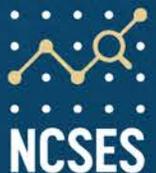


# NCSES's SKILLED TECHNICAL WORKFORCE INITIATIVE

## 2020 WORKSHOPS





*NCSES Webinar Series: Workshop #2 of  
The Skilled Technical Workforce Initiative Workshops*

# Administrative and Other Supplemental Data Sources for the STW

Friday, August 21 | 1:00 pm – 2:30 pm (Eastern)

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National Center for Science and Engineering Statistics  
Social, Behavioral & Economic Sciences  
National Science Foundation

# Let's talk about the STW

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- NCSES invites you to discuss the Skilled Technical Workforce (STW)

Workers that use significant levels of science and engineering expertise and technical knowledge in their occupations and whose educational attainment is less than a bachelor's degree

- A focus on the STW expands not only the federal knowledge of the STEM Workforce but the total U.S. workforce



# Let's talk about why we are here

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- Many are contributing to measuring and understanding the workforce
- Effort is larger than one agency or organization
- We need increased coordination
- We need forums for interaction and discussion

# The federal importance of measuring the STW

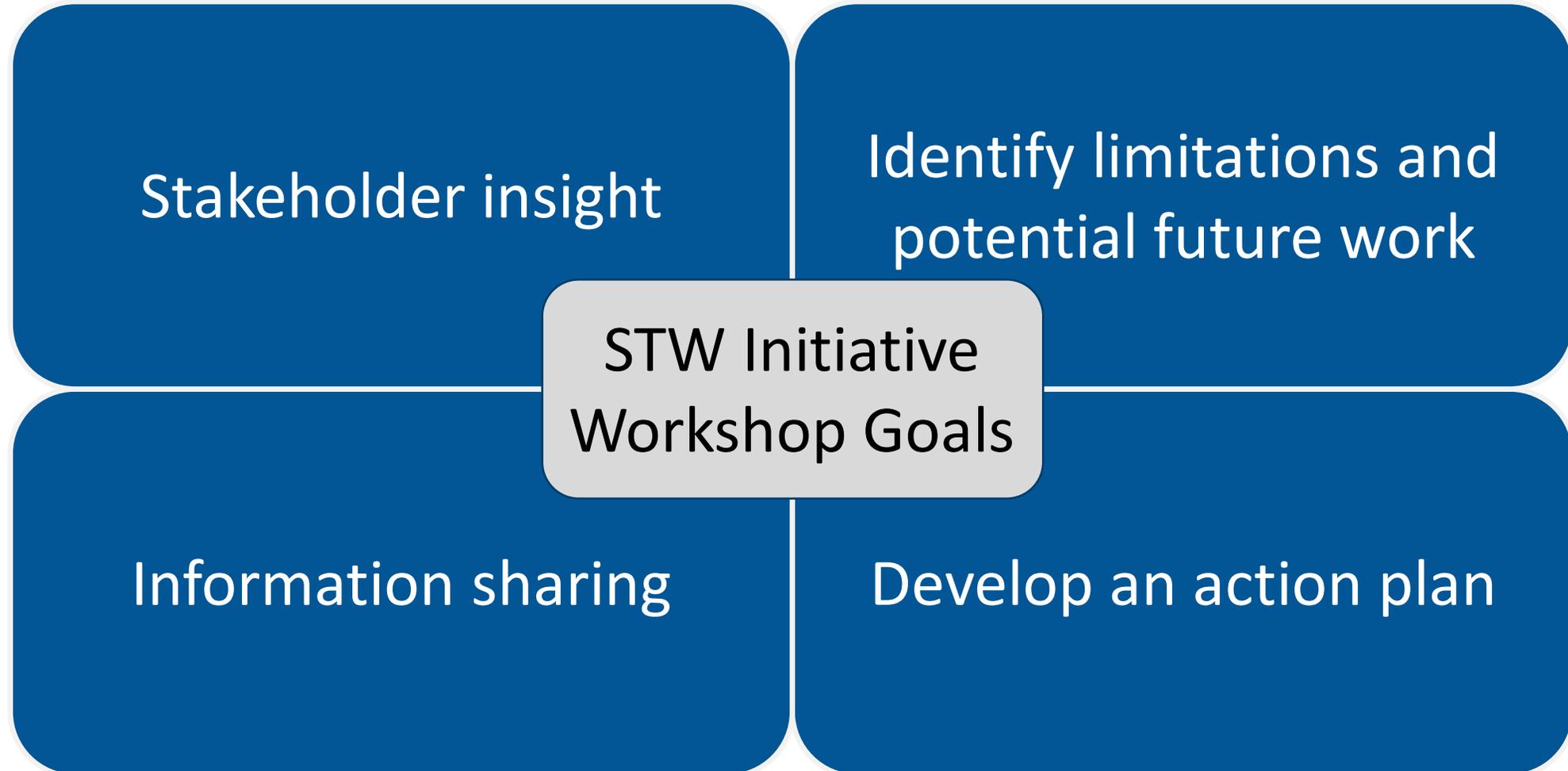
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- A national strategy for training workers across high-demand industries
- The foundation of the S&E enterprise
- The coronavirus pandemic
- Limited data and inconsistent coordination



# STW Initiative workshop goals

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# Making Connections: Workshop #1 key takeaways

