- Pathway to a better life: 7 items, Cronbach's alpha = .88
- Reflective learner (Inclination): 4 items, Cronbach's alpha = .73
- Reflective learner (Prior academic success): 3 items, Cronbach's alpha = .79
- Synchronizing learning, earning, and living: 4 items 8, Cronbach's alpha = .79
- Match with an academic life (Institutional support): 4 items, Cronbach's alpha = .81
- Match with an academic life (Program fit): 6 items, Cronbach's alpha = .90

3. Next Steps in the External Evaluation

Evaluation activities over the next two years of the NSF grant period will include: (1) ongoing monitoring of the progress of the project against project timelines; (2) objective review of data survey results; and (3) review of the replicability of the analyses conducted. In addition, the evaluation team will serve as external resources for technical advice, and will continue to provide commentaries and written reviews of the project's various activities.

We will continue to maintain regular contact with Dr. Tyson and his team, bringing in other members of the external evaluation team as needed. We will prepare quarterly monitoring memos, in which the research team's progress towards project milestones is assessed and suggestions for addressing challenges are provided.

Each year, the external evaluation team will prepare an annual evaluation report summarizing evaluation activities and findings. Each annual evaluation report will build off of each other starting with this report, and will be submitted to NSF as part of the annual reporting requirements, as evidence of the quality of the project's quality assurance procedures.



Participation in Targeted Research from the College Perspective

June 2017

An Executive Summary of the Early Lessons Learned in Soliciting the Support of Two-Year Advanced Technological Education College Programs to Distribute the PathTech LIFE National Survey to Their Students

PathTech LIFE began with a goal: 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 an advanced technology certificate or degree.

To achieve this goal, a significant problem had to be solved: How do we *best* connect with this targeted selection of college students?

PathTech LIFE began with a frame of reference:

- This is targeted research which needs verification that those being surveyed are in fact students in advanced technology courses.
- We cannot directly be given students' information from colleges.
- To reach and verify these students, PathTech LIFE would distribute the survey through advanced technology college programs.
- Three groups need to be satisfied: NSF ATE Centers (PathTech LIFE's strategic partners providing connection to the initial group of college partners), two-year advanced technology college programs (focus of this report), and two-year advanced technology students.
- Information and insights will emerge as we communicate further with our ATE Center partners and with more and varied college programs and students.
- As we learn, we need to evolve our processes and methods quickly in response to the wants, needs, obstacles, and roadblocks of college programs distributing the survey and students completing the survey.

The following four takeaways are PathTech LIFE's early lessons learned in soliciting the support of college programs to distribute a survey to their students. Essentially, this knowledge is an unintended consequence of PathTech LIFE's work towards its primary goal, and has come to be important not only for its future work but also for any entity conducting targeted research by working through college programs.

Lesson 1: Understand which levers to pull.

What do colleges want? What would incentivize them to participate? What is our unique selling proposition? Why would a college take the time and effort to distribute this survey to their students? Variations of this question were discussed amongst PathTech LIFE, with ATE Center partners, and with prospective colleges. The goal was to get this right during the initial period so that this and other surveys could be launched at significant scale with effectiveness and efficiency. While answers varied from college to college, they all shared some combination of these following reasons for being willing to participate:

- Request from a partner or connection. A relationship didn't always ensure a college program's commitment; they did however provide dozens of colleges in which to pilot the survey and distribution strategy, essentially giving PathTech LIFE the start from which it can now independently seek and partner with qualifying college programs.
- Help our community of practice. In this case, it means contributing to the research base, but it is important to note that the spirit of helping was primary, sense of belonging next, followed by an understanding and belief in the research being conducted. Further, if a college program had a connection to NSF ATE, they were more enthusiastic and committed. This recognition led to identifying all NSF ATE grantees as the next group of college programs from which to solicit support. NSF ATE Centers and other grantees regardless of size or scope expressed the value of their receiving a summary report of their involvement in the research to document how they contribute to the NSF ATE community beyond the scope of their specific objectives.
- Student incentive. College programs responded most enthusiastically to the \$25 gift card incentive for their students, showing that they value their students' interests when making a request for their time. Without the monetary incentive for students, neither college programs nor students would participate.
- College incentives. Program directors (usually a ranking faculty member) and higher took interest in the promised Findings Report, especially when it was communicated that the information will contribute to understanding how to better recruit and retain students. To encourage colleges to put in the extra effort required to reach at least a 70% student response rate, two additional incentives were offered: an individual college findings report and a financial incentive. The individual college findings report was most encouraging and that the extra financial incentive was regarded as a nice token of appreciation (with the amount not being of consequence, \$250 came out to be the sweet spot between not enough to convey appreciation and more than enough to achieve the desired result). Colleges receiving the monetary incentive gave it to their students in one form or another; for example, one college purchased a 3D printer for the student

