CTE Graduate Trends by Program: Visualized Instantly!

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The Hidden Innovation Infrastructure: Understanding the Economic Development Role of Technician Education in the Changing Future of Work

(also known as the HII project)

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Agenda

- Welcome /Introductions

- HII Project overview

- Early project findings and impacts

- Discussion - Economic Impact of ATE programs

- Data Tool overview

- Data Tool – hands on, with sharing discussion

- Overview of HII ATE Data Analysis (time permitting)

- Closing comments

Project Team

PI: Michelle Van Noy (Rutgers EERC)

Co-PI: Rene Edwards (Rutgers EERC)

Co-PI: Marilyn Barger (FLATE-FloridaMakes)

Co-PI: Bill Mabe

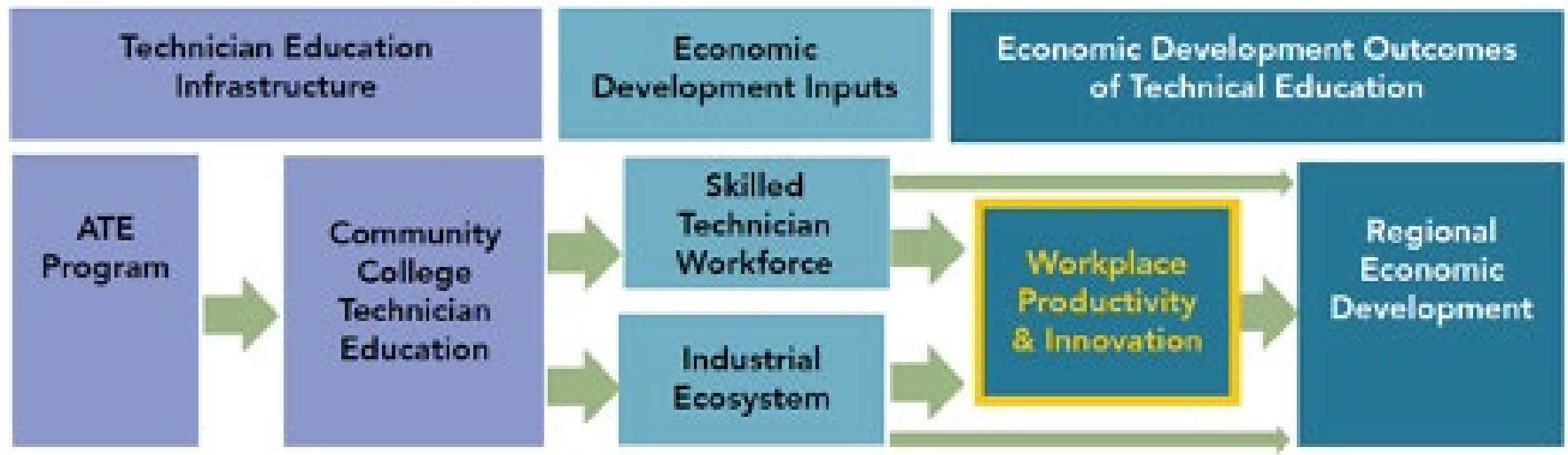Co-PI: Andrew Weaver (University of Illinois, Urbana-Champaign)

Researchers: Rhada Biz and Daniel Douglas

Senior Program Coordinator: Tracy Cangiano

Conceptual Model

Conceptual Model of Technician Education and Economic Development

Technician Education Infrastructure	Economic Development Inputs	Economic Development Outcomes of Technical Education

ATE Program → Community College Technician Education → Skilled Technician Workforce → Workplace Productivity & Innovation → Regional Economic Development

Community College Technician Education → Industrial Ecosystem → Workplace Productivity & Innovation

The project's researchers use this conceptual model to frame their analysis of ATE program impacts on the innovation ecosystem and regional economic development.

- Grantee Review interviews of ATE
- Case study interviews of CC manf.

- Grantee Review interviews of ATE
- Case study interviews of CC manf, and partners
- Administrative data analysis

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The Role of Technician Education in Economic Development

TECHNICIAN EDUCATION INFRASTRUCTURE

- ATE Program support
- Skills development via technician education programs
- Business support & development, and regional engagement

ECONOMIC DEVELOPMENT OUTCOMES FROM TECHNICIAN EDUCATION

- Skilled Technician Workforce
- Innovation Ecosystem
- Workplace productivity and innovation increases
- Regional economic development

HII Key Activities

- Use multipronged approach to define the economic impact of ATE programs

- Analyze past and current ATE grants for economic development activities via interviews

- Review relevant national quantitative student and industry data

- Develop detailed community college case study "deep dives" of four regions

See the HII Project on page 119 of the 2022-2023 ATE Impact Book
https://atecentral.net/impacts/book

HI-TEC Conference 2022

Salt Lake City, UT

DISCUSSION

How does your program or programs interact with local or regional economic development?

