Forum Guide to

Collecting and Using Data About the Educator Workforce

National Forum on Education Statistics

Forum Guide to

Collecting and Using Data About the Educator Workforce

National Forum on Education Statistics

National Cooperative Education Statistics System

The National Center for Education Statistics (NCES) established the National Cooperative Education Statistics System (Cooperative System) to assist in producing and maintaining comparable and uniform information and data on early childhood, elementary, and secondary education. These data are intended to be useful for policymaking at the federal, state, and local levels.

The National Forum on Education Statistics (Forum) is an entity of the Cooperative System and, among its other activities, proposes principles of good practice to assist state and local education agencies (SEAs and LEAs) in meeting this purpose. The Cooperative System and the Forum are supported in these endeavors by resources from NCES.

Publications of the Forum do not undergo the same formal review required for products of NCES. The information and opinions published here are those of the Forum and do not represent the policy or views of NCES, the Institute of Education Sciences (IES), or the U.S. Department of Education (ED).

November 2025

Other Forum publications may be found at the websites listed below.

The NCES Home Page address is **http://nces.ed.gov**.

The NCES Publications and Products address is **http://nces.ed.gov/pubsearch**.

The Forum Home Page address is **http://nces.ed.gov/forum.**

Suggested Citation

National Forum on Education Statistics. (2025). *Collecting and Using Data About the Educator Workforce* (NFES 2026-002). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

Foreword

The purpose of this document is to help education agencies identify the types of workforce data that are most useful for understanding immediate teacher shortages and monitoring educator supply and demand, as well as best practices for using these data. This resource supplements the information in the *Forum Guide to Staff Records* (2021), which was developed to help education agencies effectively collect and manage staff data, protect the privacy of staff data, and ensure that requests for data access and data releases are managed appropriately. That guide included a discussion of types of staff records, updated best practices for data collection and management, and case studies from SEAs and LEAs. While the 2021 guide briefly discusses the types of data that are useful for understanding educator supply and demand—such as licensure, certification, and teaching assignment data—it more broadly addresses all types of data included in staff records. This supplemental resource delves specifically into questions around data related to educator workforce supply and demand while building on the best practices and privacy protections outlined in the *Forum Guide to Staff Records*.

This guide focuses mainly on SEA and LEA educator workforce data, but a few federal education resources are also highlighted throughout. Additional federal resources are provided in the appendices.

Publication Objectives

This resource is intended to:

- identify common types of educator workforce data that are important for federal, state, and local reporting;
- describe how SEAs and LEAs communicate about educator shortages, as well as how they determine which information is critical to share;
- discuss solutions to and lessons learned in addressing workforce data-related challenges, such as managing teacher supply and demand or ensuring that vacancies can be filled quickly and effectively; and
- provide case studies from states and districts that have implemented efficient data practices.

Intended Audience

The primary audience for this publication includes staff at the local, state, and national levels whose responsibilities include any aspect of collecting, reporting, analyzing, or using educator workforce data.

National Forum on Education Statistics

The work of the Forum is a key aspect of the Cooperative System. The Cooperative System was established to produce and maintain, with the cooperation of the states, comparable and uniform education information and data that are useful for policymaking at the federal, state, and local levels. To assist in meeting this goal, NCES within IES—a part of ED—established the Forum to

improve the collection, reporting, and use of elementary and secondary education statistics. The Forum includes approximately 120 representatives from SEAs and LEAs, the federal government, and other organizations with an interest in education data. The Forum deals with issues in education data policy, sponsors innovations in data collection and reporting, and provides technical assistance to improve state and local data systems.

Development of Forum Products

Members of the Forum establish working groups to develop guides in data-related areas of interest to federal, state, and local education agencies. They are assisted in this work by NCES, but the content comes from the collective experience of working group members who review all products iteratively throughout the development process. After the working group completes the content and reviews the document a final time, the publication is subject to examination by members of the Forum standing committee that sponsors the project. NCES provides final review and, when needed, makes editorial or other edits to ready a product for publication. The information and opinions published in Forum products do not represent the policies or views of ED, IES, or NCES. Readers may modify, customize, or reproduce any or all parts of this document.

Working Group Members

This online publication was developed through the Cooperative System and funded by NCES within IES—a part of ED. The Educator Workforce Data Working Group of the Forum is responsible for the content.