Engineering room, another college let the students choose and they decided textbooks, and another college donated it to their student scholarship fund.

Additionally, it is conducive to college participation and student responses to:

- Defined survey period. This let's colleges know that their involvement will be complete within a specific time frame, which removes an obstacle of uncertainty (and for students it creates urgency for completing the survey). A two-week window for taking the survey was the best as it allowed the program head and/or faculty to distribute and announce the survey in one week, then remind them in the next. As the third week came, it was announced that the survey was open for an additional week because additional colleges had been added, which did contribute to additional students completing the survey.
- Distribute the survey early in the semester. Thereby not occurring during the busy exam preparation period, rather with plenty of time remaining which yields a sense of abundance contributing to a generous, helpful attitude instead of one that is closed.
- Don't take this higher than the program level. Once it goes to the administration level (Dean or VP) it may be vetoed from up high and then it has no chance of being revived at that program level. The only exception would be if a college program states that they have an administration that is favorable to this type of request.
- Ask for recommendations. After telling them what we've seen as best practices, ask college programs for recommendations of how they may go about it differently at their college. Bring colleges into a discussion of strategy formation serves two purposes, to give them a sense of ownership which strengthens their commitment to the work ahead, and may yield unheard insights contributing to a better or alternative distribution process.

Lesson 2: Use multiple touch points and stay in communication.

Multiple touch points proved to be important to bring a prospective partner from awareness to agreement to strengthened commitment. Prospective colleges were successfully introduced to the work and need of the PathTech LIFE survey via existing relationships with ATE Centers, FLATE's presentation at the Engineering Technology Forum, and Will Tyson's (PI) involvement at the NSF ATE PI Conference. Once colleges (from relationships and presentations) were "interested and likely" to participate, it proved important to follow-up via:

- 1st, Email: To introduce their point of contact in this work (elaborated in the next lesson learned) and to reiterate the mission in text and in a professionally produced flyer clearing stating the benefits of participation for both the college program and their students. This email concluded with scheduling a brief phone conversation.

- 2nd, Telephone: To verbally gain a commitment. First contacts at colleges programs were asked to talk about their programs. Then the PathTech LIFE purpose, process, responsibility, and benefits of participating in the PathTech LIFE survey were discussed. Q&A followed and it concluded with their verbal agreement to participate and understanding of next steps.
- Thereafter per understanding and as needed, Email and Telephone: To keep this work top of mind at the right. The week prior and week of distribution, reminder emails were sent. The second and third weeks, a count of how many students from their college had participated to date along with an encouraging note to reannounce the survey to their students. If colleges had been unresponsive or were having difficulties, communication occurred as needed to bring a previously agreeing college program back on track.

For the Fall 2018 distribution, in addition to the above methods, PathTech LIFE will be 1) providing informational webinars for participating colleges which explain targeted research, the PathTech LIFE survey, and how its findings can help colleges with recruitment, retention and completion; 2) research and outreach prior to Hi-TEC for partnership making during the event, and; 3) research and outreach directly to all NSF ATE project grantees (those identified as most enthusiastic about participating).