What aspects of your work do you think supports economic development?

QUANTITATIVE ANALYSES
Hidden Innovation Infrastructure

William F. Mabe, Jr., PhD

July 22, 2021

HI-TEC Conference 2022

Salt Lake City, UT

TECHNICIAN TRENDS: Technician Supply

DRIVING QUESTION   **What are the trends in community college technician production since 1994?**

TECHNICIAN PRODUCTION

DATA SOURCE   IPEDS and HUD CBSA to zip code crosswalk

TIME PERIOD   **1994 - 2019**

PRODUCT   Interactive Data Visualization, allowing users to view trends in technician production at the national, state, and metro area levels

TECHNICIAN GRADUATES PER YEAR

PURPOSE:

- **To allow users to view the evolution of technician production since 1995**

- **View national trends as well as trends by state and program**

- **Assist colleges and systems in identifying potential areas of skill needs**

PRODUCT:

Easy to use web application displaying number of graduates per year

POPULATION

STUDENTS:
- **Graduates Only**
- **Earners of degrees and certificates at various levels up to bachelor's level**

PROGRAMS:
- **Technician programs only (please see next slide)**
- **Four-digit Classification of Instructional Program (CIP) codes**

TECHNICIAN PROGRAMS
Technician Program Criteria

INCLUSION:

A technician program that is NOT a healthcare program AND either:

CONTAINS the word "technician" OR is in any of the following:

- **CIP family 15** (Engineering/ Engineering-Related Technologies/Technicians),
- **CIP Family 41** (Science

EXCEPT FOR:

Programs in the follow CIP families:

- Biological And Biomedical Sciences
- Parks, Recreation, Leisure, And Fitness Studies
- Homeland Security, Law Enforcement, Firefighting And Related Protective Services

and also six-digit CIPs for the following:

- Upholstery/Upholsterer.
- Shoe, Boot and Leather Repair
- Library Science
- Leatherworking and Construction Trades
- Upholstery, Other
- Personal And Culinary

FUNCTIONALITY

VIEWS:

- **National by year and program**
- **Within a state by year and program**
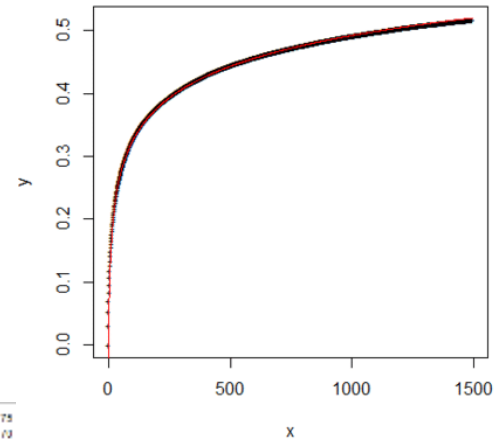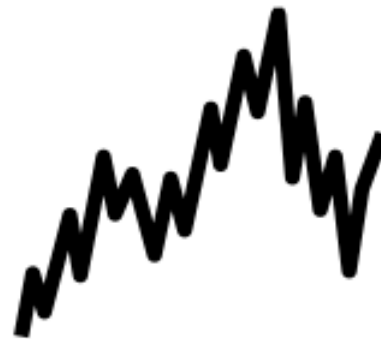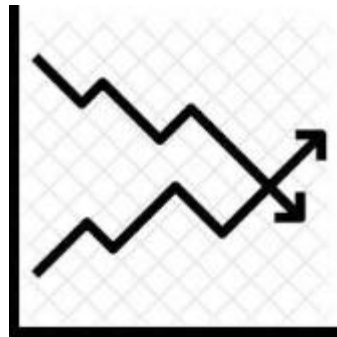- **Within a program by year and state**
- **Spreadsheet download**

DEMO: **https://practicaldatalab.shinyapps.io/technician_programs**

DATA PATTERNS

Expanding

Declining

Static

Diverging

Spiking

Saturated

QUICK EXAMPLES

SAMPLE ANAYSES

Case Study Briefs for these 3 examples can be found here: https://sites.rutgers.edu/eerc-hii/publications/

The Technician Graduates Data Tool

A Product of The Hidden Innovation Infrastructure: Understanding the Economic Development Role of Technician Education in the Changing Future of Work Project

- Allows users to access public-use data on technician graduates spanning a 25-year period from 1995 to 2019. New data will be added as it becomes available.
- Users can visualize data for multiple technician programs at the national and state levels and compare trends for a single program of study across states.

