



Annual External Evaluation Report

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

NSF Award #1501999

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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.