Annual External Evaluation Report

PathTech: Successful Academic and Employment Pathways in Advanced Technologies

NSF Award #1104214

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1. Overview of PathTech and the External Evaluation

1.1 About the PathTech 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 #1104214). 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.

PathTech is a research study designed to examine the progression of students from high school into advanced technology programs, specifically engineering technology (ET), at community colleges and into the workforce. This study will be conducted over four years between September 1, 2011 and August 31, 2015. Grant funds for this project period total $1,196,790.

The NSF ATE grant for the PathTech project was awarded to the University of South Florida (USF), which established a collaboration of higher education institutions in Florida, including researchers from the Departments of Sociology and Anthropology at USF, the Florida Advanced Technological Center (FLATE) at Hillsborough Community College (HCC), Polk State College, St. Petersburg College, and State College of Florida. Dr. Will Tyson (USF) is the principal investigator, and Dr. Kathryn Borman (USF) and Dr. Marie Boyette (HCC) are serving as co-principal investigators. In Year 1 of the grant, the project leaders expanded the research team to include university students and other research staff to contribute to the PathTech project.

1.1.1 PathTech Research Design and Methodology

The PathTech 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 research study is to answer two research questions (with subquestions):

1. Who enrolls in ET community college programs out of high school?
    a. How are student demographic and academic characteristics related to ET enrollment?
    b. How do students learn about ET programs (i.e., outreach)?
    c. How can the pathway from high school into ET programs be improved?

2. How do ET students benefit from enrolling (in degree programs) and earning degrees through these programs?
    a. What are the most critical steps in ET degree attainment from enrollment through gatekeeper courses and to the degree?
    b. How do these students become ET graduates?
    c. How do ET students differ from comparable students in their degree and employment outcomes?

METHODOLOGY

PathTech is a mixed-method study that is employing both descriptive statistics and empirical analysis of verifiable quantitative data from state databases along with ethnographic (qualitative) methods. Quantitative analyses examine statewide trends in career academy participation and engineering technology enrollment. Quantitative data will come from the Florida Department of Education (FLDOE) PK-20 Education Data Warehouse (EDW) and from site visits to construct several indicators of high school preparation that predict enrollment into engineering technology programs. The research team will analyze retrospective data from students during Grades 9-12 to measure high school and post-secondary coursetaking, achievement, and degree attainment. Four cohorts of students who graduated from high school and entered into the full-time workforce or post-secondary schooling in 2007-08, 2008-09, 2009-10, 2010-11 will be tracked.

Qualitative analyses focus on four engineering technology programs housed at community college campus in the Tampa Bay region of Florida, as well as feeder high schools and local industry. Site visits will take place in this region, which contains a concentration of high school STEM career academies, STEM industry, and community colleges that offer advanced technology associates degrees.

1.1.2 PathTech Project Timeline

In Year 1 of the PathTech project, the research team was to conduct these activities:

- Create project brochure highlighting goals and purpose of study for stakeholders
- Conduct pilot site visits to pilot test instruments in one high school, community college, and industry
- Request additional Florida Department of Education (FLDOE) data updates
- Carry out data preparation, descriptive analysis of current FLDOE data
- Conduct propensity score analysis to create samples of students with equal propensity of being in a STEM-themed career academy and propensity score analysis at the school level to create pairs of schools with equal propensity of having a STEM-themed career academy in using Cohorts 1 and 2
- Conduct a literature review on technician education
- Write one paper for dissemination at a relevant conference and/or journal article for a peer reviewed journal

1.2 About the External Evaluation

The external evaluation of PathTech is being conducted by ICF International, led by Thomas Horwood as lead evaluator and supported by Dr. Teresa Duncan and Dr. Katerina Passa. The

external evaluation is intended to complement and support the efforts of the PathTech 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.

This report serves as the first in a series of four annual evaluation reports and covers the first year of the implementation of the PathTech project. Data was collected for this report through conversations with the PathTech project team and through review of project documents (e.g., grant application, research instruments, research protocols, reports.

2. External Evaluation Findings – Year 1

This annual external evaluation report #1 assesses the PathTech project team's progress according to the workplan during the first year of the grant. The Year 1 project period was September 1, 2011 to August 31, 2012. Exhibit 1 shows the activities completed, status, and notes about each PathTech task for Year 1 of the grant project period. Of the seven Year 1 tasks, one involves marketing the PathTech project, one is for qualitative data collection protocols, three are for quantitative data collection and analysis, one involves literature reviews, and one involves dissemination.