Lesson 3: Utilize an “External Communications Coordinator”

Of all the early lessons learned, this was the most impactful. The results speak for themselves: without an “External Communications Coordinator” (ECC) the average number of responses during the first and second rounds of distribution was 122; with an ECC during the third round of distribution there were 534 responses. Utilizing an ECC resulted in a 437% increase in responses. The reasons why an ECC deliver a drastic improvement in results are:

- An independent party may follow up until the job is accomplished.
 - Whereas an internal person becomes a nuisance by following up multiple times after the person they’ve tried to reach is unresponsive, and external person is justified and expected to follow up. An ECC can say, “please understand and excuse me if my multiple attempts to reach you have been a bother; I’ve been contracted to do this job and deliver these results, I know this isn’t on the top of your priority list, so what can I do to help you get this survey distributed?” Or when speaking to an ATE Center having trouble onboarding its college partners, “...what can I do to help you bring your college partners onboard?”
- A dedicated, extra person is needed because it is a big job to be taken on, though only for temporary periods of time.

- It was surprising the amount of communication actually needing to take place in order to help ATE Centers onboard their college partners and update them and to solidify college program commitment to distribute, announce, and re-announce the survey to their students. In total with ATE Centers and colleges (in addition to those with PathTech LIFE's PI), the ECC had more than 40 conversations and 550 sent and received emails. To load that amount of communication on top of a Primary Investigator or staff during a short window of time all but ensures that this job or one of their other primary responsibilities will be neglected; thus, the results show that it is best to have a dedicated person to the specific job of coordinating communications.
- The skillset of outreach communication is specific and usually different than a person involved in the management of a grant at a college.
 - Fortunately, the professional we brought on had a private sector background in marketing and communications and was also an Evaluator of one of our ATE Center partners and a former college faculty and staff member, which allowed him to know our work plus understand and relate to the college partners from which he would be soliciting support. His background helped the PathTech LIFE team strategize and revise plans, too.
 - This communications professional also brought to the table another professional within our NSF ATE community, an expert in graphic design and data visualization who redesigned the PathTech Logo and Promotional Flyers and designed the data visualization in the Findings Report.
- It ensures a consistent message and that everyone is on the same page.
 - Prior to the ECC, each ATE Center communicated to their college partners everything involved about the PathTech LIFE survey. This led to colleges not having key information about why or how to participate and gain the best survey results.
- It alleviated the workload of ATE Centers and college partners.
 - PathTech LIFE understood that communicating with each college partner added to the workload of ATE Centers and alleviated that by adding a single point of contact for all participating colleges, which had the added benefit of delivering consistent, timely message to colleges.
 - For college programs, the ECC drafted emails to be sent to additional faculty members and to their students taking the survey. The idea was to make it as easy as possible for colleges to participate, and it showed in the results.
- A single point of contact allowed us to connect the dots and see the big picture and the details as they emerged. One person communicating to all involved parties led to the changes that needed to take place and these early lessons learned.

Lesson 4: Solidify future partnerships.

Beyond treating these partners with the respect and appreciation they deserve for this work, there is a future value incentive. Ultimately PathTech LIFE wants to build strong relationships with advanced technological college programs because those will facilitate future a) efficient surveying for both this research and longitudinal studies, b) avenues for disseminating the findings and applying the research, and c) networks for collaborative work to leverage this work. In order to maintain each college as a partner, it is important to:

- Express gratitude. It is not enough to simply say thank you; it is important to take the time to tell how their involvement was essential to the project and further explain how this research is impacting this advanced technology community.
- Deliver on promises. When the students report back that they received the gift cards, the faculty reported back to PathTech LIFE in a positive manner. Likewise, when PathTech LIFE delivered the colleges incentives, it built trust and strengthened the relationship.
- Make the ask. Letting colleges know of our future plans and how they can be involved is the final important step. And again, asking for their commitment is crucial.



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August 11, 2017

Submitted to:

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Tampa, FL 33612

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1.1 About the PathTech LIFE Project

The Successful Academic and Employment Pathways in Advanced Technologies (PathTech) project is funded through a grant from the National Science Foundation (NSF) Directorate for Education and Human Resources (DEHR) under the Advanced Technological Education (ATE) program (NSF Award #1501999). The NSF ATE program promotes the improvement of education, particularly at two-year colleges, for science and engineering technicians entering into high-technology fields. The ATE program supports different types of activities, including the development of curriculum, educator professional development, career pathways, articulation between two-year and four-year programs for potential educators, and research to add to the understanding of various aspects of technician education.