Chair

DeDe Conner,* Kentucky Department of Education

Members

Dawn Gessel,* Putnam County Schools (WV)
Georgia Hughes-Webb, West Virginia Department of Education
Peggy Jones, Pasco County Schools (FL)
Mary Klute, Regional Educational Laboratory—Appalachia
Rachel Kruse, Iowa Department of Education
Hope Moffett, Brandywine School District (DE)
Rich Nye, Granite School District (UT)
Julie Riordan, Regional Educational Laboratory—Northeast & Islands
Matthew Strom,* Mesa Public Schools (AZ)
Susan Williams,* Virginia Department of Education

* Working group members marked with an asterisk also contributed case studies or real-world examples to this guide.

Acknowledgments

The Educator Workforce Data Working Group would like to thank everyone who reviewed or otherwise contributed to the development of the *Forum Guide to Collecting and Using Data About the Educator Workforce,* including the following.

Reviewers

Stephen Gervais, San Bernardino City Unified School District (CA)

Raymond Martin, Connecticut State Department of Education

Liberty Van Natten, California Department of Education

Case Study/Vignette Contributors

Carol Wells Bazzichi, Virginia Department of Education

Aimee Green-Webb, formerly of Jefferson County Public Schools (KY)

Paul Katnik, Missouri Department of Elementary and Secondary Education

Contents

Glossary

Ancillary system: A database or data system that receives data from a source system and may have data purposes beyond the original system.

Educator: A person who is involved in planning, directing, or providing education to students. Educators may include classroom or online teachers, teaching assistants, subject matter specialists, librarians, administrators, and others.

Educator mobility: The movement of teachers or other educators among different roles, professional levels, or locations (schools, districts, or states). Mobility affects the number of vacancies within schools or LEAs.

Intern teacher: An employee with a bachelor's degree enrolled in an approved educator preparation program while working as a teacher of record.

Limited-term employee (LTE): A part-time employee hired by a department or school to assist with programming and special assignments and initiatives.

Permit teacher: An employee with a bachelor's degree seeking or enrolled in an approved educator preparation program while working as a teacher of record.

Point-in-time collection: In educator data, a metric that indicates the number of educator vacancies on a particular date, allowing a "snapshot" of the data.

Retention rate: In educator data, the percentage or ratio of educators remaining in their positions or employed by an agency within a given time frame. Education agencies may have different formulas for calculating these rates.

Roster system: A system allowing an organization to track the hours employees work and the credentials they hold, as well as to generate reports on employee hours, teacher-student data links, and project completion.

Shortage: A job market with more open positions than qualified candidates to fill them.

Source system: Any system or file that captures or holds data of interest.

Teacher resident: An employee with a bachelor's degree enrolled in an approved educator preparation program while completing a year of apprenticeship with a fully licensed classroom teacher.

Vacancies: The courses or grade levels that do not have an assigned teacher within an LEA or school. In some districts, vacancies are defined as not having a properly endorsed teacher: The role may be filled temporarily by a long-term substitute or other temporary staff.

Chapter 1: What Are Educator Workforce Data?

Educator workforce data are information about the qualifications, education, quality, and experience of staff providing direct student instruction and administrative and support services in schools. This includes teachers, educational assistants, support staff, and administrators. In addition, educator workforce data include information about staffing, recruiting, and hiring–including vacancies and shortages. Education agencies need accurate, up-to-date information about the educator workforce to ensure that they can provide effective instruction and qualified teachers to all students. To do that, agencies need indicators of the health and sustainability of the educator ecosystem, which include but are not limited to

- qualifications, licensure, and certifications;
- recruitment and placement;
- enrollment in educator preparation programs;
- compensation and benefits; and
- retention and retirement rates.

Agencies also need indicators of weaknesses or barriers in this ecosystem. These elements, as well as the connections among them, provide the context required to plan schedules, curricula, and programs. The more current, real-time data are available to agencies, the faster they can address the root causes of workforce concerns and adjust efforts.

Key areas of educator workforce data collected by state and local education agencies (SEAs and LEAs) include

- qualifications such as degrees, certifications, licenses, and years of experience;
- special credentials such as National Board-Certified Teacher status or other national certifications;
- compensation and benefits;
- cost of living;
- residence area;
- identification of position vacancies and staffing needs, including specific data on high-needs subject areas;
- candidate searches, recruitment, hiring, placement, and assignment;
- educator preparation program information, including enrollment, coursework, and areas of specialization;
- alternative teaching pathways and certifications;

- geographic location of the workforce, candidates, new hires, and those enrolled in teacher preparation programs;
- professional development;
- teacher evaluation;
- retention and separation, including data about stayers, movers, and leavers; and
- exit surveys.