Examples of analysis and visualizations:
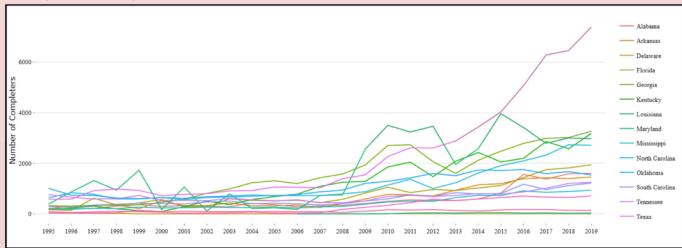
Nearly all southern states increased in the number of Precision Metalwork credentials awarded. Texas dramatically increased its awards in this field, from just over 1,000 in 2007 to nearly 7,400 in 2019.

Figure 1. Sub-Baccalaureate Graduates in Precision Metalwork in Southern States, 1995-2019

Prior to 2004, southern states including Florida, Louisiana, and Virginia awarded between 300 and 600 CIS credentials per year. However, many southern states saw the number of these credentials awarded drop after 2004 with some slight recoveries around 2010.
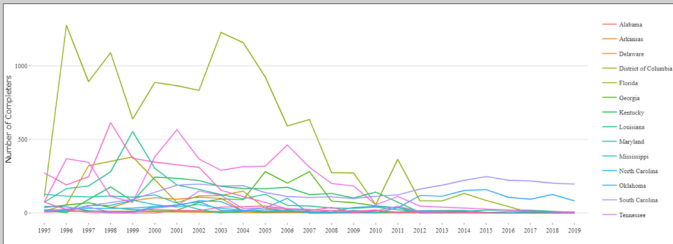

Figure 2. Sub-Baccalaureate Graduates in Computer and Information Sciences (CIS) in Southern States, 1995-2019
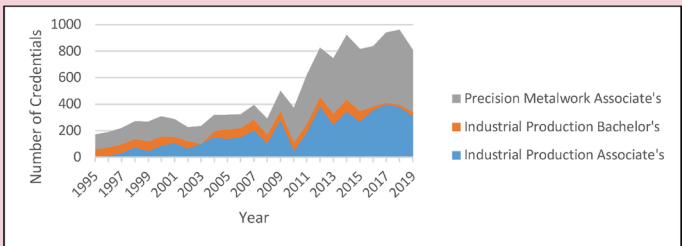

In Washington State, Associates degree awards in Industrial Production grew from less than 10 in 1995 to an average of over 300 per year in since 2016. In Precision Metalwork, these figures were 112 in 1995 and an average of 503 per year since 2016.

Figure 3. Industrial Production and Precision Metalwork Degrees Awarded in Washington from 1995 to 2019

Scan this code to start using the Technician Graduates Data Tool, or visit https://practicaldatalab.shinyapps.io/technician_programs/

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QUESTIONS? Let's Try it!

https://practicaldatalab.shinyapps.io/technician_programs

OVERVIEW OF HII ANALYSIS

DRIVING QUESTION

Does NSF funding of Advanced Technological Education (ATE) programs increase the number of technician graduates?

APPROACH

Leverage IPEDS data on the counts of ATE graduates by institution + Classification of Instructional Program (CIP) to count number of ATE program graduates

Compare graduate counts per program (CIP) of ATE schools to graduate counts in the same programs at schools that have never received ATE funding

DESIGN

Propensity score matching with difference-in-differences of the number of graduates per year

PROMISE AND LIMITATIONS OF DATA DRIVEN WORK ON ATE

PROMISE

Ability to identify broader trends in the technician workforce and labor market

Opportunity to offer at least preliminary answers to questions of interest about the ATE program

LIMITATIONS

The data sources are **imperfect** in many ways

The sample size is **small**

Selecting ATE grants that are likely to have an effect on employment presents challenges and will necessarily be imperfect

Confounding variables / selection challenges

LIMITATIONS OF **ATE** DATA

There are some limitations with the information that the ATE program collects from its grant applicants that make this analysis difficult to conduct.

1. No systematic way to identify the technician educational programs and technician occupational fields in which students are being trained

2. No institution identifier

3. Inability to identify partner colleges

4. Inability to link related grant awards

QUESTIONS

Would you (or someone at your institution) use this data viz tool?

If so – how, for what?

Anything else that might be helpful?

Any comments on CIP number assignments?

Project Team Contacts

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Visit our website:

http://smlr.rutgers.edu/eerc

https://sites.rutgers.edu/eerc-hii/

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