The NSF ATE grant for the PathTech LIFE project was awarded to the University of South Florida (USF). This project is being conducted over three years between September 15, 2015 and August 31, 2018. Grant funds for this period total \$778,031. The primary goal of the project is to develop a national survey of students completing coursework, certification, and AS/AAS degrees in advanced technology programs at community colleges.

Dr. William Tyson (USF) is the principal investigator, and Dr. Edward Fletcher (USF) and Dr. Danielly Orozco (USF) are serving as co-principal investigators. In addition to ICF serving as the external evaluator, this project is being aided by the following collaboration of ATE partners:

- Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM);
- California Regional Consortium for Engineering Advances in Technological Education (CREATE);
- National Resource Center for Materials Technology Education (MatEdU);
- Northeast Advanced Technological Education Center (NEATEC);
- Regional Center for Nuclear Education and Training (RCNET); and
- Regional Center for Next Generation Manufacturing (RCNGM).

1.1.1 The PathTech LIFE Project Research Design and Methodology

The PathTech LIFE project contributes to a growing body of knowledge on advanced technician education and to the overall mission of the NSF ATE program by:

- increasing understanding of recruitment and pathways into engineering technology programs,
- providing information to improve the education of engineering technicians,
- discovering promising practices that increase the visibility of ET programs at community colleges, and
- providing information about practices that produce qualified science and engineering technicians to meet workforce demands.

RESEARCH QUESTIONS

The purpose of the PathTech LIFE project is to answer two broad research questions:

1. What factors contribute most to students' decision to enroll in engineering technology and other advanced technologies programs?
2. How do student pathways, career goals, and school-work-life balance influence recruitment and retention in engineering technology and other advanced technologies programs?

METHODOLOGY

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). An expert panel made up of two persons each from the Florida Advanced Technological Education Center (FLATE), six ATE Center partners, and the external evaluator reviewed the online pilot survey using the Delphi Method. The objective of the review was 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.

In Round 1, the Delphi panel concentrated on the wording of individual items. For each item panelist were asked to indicate whether each item seemed suitable for inclusion in the survey "as is" or whether and how it might be improved. In Round 2, the panelists further reviewed the revised list of items to check for clarity, conciseness, and completeness. Items that received at least 80% consensus by the panel were selected for inclusion in the pilot survey. In Round 3, researchers asked the panelists to again review the items which had not received 80% agreement. Round 3 items upon which panelists achieved 80% consensus were then added to the pilot survey. Once assembled, the pilot survey was sent to the ATE Center partners to distribute at their institution or a partner institution.

1.2 About the External Evaluation

The external evaluation of PathTech LIFE is being conducted by ICF, led by Thomas Horwood as lead evaluator and supported by Dr. James Demery. The external evaluation is intended to complement and support the efforts of the PathTech LIFE research team. The approach to external evaluation involves: (1) monitoring the progress of the project; (2) providing objective reviews of project instruments, protocols, analysis plans, and reports; and (3) serving as an external resource for technical advice. Data for this report were collected through conversations with the PathTech LIFE project team and through review of project documents (e.g., grant application, research instruments, research protocols, reports).

2. Year 2 External Evaluation Findings

This report assesses the PathTech LIFE project team's progress during the second year of the grant. The Year 2 project period was September 15, 2016 to August 31, 2017. In Year 2 of the PathTech LIFE project, the research team set out to:

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

The research team met these goals by conducting a second pilot survey in November 2016 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 college which resulted in the survey being shortened from 25 to 15 minutes for the Wave 1 administration in April 2017. The Wave 1 survey received 528 responses from students at 26 colleges. The median completion time was 15 minutes, 4 seconds.