Exhibit 1: Status of PathTech Tasks for Year 1 (September 1, 2011-August 31, 2012)

Year 1 Task	Activities Completed – Year 1	Status at End of Year 1	Notes
1. Create project brochure highlighting goals and purpose of study for stakeholders	▪ PathTech web site landing page was developed and includes a brief project overview	In Progress	▪ Continuing to work on brochure, building out the web site, and business cards for PathTech staff
2. Conduct pilot site visits to pilot test instruments in one high school, community college, and industry	▪ Conducted the pilot site visits at one community college and one ET company ▪ Conducted 12 pilot interviews with community college students at St. Petersburg College on April 25, 2012 ▪ Conducted pilot interviews with one employee and one employer/recruiter on-site at the ET company location ▪ Trained 14 student interviewers in ethical issues and fundamental interview strategies ▪ Conducted one-on-one training sessions on analytic strategies after interviews were transcribed	In Progress	▪ Unable to gain the necessary permission to access the high school by the end of the academic year 2011–2012; will revisit in Year 2
3. Request additional Florida Department of Education (FLDOE) data updates	▪ Submitted data requests to FLDOE	Delayed	▪ Three data requests have not been filled by FLDOE due to lack of data staff availability
4. Carry out data preparation, descriptive analysis of current	▪ See Task 3	Delayed	▪ See Task 3

Year 1 Task	Activities Completed – Year 1	Status at End of Year 1	Notes
FLDOE data			
5. Conduct propensity score analysis to create samples of students with equal propensity of being in a STEM-themed career academy and propensity score analysis at the school level to create pairs of schools with equal propensity of having a STEM-themed career academy in using Cohorts 1 and 2	▪ Created analysis plans based on known variables expected to be collected ▪ See Task 3	Delayed	▪ See Task 3
6. Conduct a literature review on technician education	▪ Conducted a literature search to collect articles and other materials in three topic area: high schools, community colleges, and industry ▪ Wrote three literature reviews, which will be updated on a regular basis throughout the grant project period to continually inform the project	Complete	▪ PathTech: Review of the Literature about Community College Graduates and Employers by Marc Hébert ▪ Path Tech: Literature Review on Community Colleges and STEM Programs by Margaret Cooper ▪ PathTech: High School and Career Academies Literature Review by Pangri Mehta and David Zeller
7. Write one paper for dissemination at a relevant conference and/or journal article for a peer reviewed journal	▪ No action	Not Started	▪ Insufficient data (see Task 3) to develop publications/ presentations

Of the seven Year 1 tasks, one is complete, two are in progress, three are delayed, and one was not started. The marketing task is in progress and will continue to be finalized in Year 2. The task to develop and pilot the qualitative data collection protocols has shown the most progress, but the status is in progress due to the inability to gain entry to the high school by the end of the 2011-2012 academic year, which will happen in Year 2. The three quantitative data collection and analysis tasks were delayed because FLDOE has not yet provided access to the needed student data. The research team will continue in Year 2 to request this data. The status of the literature review task is listed as complete for Year 1, but the literature reviews will continue to be updated throughout the course of the grant period to inform all tasks. The dissemination task has not started due to insufficient data.

3. Conclusions

Year 1 of the PathTech project was mostly about project startup, including the establishment of the larger research team and ongoing planning by the project leaders. While seven tasks were planned for Year 1, only one was completed. The research team collected literature and wrote up three literature reviews on focused topics for the literature review task (Task 6), which will be updated throughout the course of the project. While still in progress, the research team successfully completed several activities for the ethnographic (qualitative) research task (Task 2), which is a cornerstone of the PathTech study. Task 1, the marketing task, is in progress since the brochure still needs to be finalized in Year 2; however, a project web site has been

started to inform the public and project stakeholders about the project. Three of the tasks (Tasks 3-5) were delayed since FLDOE was not able to provide all of the needed data as requested by the PathTech research team. However, the research team did start to plan for how to analyze the data once all datasets are received (Task 5). Lastly, Task 7, the dissemination task, has not been started due mostly to having insufficient data.

4. Next Steps in the External Evaluation

Evaluation activities over the next three 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 collection protocols, site visit criteria, and quality of the propensity score matching results; (3) evaluation of the interpretability of course trajectories between the cohorts (years 2 and 3); and (4) review of the replicability of the analyses conducted; provide recommendations for future directions.

In addition, the evaluation team will serve as external resources for technical advice, and will provide commentaries and written reviews of the project's various activities. In addition, he will maintain regular, monthly contact with Dr. Tyson and his team via teleconferences and email, bringing in other members of the external evaluation team as needed. He will prepare monthly 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.