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- The importance of the STW
- Defining the STW
- Current data sources only tell part of the STW story
- Policy and research questions highlight the need for additional data sources

# Workshop #2: Administrative and other data sources

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- Keynote speaker – Emilda Rivers

“Increasing the Value of Federal Statistics: NCSES’s Work to Better Measure and Understand the Skilled Technical Workforce”

- NCSES presentation – Dr. Matt Williams

“Developing an STW Administrative Data Strategy for a Federal Statistical Agency”

- Iowa Dept. of Education presentation – Vladimir Bassis

“Actionable Management Information Systems: Building Data Connections for Tangible Results”

- Chat and Q&A moderator – Dr. Gigi Jones

- Wrap-up – John Finamore

# Audience Involvement: Two ways to participate

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## CHAT FEATURE

- Feedback
- Ideas
- Comments

## Q & A FEATURE

- Questions
- Realtime responses from NCSES



# Increasing the Value of Federal Statistics

## *NCSES's Work to Better Measure and Understand the Skilled Technical Workforce*

Emilda B. Rivers, NCSES Director

August 21, 2020

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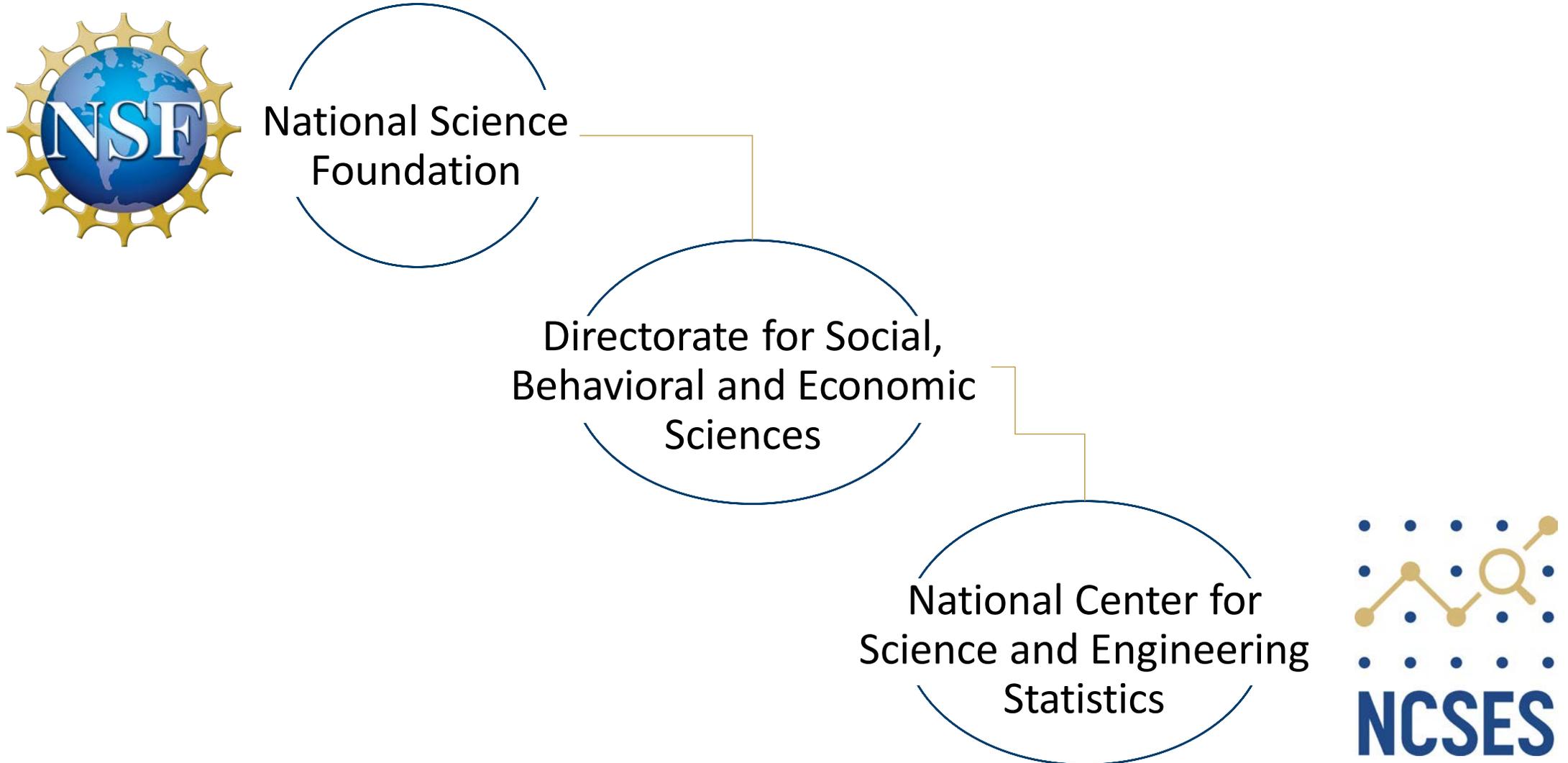
National Center for Science and Engineering Statistics (NCSES)  
Social, Behavioral and Economic Sciences  
National Science Foundation