An early challenge was figuring out how to recruit and distribute surveys to community college students from across the country. The project team met this challenge by communicating directly with colleges and offering incentives. More specifically they hired a consultant to serve as the External Communications Consultant (ECC) to complete the following tasks:

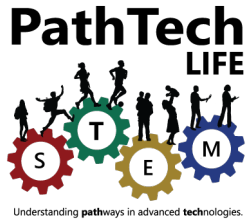
- Strategize with PathTech LIFE and FLATE on how to best achieve the end goal of receiving the desired student response rate from each college.
- Continually evolve the strategy as new information comes to light from communications with administration and faculty at partner colleges.
- Be the “point of contact” for PathTech LIFE and FLATE in order to coordinate communication with partner centers and colleges in order to achieve desired goals.
- Distribute surveys and other information to partner centers and colleges as needed.

The ECC was able to make and sustain contact with over 40 colleges during and before the survey period. The ECC also recommend a comprehensive incentive plan based on his interactions with college program heads. Thus, it was agreed that each participating college would receive a \$250 stipend and a report on findings unique to their own college if they delivered a 70% response rate. Seven of 26 colleges reached this goal. The Wave 2 survey in mid-September will occur with only minor revisions.

3. Next Steps in the External Evaluation

Evaluation activities over the next year of the NSF grant period will include: (1) ongoing monitoring of the progress of the project against project timelines; (2) objective review of data survey results; and (3) review of the replicability of the analyses conducted. In addition, the evaluation team will serve as external resources for technical advice, and will continue to provide commentaries and written reviews of the project’s various activities.

The ICF evaluators will continue to maintain regular contact with Dr. Tyson and his team, bringing in other members of the external evaluation team as needed. We will prepare quarterly monitoring memos, in which the research team’s progress towards project milestones is assessed and suggestions for addressing challenges are provided. We will prepare a final evaluation report in August 2018.



A Process Perspective in Conducting Targeted Research

August 2018

A Draft Executive Summary of the Lessons Learned in Conducting a National Survey of Two-Year Students at Advanced Technological Education College Programs Nationwide.

By necessity of having to solve how to connect with this targeted selection of college programs and college students - and further, how to sustain those relationships and continue to provide value over time - PathTech LIFE has become a defacto expert in the process of implementing targeted research plans in this space.

The purpose of this preliminary case study is to build upon the June 2017 paper, "Participation in Targeted Research from the College Perspective," which specifically addressed "Soliciting the Support of Two-Year Advanced Technological Education College Programs to Distribute the PathTech LIFE National Survey to Their Students."

This paper, which views the entire process of conducting this research, is preliminary as we are currently preparing the National Findings Report and the Individual College Reports from the 3214 student respondents enrolled in technician education programs at 96 community colleges throughout the United States in three survey rounds (Spring 2017, Fall 2017, and Spring 2018). The first two rounds gave us a good indication of use by the colleges of their data, however, before publishing the value and usage of the data returned to colleges we first want to get the complete picture from this project after the latest round of reports is provided to the new and repeat colleges and feedback is provided. Thus, the intended recipients of this report are the PathTech LIFE Principal Investigators and NSF Program Officers. A complete case study is expected to be completed in January 2019.

The three primary questions below were asked, which build upon and fill-in gaps from the previous report on the early lessons learned. Following each question is a sample of the data to be included in the full case study.

Question 1: How do we provide value for colleges with the data collected?

The primary purpose of PathTech LIFE is to show the national picture of 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 an advanced technology certificate or degree. However, we understood that on the micro level, individual colleges could make practical use of their aggregated student responses. Colleges have reported using their own

College Findings Reports for two purposes: to improve their programs and to promote their programs. For example, one college reported "I actually used the last results to get our school to dedicate an adviser for our program because that was an area students recognized as a "needs improvement"." While other colleges reported that they'd use pieces of their report where they were far above average to promote those aspects of their programs.

Per recommendations from colleges for usability of the reports, the college reports this round are being condensed to a one-page document to be shared as a high level overview. The long, detailed version of those reports will still be shared with the college programs, too, so that they can clearly understand the background of their students and what is and isn't working. Anticipation from colleges leaves us with the expectation that colleges will be using their new reports to improve and promote their programs and we are looking forward to sharing that usage information with our communities of interest.