After collecting these data, agencies analyze and use them in various ways depending upon their needs. In many cases, data are disaggregated to provide a more accurate picture of the educator workforce in a given location (whether national, state, or local). Some data are used to create specific metrics—such as the number of teachers who are teaching out of their field of qualification—to provide greater context to discussions about the teacher workforce.

Data based on geographic locations also may be used to inform educator workforce data for strategic and long-term planning. For example, data on birth rates or projected housing growth can predict where additional educators may be needed in the years ahead.

Some data collections rely on connections among agencies, most commonly those between SEAs and LEAs. In many states, LEAs collect most workforce data and provide them to SEAs when needed, while SEAs collect data on areas such as licensure because they are the licensing agents. In addition, many LEAs partner with postsecondary institutions to gather data about teacher preparation programs, degrees earned, and the teacher preparation pipeline.

The Illinois State Board of Education collects data about higher education programs and candidates in these programs through its Annual Reporting System. Data collected are used for the calculations necessary for the Illinois Educator Preparation Profile (**https://www.isbe.net/Pages/eppPublic.aspx**) system, which is a tool for accountability, continuous improvement and transparency to strengthen teacher preparation.

Chapter 2: How Do Education Agencies Collect and Use Educator Workforce Data?

Valid, high-quality, and timely national and state-level data are crucial for education leaders who make decisions about programs, policies, and funding. Leaders also need to understand how local results compare to national or state-level metrics, as well as how current data compare to those collected previously or under different circumstances.

Agencies must have accurate, timely data about the different parts of the educator ecosystem and how each category of data influences or relates to the others. For example, data about specific positions and vacancies in a local education agency (LEA) show which certifications and qualifications candidates will need. The candidate pool then influences processes for recruiting and hiring. Hiring and onboarding new educators requires data about salaries and benefits, training and professional development, mentoring, and placement in locations and positions. Salary data influence budgets and other fiscal considerations, which then play a key role in strategic planning. Strategic planning includes preparing for reporting and accreditation requirements, which necessitates accurate data on current vacancies.

Educator Workforce Data Collections

Although state education agencies (SEAs) and LEAs may vary in the specific data they collect and their processes for doing so, there are several broad categories of data collected by these agencies.

Candidate Searches, Recruiting, and Hiring

LEAs collect and use many types of data when searching for and recruiting new educators, and SEAs may offer guidance and support to their LEAs for these processes. To begin, many agencies consider the educator pipeline—that is, who is available as a potential hire. Data from teacher preparation programs offer insight into numbers of job candidates, subjects covered, and projected time of program completion. SEAs such as Kentucky, Minnesota, and West Virginia, as well as LEAs such as Mesa Public Schools (AZ) and San Bernardino City Unified School District (CA), have developed "grow your own" programs, which aim to increase numbers of available educators. These programs often start in high schools by identifying students interested in teaching or in particular areas

The Kentucky Department of Education's Grow Your Own program aims to address significant teacher shortages and expand teacher workforce demographics in the state. The program identifies and recruits secondary school students for one of two pathways: the Teaching and Learning career pathway or Educators Rising, a Career and Technical Student Organization (CTSO). Students receive formal training in the classroom. CTSO participants receive additional support to develop leadership skills, positive personal attributes, and real-world application of knowledge. **https://goteachky.com/resources/grow-your-own/educator-recruitment/**

like career and technical education (CTE) and encouraging them to enter the field. Granite School District (UT) uses data to broaden the pipeline by identifying community members with teaching licenses who might be recruited back into open positions after starting families or spending time in other careers. Many LEAs also look beyond their location to consider data from teacher preparation programs in other states, hoping to increase their numbers of candidates.

Educator Qualifications

Data about educator qualifications are crucial for recruiting, hiring, assignment, salaries and benefits, and retention, as well as many other workforce issues. Qualification data include degrees, licenses, certifications, and experience, but they also cover many additional areas. For example, LEAs aim to have highly qualified teachers, but they may have different metrics, definitions of quality, and means of placing these teachers in specific subjects. Some agencies collect evaluation, observation, and survey data about teacher quality and combine these with subject area data to link teachers, students, and courses more effectively. Some agencies use established data standards to help in these endeavors: The Delaware Department of Education and Virginia Department of Education use School Courses for the Exchange of Data (SCED) codes to map teacher certifications to courses taught. Teacher qualification data also can influence retention. For example, salary increases and bonuses may be designed to reward and retain those teachers who reach higher certifications or degrees.