## Today's Discussion...

### In the Context of Evidence-Based Information to Better Measure and Understand the Skilled Technical Workforce

- NCSES and its Clearinghouse Role
- Governing Laws and Principles Signaling the Importance of Agency Collaborations Around Data
- Alignment with the Evidence Act

# Organizational placement of NCSES





# NCSES: NSF's Federal Statistical Agency

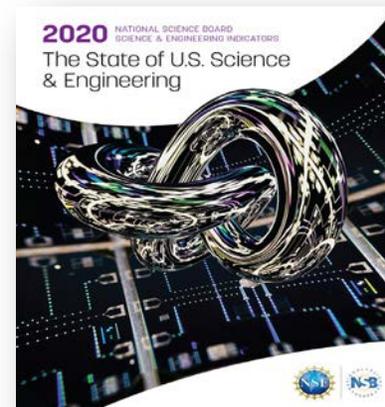
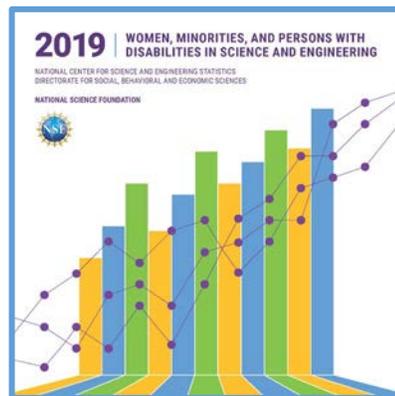
- Mission: policy-neutral policy-relevant statistical data on the U.S. science and engineering enterprise often in a global context
- Federal clearinghouse for data that provides key insights on the American economy, responsibility for data on:
  - Research and development
  - Science and engineering workforce
  - U.S. competitiveness in science, engineering, technology, and R&D
  - Condition and progress of STEM education



# NCSES Clearinghouse Activities

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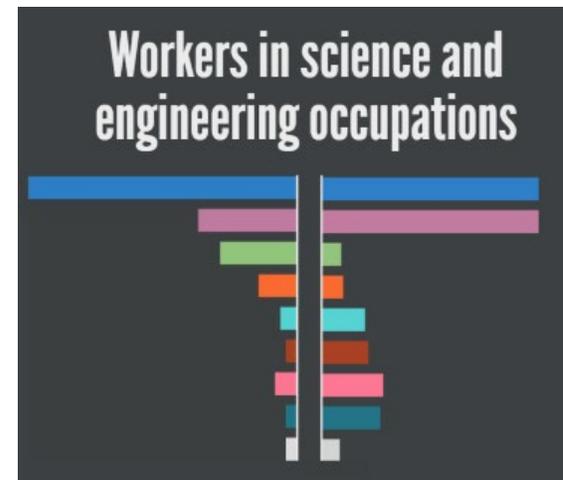
- Primary data through traditional surveys
- Secondary data from administrative data and non-traditional sources, including U.S. federal, international, and private data sources
- Analysis of clearinghouse data sources for congressionally mandated reports



# The Skilled Technical Workforce (STW) and U.S. Economic Competitiveness

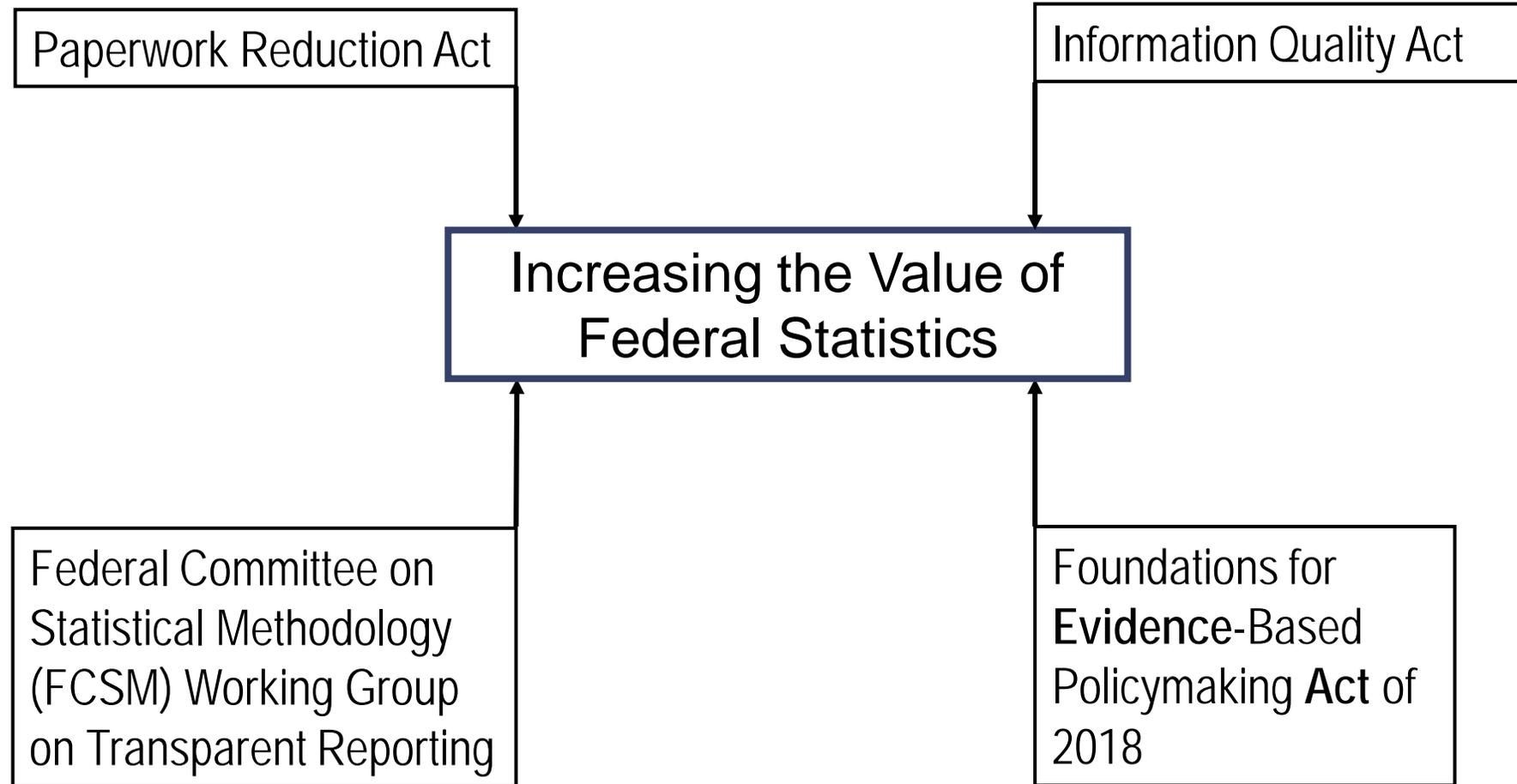
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- Limited statistical data exists to contribute to evidence-based policy-making on the STW, a major component of the STEM workforce
- Requires partnering with statistical agencies and external stakeholders
  - National Center for Education Statistics
  - U.S. Census Bureau
  - Bureau of Labor Statistics
  - National Science Board
  - Office of Science and Technology Policy
  - You!