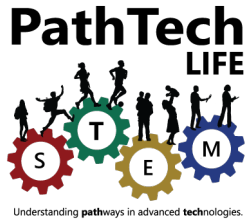
Question 2: What should be expected when connecting with colleges?

Much of this was covered in the previous Executive Summary on "Soliciting the Support of Two-Year Advanced Technological Education College Programs to Distribute the PathTech LIFE National Survey to Their Students", though new lessons have been gleaned. These include knowing when is too much for a college (e.g. too many survey rounds with the same college or too many surveys from various sources attempting to be distributed to a college program's students); accounting for and the factors contributing to drop-offs (i.e. colleges that committed to distributing the survey but didn't after all); accounting for the time to gain approvals prior to distributing the survey (e.g. individual college's departmental and IRB approvals); and response and partnership rates when reaching out to college departments.

Question 3: What were the best strategies deployed for longitudinal studies and spill-over work in ATE Targeted Research?

While the sole work evolved around the specified targeted research outlined in the grant, a few key itemized added without additional expense proved to be essential for adding tremendous potential value related to this work. Specifically, a single question was added to the end of the survey which asked for personal contact information if the students would like to participate in subsequent research studies related to this research. This produced over 70% of respondents agreeing and providing their personal contact information (so they can be reached after they've left their college programs), and this was the core value for the subsequent NSF ATE proposal, PathTech LISTEN. Additionally, one-on-one communication essential to forming the partnerships to distribute the PathTech LIFE survey led to colleges self-identifying their continued interests in ATE Targeted Research. This narrowed list will be useful for distributing findings about this research and other ATE Targeted Research as well as being an experts database utilizable for all in ATE Targeted Research for the purpose of creating partnerships.

For reference, the previous Executive Summary on Early Lessons Learned follows.



Participation in Targeted Research from the College Perspective

June 2017

An Executive Summary of the Early Lessons Learned in Soliciting the Support of Two-Year Advanced Technological Education College Programs to Distribute the PathTech LIFE National Survey to Their Students

PathTech LIFE began with a goal: 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 an advanced technology certificate or degree.

To achieve this goal, a significant problem had to be solved: How do we *best* connect with this targeted selection of college students?

PathTech LIFE began with a frame of reference:

- This is targeted research which needs verification that those being surveyed are in fact students in advanced technology courses.
- We cannot directly be given students' information from colleges.
- To reach and verify these students, PathTech LIFE would distribute the survey through advanced technology college programs.
- Three groups need to be satisfied: NSF ATE Centers (PathTech LIFE's strategic partners providing connection to the initial group of college partners), two-year advanced technology college programs (focus of this report), and two-year advanced technology students.
- Information and insights will emerge as we communicate further with our ATE Center partners and with more and varied college programs and students.
- As we learn, we need to evolve our processes and methods quickly in response to the wants, needs, obstacles, and roadblocks of college programs distributing the survey and students completing the survey.

The following four takeaways are PathTech LIFE's early lessons learned in soliciting the support of college programs to distribute a survey to their students. Essentially, this knowledge is an unintended consequence of PathTech LIFE's work towards its primary goal, and has come to be important not only for its future work but also for any entity conducting targeted research by working through college programs.

Lesson 1: Understand which levers to pull.

What do colleges want? What would incentivize them to participate? What is our unique selling proposition? Why would a college take the time and effort to distribute this survey to their students? Variations of this question were discussed amongst PathTech LIFE, with ATE Center partners, and with prospective colleges. The goal was to get this right during the initial period so that this and other surveys could be launched at significant scale with effectiveness and efficiency. While answers varied from college to college, they all shared some combination of these following reasons for being willing to participate:

- Request from a partner or connection. A relationship didn't always ensure a college program's commitment; they did however provide dozens of colleges in which to pilot the survey and distribution strategy, essentially giving PathTech LIFE the start from which it can now independently seek and partner with qualifying college programs.
- Help our community of practice. In this case, it means contributing to the research base, but it is important to note that the spirit of helping was primary, sense of belonging next, followed by an understanding and belief in the research being conducted. Further, if a college program had a connection to NSF ATE, they were more enthusiastic and committed. This recognition led to identifying all NSF ATE grantees as the next group of college programs from which to solicit support. NSF ATE Centers and other grantees regardless of size or scope expressed the value of their receiving a summary report of their involvement in the research to document how they contribute to the NSF ATE community beyond the scope of their specific objectives.
- Student incentive. College programs responded most enthusiastically to the \$25 gift card incentive for their students, showing that they value their students' interests when making a request for their time. Without the monetary incentive for students, neither college programs nor students would participate.
- College incentives. Program directors (usually a ranking faculty member) and higher took interest in the promised Findings Report, especially when it was communicated that the information will contribute to understanding how to better recruit and retain students. To encourage colleges to put in the extra effort required to reach at least a 70% student response rate, two additional incentives were offered: an individual college findings report and a financial incentive. The individual college findings report was most encouraging and that the extra financial incentive was regarded as a nice token of appreciation (with the amount not being of consequence, \$250 came out to be the sweet spot between not enough to convey appreciation and more than enough to achieve the desired result). Colleges receiving the monetary incentive gave it to their students in one form or another; for example, one college purchased a 3D printer for the student

Engineering room, another college let the students choose and they decided textbooks, and another college donated it to their student scholarship fund.

Additionally, it is conducive to college participation and student responses to:

- Defined survey period. This let's colleges know that their involvement will be complete within a specific time frame, which removes an obstacle of uncertainty (and for students it creates urgency for completing the survey). A two-week window for taking the survey was the best as it allowed the program head and/or faculty to distribute and announce the survey in one week, then remind them in the next. As the third week came, it was announced that the survey was open for an additional week because additional colleges had been added, which did contribute to additional students completing the survey.
- Distribute the survey early in the semester. Thereby not occurring during the busy exam preparation period, rather with plenty of time remaining which yields a sense of abundance contributing to a generous, helpful attitude instead of one that is closed.
- Don't take this higher than the program level. Once it goes to the administration level (Dean or VP) it may be vetoed from up high and then it has no chance of being revived at that program level. The only exception would be if a college program states that they have an administration that is favorable to this type of request.
- Ask for recommendations. After telling them what we've seen as best practices, ask college programs for recommendations of how they may go about it differently at their college. Bring colleges into a discussion of strategy formation serves two purposes, to give them a sense of ownership which strengthens their commitment to the work ahead, and may yield unheard insights contributing to a better or alternative distribution process.

Lesson 2: Use multiple touch points and stay in communication.

Multiple touch points proved to be important to bring a prospective partner from awareness to agreement to strengthened commitment. Prospective colleges were successfully introduced to the work and need of the PathTech LIFE survey via existing relationships with ATE Centers, FLATE's presentation at the Engineering Technology Forum, and Will Tyson's (PI) involvement at the NSF ATE PI Conference. Once colleges (from relationships and presentations) were "interested and likely" to participate, it proved important to follow-up via:

- 1st, Email: To introduce their point of contact in this work (elaborated in the next lesson learned) and to reiterate the mission in text and in a professionally produced flyer clearing stating the benefits of participation for both the college program and their students. This email concluded with scheduling a brief phone conversation.

- 2nd, Telephone: To verbally gain a commitment. First contacts at colleges programs were asked to talk about their programs. Then the PathTech LIFE purpose, process, responsibility, and benefits of participating in the PathTech LIFE survey were discussed. Q&A followed and it concluded with their verbal agreement to participate and understanding of next steps.
- Thereafter per understanding and as needed, Email and Telephone: To keep this work top of mind at the right. The week prior and week of distribution, reminder emails were sent. The second and third weeks, a count of how many students from their college had participated to date along with an encouraging note to reannounce the survey to their students. If colleges had been unresponsive or were having difficulties, communication occurred as needed to bring a previously agreeing college program back on track.