# Governing Laws and Principles Signaling the Importance of Agency Collaborations Around Data

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# FCSM Working Group on Transparent Reporting

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- Pilot projects that include different types of combined data
- Blending multiple-survey sources from statistical agencies
- Blending administrative and survey data
- Use of private sector data, possibly in combination with other data



# Paperwork Reduction Act

# Information Quality Act

P.L. 96-511  
Vol. 2

PAPERWORK REDUCTION ACT OF 1980

P.L. 96-511 94 Stat. 2812

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December 11, 1980

BILLS

H.R. 6410 as introduced by Mr. Brooks, *et al.*, and referred to the House Government Operations Committee, 96th Congress, February 5, 1980. (Unavailable for inclusion; see page 3 of Item 6 of this history for the full text of the introduced version.)

H.R. 6410 as reported (House Report No. 96-385) with an amendment, March 19, 1980. (Unavailable for inclusion; see Item 21 of this history for the full text of the reported version.)

8) H.R. 6410 as passed the House and referred to the Senate Governmental Affairs Committee, March 26, 1980.

9) S. 1411 as introduced by Messrs. Chiles, Bentsen and Danforth and referred to the Senate Governmental Affairs Committee, 96th Congress, June 26, 1979.

10) S. 1411 as reported (Senate Report No. 96-930) with an amendment, September 8, 1980.

RELATED BILLS



EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF MANAGEMENT AND BUDGET  
WASHINGTON, D.C. 20503

April 24, 2019

M-19-15

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Russell T. Vought   
Acting Director

SUBJECT: Improving Implementation of the Information Quality Act

**Introduction**

The purpose of this Memorandum is to reinforce, clarify, and interpret agency responsibilities with regard to responsibilities under the Information Quality Act (IQA).<sup>1</sup> In 2002, the Office of Management and Budget issued *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by Federal Agencies*<sup>2</sup> (“*Guidelines*”). The principles and core responsibilities described in the *Guidelines* remain sound and relevant for agency practice; however, additional guidance is required to address changes in the information landscape and to incorporate best practices developed over time.<sup>3</sup> This Memorandum updates implementation of the *Guidelines* to reflect recent innovations in information generation, access, management, and use, and to help agencies address common problems with maintaining information quality.

**Background**

Prudent decision making depends on reliable, high-quality information. Congress has long recognized that federal agencies should make decisions using the best data reasonably available, and Congress has entrusted OMB with the statutory role of ensuring that federal

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<sup>1</sup> Treasury and General Government Appropriations Act, 2001, Pub. L. No. 106-554, § 515(a) (2000) (as codified at 44 U.S.C. § 3516, note).

<sup>2</sup> Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies, 67 FR 8452 (Feb. 22, 2002), available at <https://www.federalregister.gov/documents/2002/02/22/R2-59/guidelines-for-ensuring-and-maximizing-the-quality>.

# The Skilled Technical Workforce Initiative Aligns with The Evidence Act

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- The Act calls for identifying data that can be used for evidence-building activities
- The term “evidence” means information produced as a result of statistical activities conducted for a statistical purpose
- Evidence includes foundational fact finding, performance measurement, policy analysis, and program evaluation

## One Hundred Fifteenth Congress of the United States of America

AT THE SECOND SESSION

*Begun and held at the City of Washington on Wednesday,  
the third day of January, two thousand and eighteen*

### An Act

To amend titles 5 and 44, United States Code, to require Federal evaluation activities, improve Federal data management, and for other purposes.

*Be it enacted by the Senate and House of Representatives of  
the United States of America in Congress assembled,*

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the “Foundations for Evidence-Based Policymaking Act of 2018”.

# The Skilled Technical Workforce Initiative Increases the Value of Federal Statistics

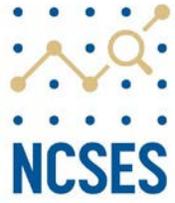
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- Principles and practices of federal statistical agencies provides framework for the high-quality data needed to inform policies related to the Skilled Technical Workforce
- Partnering with agencies, the federal statistical system and external stakeholders to effectively use administrative and survey data for evidence-based policy making





National Center for Science and Engineering Statistics <https://www.ncses.nsf.gov/>



# Developing an STW Administrative Data Strategy for a Federal Statistical Agency

Matthew Williams

August 21, 2020

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National Center for Science and Engineering Statistics

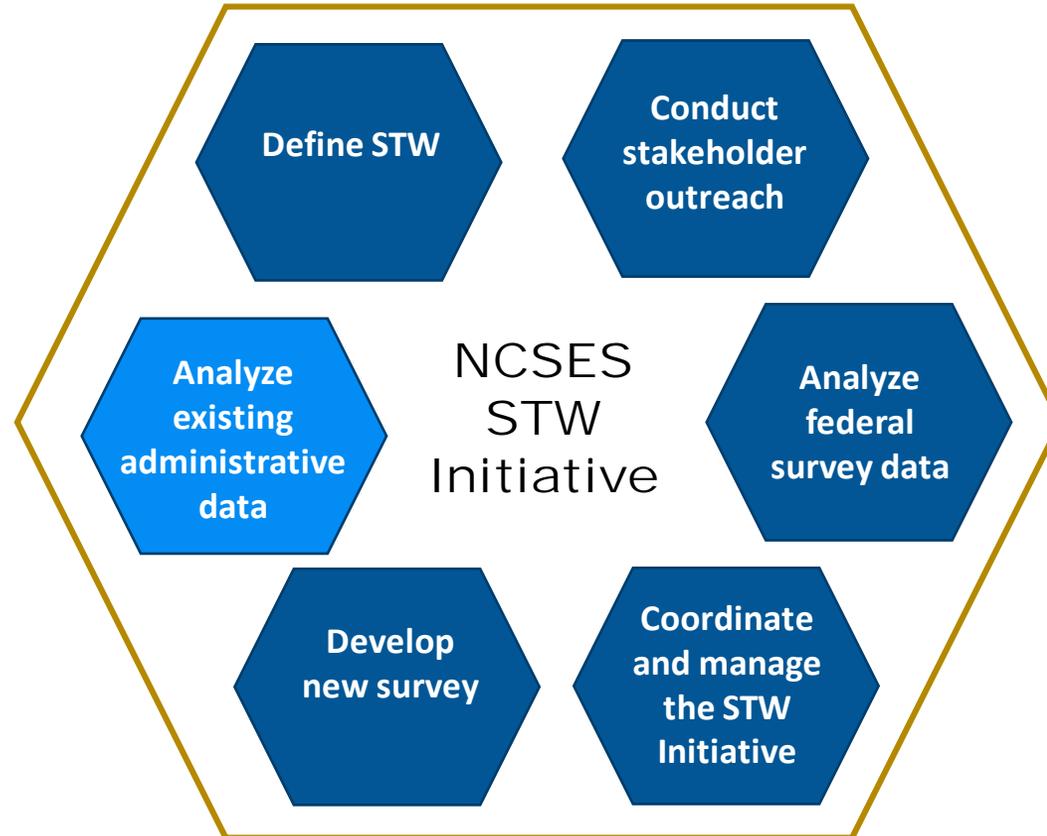
Social, Behavioral and Economic Sciences

National Science Foundation

# NCSES efforts to understanding the workforce



Community of STEM  
Workforce Efforts



# Acknowledgements and Disclaimer

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Thank you to our colleagues at the U.S. Census Bureau, National Student Clearinghouse, the State of Iowa, and the University of Virginia for their time and expertise.

The review and suggested analyses presented here are shared for informational purposes. No formal commitments between organizations are meant to be implied.

# Overview

# Looking Beyond Survey Data

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Decline in response rates

*E.g., Steady decline in response rates to federal surveys of the general population.*

Measurement challenges

*E.g., Asking respondents to recall specific past events and activities*

Burden on establishments and individuals for increasing data demands

*E.g., More detailed or more frequent data collections*

# Alternative Data: What is it?

## Administrative

- Data *generated* in the normal course of conducting business
  - Payroll and unemployment insurance information
  - Program participation data (financial aid)
- Primary collection and use is tied to **laws or business practices**

## Supplemental

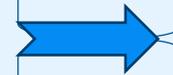
- *Assembled* or *curated* from a variety of sources
  - Web-scraping job postings
- “Opportunity” data
- Primary collection and use may be tied to **proprietary products and services**

# Objectives

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Evaluate and summarize the fitness of use of existing data

Examine non-traditional STEM pathways



Identify STW-related employee and employer administrative data

Identify other potential sources of STW-related data

# Presentation Outline

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- Fitness for Use Criteria
- Inventory of STW related resources (National Level)
- Potential Uses for Alternative Data
- Deeper Dive into Potential Case Studies/Prototypes
- Discussion Questions (through-out)
  - Respond in the chat feature (live)
  - Compiled and posted with presentation recording

## Discussion Question (2 minutes)

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What is your organization's **most used** data **source** for analyzing the workforce?