For the Fall 2018 distribution, in addition to the above methods, PathTech LIFE will be 1) providing informational webinars for participating colleges which explain targeted research, the PathTech LIFE survey, and how its findings can help colleges with recruitment, retention and completion; 2) research and outreach prior to Hi-TEC for partnership making during the event, and; 3) research and outreach directly to all NSF ATE project grantees (those identified as most enthusiastic about participating).

Lesson 3: Utilize an “External Communications Coordinator”

Of all the early lessons learned, this was the most impactful. The results speak for themselves: without an “External Communications Coordinator” (ECC) the average number of responses during the first and second rounds of distribution was 122; with an ECC during the third round of distribution there were 534 responses. Utilizing an ECC resulted in a 437% increase in responses. The reasons why an ECC deliver a drastic improvement in results are:

- An independent party may follow up until the job is accomplished.
 - Whereas an internal person becomes a nuisance by following up multiple times after the person they’ve tried to reach is unresponsive, and external person is justified and expected to follow up. An ECC can say, “please understand and excuse me if my multiple attempts to reach you have been a bother; I’ve been contracted to do this job and deliver these results, I know this isn’t on the top of your priority list, so what can I do to help you get this survey distributed?” Or when speaking to an ATE Center having trouble onboarding its college partners, “...what can I do to help you bring your college partners onboard?”
- A dedicated, extra person is needed because it is a big job to be taken on, though only for temporary periods of time.

- It was surprising the amount of communication actually needing to take place in order to help ATE Centers onboard their college partners and update them and to solidify college program commitment to distribute, announce, and re-announce the survey to their students. In total with ATE Centers and colleges (in addition to those with PathTech LIFE's PI), the ECC had more than 40 conversations and 550 sent and received emails. To load that amount of communication on top of a Primary Investigator or staff during a short window of time all but ensures that this job or one of their other primary responsibilities will be neglected; thus, the results show that it is best to have a dedicated person to the specific job of coordinating communications.
- The skillset of outreach communication is specific and usually different than a person involved in the management of a grant at a college.
 - Fortunately, the professional we brought on had a private sector background in marketing and communications and was also an Evaluator of one of our ATE Center partners and a former college faculty and staff member, which allowed him to know our work plus understand and relate to the college partners from which he would be soliciting support. His background helped the PathTech LIFE team strategize and revise plans, too.
 - This communications professional also brought to the table another professional within our NSF ATE community, an expert in graphic design and data visualization who redesigned the PathTech Logo and Promotional Flyers and designed the data visualization in the Findings Report.
- It ensures a consistent message and that everyone is on the same page.
 - Prior to the ECC, each ATE Center communicated to their college partners everything involved about the PathTech LIFE survey. This led to colleges not having key information about why or how to participate and gain the best survey results.
- It alleviated the workload of ATE Centers and college partners.
 - PathTech LIFE understood that communicating with each college partner added to the workload of ATE Centers and alleviated that by adding a single point of contact for all participating colleges, which had the added benefit of delivering consistent, timely message to colleges.
 - For college programs, the ECC drafted emails to be sent to additional faculty members and to their students taking the survey. The idea was to make it as easy as possible for colleges to participate, and it showed in the results.
- A single point of contact allowed us to connect the dots and see the big picture and the details as they emerged. One person communicating to all involved parties led to the changes that needed to take place and these early lessons learned.

Lesson 4: Solidify future partnerships.

Beyond treating these partners with the respect and appreciation they deserve for this work, there is a future value incentive. Ultimately PathTech LIFE wants to build strong relationships with advanced technological college programs because those will facilitate future a) efficient surveying for both this research and longitudinal studies, b) avenues for disseminating the findings and applying the research, and c) networks for collaborative work to leverage this work. In order to maintain each college as a partner, it is important to:

- Express gratitude. It is not enough to simply say thank you; it is important to take the time to tell how their involvement was essential to the project and further explain how this research is impacting this advanced technology community.
- Deliver on promises. When the students report back that they received the gift cards, the faculty reported back to PathTech LIFE in a positive manner. Likewise, when PathTech LIFE delivered the colleges incentives, it built trust and strengthened the relationship.
- Make the ask. Letting colleges know of our future plans and how they can be involved is the final important step. And again, asking for their commitment is crucial.