Provide your example in the chat.

# Fitness for Use

# Fitness for Use: What is it?

*Data quality is subject to competing demands that influence its fitness, such as...*

Timeliness

Representativeness

Disaggregation  
(local details)

Accuracy

*Survey data is designed for specific uses, including...*

National trends

Representativeness of  
demographics



The **qualities** of the data **source** and the intended **purpose** of the **analysis** need to be in alignment.

Other data may offer more timely or local information, but may not represent the entire population, or may have noisier measures.

# Fitness for Use: Criteria For Review

*Other criteria include...*

Data Name and Ownership

Unit of Analysis

*Variables to consider include...*

Gender

Persons who live on tribal lands

Race/ethnicity

Funding amount to support R&D activities

Disability status

Types of employment or occupations

Veteran status

Geographic coverage – national, state, or regional?

Fields of study (e.g., major) or type of training

Active military and their families

## Data Availability

How often is it collected?

When do the data become available?

Can the data be trended?

Have the data been stable over time, or has the collection changed over time?

## Data Documentation

Methodology report

Data dictionary

## Data Users

Who uses this data?

Who would be interested in using this data?

## Data Accessibility

Is the data free, need to be purchased (cost?), need licensing rights, or require training to use the data?

How is the data delivered, and in what format?

## Discussion Question (2 minutes)

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What are the top **two qualities** you **evaluate** when using data from administrative and other sources?

Provide your example in the chat.

# Inventory of STW related resources

# Inventory of STW-Related Resources

*The STW Working Group created an inventory of STW-related resources*

*There are currently about 90 entries.*

*The web tool is live on UVA's server:  
<http://stw.policy-analytics.net/>.*

*Users can submit a new record or make a request to change information in a current record.*

Cooperative agreement with the University of Virginia Social & Decision Analytics Division of the Biocomplexity Institute & Initiative

Employ "fitness for use" criteria (operationalized as variables)

Develop inventory of STW-related datasets

## Limitations and Future Directions

The review was mostly focused on ***national*** data sets, excluding state-level government data.

Future work with partners should focus on better understanding how different regions, states, and local entities collect and use data related to the STW.

# Inventory Demonstration

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## UVA-NCSES Skilled Technical Workforce: A Data Discovery Inventory *(website of resources)*

# Discussion Question (2 minutes)

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1. What is your biggest **advantage** when working with administrative data?
2. What is your biggest **challenge** when working with administrative data?

Use an example from the inventory ([UVA-NCSES STW Inventory website](#)) or one of your own.

Provide your example in the chat.

# Potential Uses for Alternative Data

# Potential Uses for Data: Considerations

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*Whether a statistical agency uses the data **depends** on...*

Comparability to national survey measures

Key subpopulations, geographies, localities, national survey measures

Potential for data linkage or blending to the NCSES STW data

If not able to link, does the data source answer other areas that NCSES STW data overlooks?

If not able to connect or supplement, could the data source validate NCSES STW data?

Potential for Dissemination

Can products be easily shared and disseminated?

Utility for stakeholders and the general public

Does it address a need (timeliness or geographic resolution) that is not currently met?

# Potential Future Products

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*How a statistical agency uses the data includes...*

Replace or Complement  
survey data

Use as an official statistic (thus, replacing an NCSES survey estimate)

A few local/finer grained supplementary statistics

Blend and Combine with  
survey data

An input to a model (small area estimation) or other blended data approach

A benchmark constraint or a quality check for official estimates (range or bound)

Lead to tools and standards for  
data sharing and linking

Standards and best practices to share across organizations

## Discussion Question (2 minutes)

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1. Provide one example of a **blended data** product (two or more sources) that you **use to study** the workforce.
  
2. *If you're **not** currently using blended data, provide one example of a **blended data** product that you **would like to** use to study the workforce (and why you're not currently using it).*

Provide your example in the chat.

# Case Studies/Potential Prototypes

# Longitudinal Employer-Household Dynamics (U.S. Census Bureau)

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## *Related Work*

The Post-Secondary Employment Outcomes (PSEO) experimental release provides earning and employment outcomes of post-secondary institutions 1, 5, and 10 years after graduation.

The Job-to-Job Flows (J2J) provides worker flows between states, industries, and nonemployment.

The Quarterly Workforce Indicators (QWI) provide trends in employment, hiring, job creation and destruction, and earnings.

## *Research Questions*

Can future NCSES National Training, Education, and Workforce Survey (NTEWS) respondents **be linked to LEHD** data to obtain the complete **employment and wage information** of the NTEWS respondent? (**feasible**)

Can LEHD data be used to produce sub-national estimates of the STW workforce? (**unlikely**)

Can LEHD data be used to estimate job-flows into and out of STW fields? (**unlikely**)

# National Student Clearinghouse

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## *Related Work*

The NSC research center provides estimates of Post-Bachelor's Two-Year Enrollment.

NSC has engaged with the Census Bureau is currently investigating the linkage of manufacturing certification information (NAM) and other student outcomes to employment and wage data. **NCRN event**

## *Research Questions*

Can NSC data be used to identify the population of STW workers who changed fields (i.e. completed degrees in a non-STW related field but then received further training in an STW related field)? **(feasible with caveats)**

Can manufacturing and other certification data and student attainment information be linked to employment and wage information to measure pathways into (and out of) the STW? **(NSC testing with Census Bureau)**

## Discussion Question (2 minutes)

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What is the biggest **challenge** when **disseminating** a blended data product?

Provide your example in the chat.

# Burning Glass Technologies

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## *Related Work*

**(*Job Posting*)** Fee, K., K. Wardrip, and L. Nelson (2019). Opportunity Occupations Revisited: Exploring Employment for Sub-Baccalaureate Workers Across Metro Areas and Over Time.

**(*Resume*)** Schubert, G., A. Stansbury, and B. Taska. (2019). Mitigating Monopsony: Occupational Mobility & Outside Options.

## *Research Questions*

Can BGT job posting data be used to produce sub-national estimates for the STW workforce, for example in metropolitan statistical areas (MSAs)?  
**(possible)**

Can BGT resume data be used to examine paths or trajectories of those in STW fields?  
**(possible with caveats)**

# State Agencies

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## *Related Work*

Iowa Community Colleges Employment Outcomes: Noncredit Career and Technical Education (CTE) Programs. September 2018.  
(e.g., [Iowa Noncredit Outcomes](#), [Iowa Program Outcomes](#))

Iowa Community Colleges Employment Outcomes: Certificate, Diploma, and Associate Degree Programs. May 2019 (e.g., [Iowa Education Outcomes](#))

Measuring Non-Degree Credential Attainment. Jenna Leventoff – National Skills Coalition (e.g., [Measuring Non-degree Credential Attainment](#))

## *Research Questions*

Can state partnerships provide training, education, and employment data at a more granular level than federal datasets for the Skilled Technical Workforce (STW)?  
**(feasible for some states)**

Can standards and best practices in one state be used as a template for others?  
**(need to investigate further)**

## Discussion Question (2 minutes)

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What is one **barrier** to working with **multi-state** or **cross-state** workforce data?

Provide your example in the chat.

# Summary

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We talked about...

- **Criteria** for Quality Assessment
- **Potential Uses** for Administrative and Supplemental Data
- An **Inventory** of STW related data sources (National)
- Promising **Examples** but
  - **Still have a need for a new national data collection**
- The **need** for more **localized** data (State Agencies)...

# For more on State Agency Success and Challenges...

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## Vladimir Bassis

- Lead Education Program Consultant
- Community College Management Information System
- Iowa Department of Education.



Community of STEM  
Workforce Efforts

**ACTIONABLE MANAGEMENT INFORMATION  
SYSTEMS: *Building data connections for tangible  
results***



## ACTIONABLE MANAGEMENT INFORMATION SYSTEMS

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*Building data connections for tangible results*

COMMUNITY COLLEGES &  
WORKFORCE PREPARATION  
*Prosperity Through Education*

# IOWA COMMUNITY COLLEGE MIS

## 256.7 DUTIES OF STATE BOARD.

23. Adopt rules directing the community colleges to annually and uniformly submit data from the most recent fiscal year to the division of community colleges and workforce preparation, using criteria determined and prescribed by the division via the management information system.

A report submitted for state board approval...and by the house and senate standing education committees and the joint subcommittee on education appropriations.

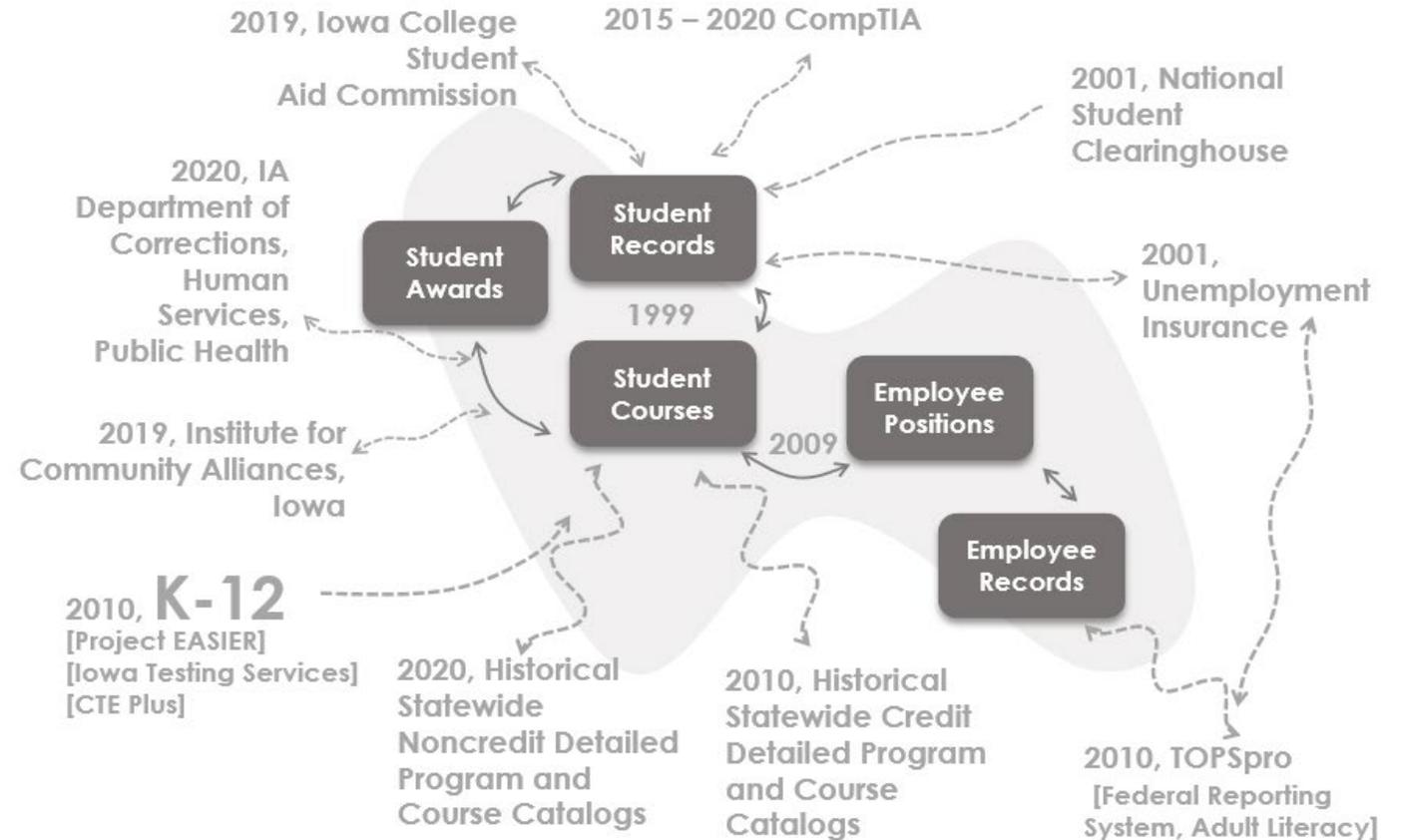
- ▶ Accountability (e.g., SGA-eligible contact hours)
- ▶ Promotion of community colleges (e.g., input in Iowa economy)
- ▶ Program improvement (e.g., tracking student achievements)
- ▶ Research (e.g., input of CC education into all education)
- ▶ **Student benefits – overarching goal**



The timeline of the data that Iowa Department of Education acquired starting in:

- 1999 with Student Courses, Student Records, and Student Awards;
- 2001 National Student Clearinghouse and Unemployment Insurance;
- 2009 Employee Positions and Employee Records;
- 2010 K-12 data (Project Easier, Iowa Testing Services, CTE Plus), Historical Statewide Credit Detailed Program and Course Catalogs, and TOPSpro (Federal Reporting System, Adult Literacy);
- 2015-2020 CompTIA
- 2019 Iowa College Student Aid Commission
- 2020 Iowa Department of Corrections, Human Services Public Health, Historical Statewide Noncredit Detailed Program and Course Catalogs

These various data sources that the Iowa Department of Education have pieced together from separate, unique organizations (some within the Iowa Department of Education, but most outside).



A black and white photograph of a computer lab. In the foreground, a student with long dark hair is seen from behind, sitting at a desk with a computer monitor. In the background, another student is looking at a computer screen. The scene is brightly lit, and the desks are arranged in rows.

Future Ready GOAL

70%

of Iowans  
with some  
postsecondary  
education by 2025



# IMPEDING FACTORS

- ▶ Political – Iowa is a strong local rule state
- ▶ Resources – state government is not a research facility
- ▶ Definitions – CTE, STEM, CIP, SCED
- ▶ Connections – SSN, Names, DOB, ZIP
- ▶ Data privacy – data usability





**Vladimir Bassis, Consultant**

*Division of Community Colleges &  
Workforce Preparation*

Vladimir.bassis@iowa.gov

515-281-3671

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More information on community colleges and the  
Division of Community Colleges & Workforce Preparation is on the Iowa  
Department of Education's website.

[www.educateiowa.gov](http://www.educateiowa.gov)

COMMUNITY COLLEGES &  
WORKFORCE PREPARATION  
*Prosperity Through Education*

# Workshop wrap-up and next steps

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- STW Initiative workshop #2 quick takeaways
- “Surveying the STW to Answer Policy-Relevant STEM-Workforce Questions: The 2021 National, Training, Education, and Workforce Survey (NTEWS)” **August 28 @ 1pm EDT**
- Visit the NCSES STW Initiative website <https://www.nsf.gov/statistics/stw/skilled-technical-workforce.cfm>

# Reach out for additional questions or comments

Presenter	Title	Contact Information
Emilda Rivers	NCSES Director	erivers@nsf.gov
Dr. Matt Williams	STW Working Group Member and mathematical statistician	mrwillia@nsf.gov
Vladimir Bassis	Education Program Consultant, Iowa Department of Education	Vladimir.bassis@iowa.gov
John Finamore	STW Initiative Champion and Human Resources Statistics Program Director	jfinamor@nsf.gov
Dr. Gigi Jones	STW Initiative Chair and the National Training, Education, and Workforce Survey (NTEWS) project officer	gijones@associates.nsf.gov