School Courses for the Exchange of Data (SCED)

The National Forum on Education Statistics' School Courses for the Exchange of Data (SCED) is a voluntary, common classification system for prior-to-secondary and secondary school courses. It can be used by local, state, and federal agencies to compare course information, maintain longitudinal data about student coursework, and efficiently exchange course-taking records. More information is available at **https://nces.ed.gov/forum/sced.asp**.

Placement and Assignment

LEAs combine data about educator qualifications and quality with data about staffing needs to make decisions about placement (school) and assignment (class or courses). LEAs might make placement and assignment decisions based on effective matching or based on specific course needs. Once educators are working in a position, placement and assignment data are tracked for evaluation, reporting, and accreditation requirements.

Pasco County Schools (FL) is required to use data from the state's value-added model (VAM) when assigning teachers to vulnerable schools. These schools are encouraged to avoid hiring teachers classified as "Needs Improvement" or "Unsatisfactory." Additionally, teachers assigned to dual-enrollment courses must meet the standards of the affiliated college as well as those of the district.

Attendance and Engagement

LEAs collect data on educator attendance and engagement because each of these factors influences the quality of education that students receive. These data also may be used in evaluations, promotions, or placements. Agencies also look at trend data in these areas. For example, if

absences steadily increase in an LEA, administrators may look for additional information to understand why. Similarly, overall highs or lows in teacher engagement metrics are likely to have important root causes for administrators at the school or LEA level to address.

Attendance may be defined and collected differently across LEAs; some define an absence as any time a teacher is out of the classroom, while others would not count a teacher completing a professional development requirement as an absence. Engagement data also vary by location, with agencies using collection methods such as observations, surveys, or reviews.

Retention, Mobility, and Turnover

Once LEAs hire and place educators in roles and classrooms, they collect and analyze data about those employees' trajectories. Even though retention, mobility, and turnover data are defined differently across agencies, they commonly are defined as follows:

- Retention data indicate whether educators stay in assignments or schools, for how long, and whether retention varies by location or grade level.
- Mobility data show trends in how educators move among roles, schools, or districts.
- Turnover data include numbers of educators who leave their positions for various reasons as well as trends in staff retiring or resigning.

To determine retention, mobility or turnover rates, education agencies analyze individual data elements collected over time. Calculating teacher mobility across districts requires coordination among LEAs and the SEA. Such opportunities for coordination are detailed in the next section.

How SEAs and LEAs Communicate About Educator Data

SEAs and LEAs have different roles in the data process, particularly with those data related to the educator workforce. LEAs are the main collection point for most of these data, and they may be required to report such data at the state and national levels at varying levels of specificity. SEAs also collect and maintain key workforce data such as teacher credentials. Workforce data influence policy areas such as funding, teacher preparation requirements, and licensing regulations. LEAs vary in the types of workforce data they collect, as well as in their opportunities and resources to collect these data. Some LEA leaders report that they would like to learn about better models and methods for collecting educator workforce data. Those who are further along in the process note the importance of consistent data standards and interoperability of collection and reporting systems. SEAs also vary in the type of data they collect; they may have more detail on issues such as the educator pipeline or evaluations.

Although they have separate roles, data leaders from SEAs and LEAs note several key areas in which they must communicate clearly about educator workforce data.

LEAs need to know the following:

- ***Numbers of teachers graduating from colleges and universities:*** This information helps inform LEAs' recruiting plans and practices. Some LEAs note that they obtain this information through connections with postsecondary institutions rather than from the SEA.

- ***Numbers of teachers graduating in high-need categories:*** These numbers may inform "grow-your-own" programs and school systems' needs.

SEAs need to know the following:

- ***Official shortage areas across the state, particularly those in high-need subject areas:*** LEAs have varied means for reporting these data.
- ***Reasons for shortages and barriers to filling positions:*** With this information, SEAs can work with higher education agencies on teacher preparation and the educator pipeline.
- ***Accurate recruitment and retention data:*** SEAs can track candidates entering the field and their retention within districts.

Data experts acknowledge that SEAs and LEAs have some communications challenges about workforce data. LEAs and even schools within LEAs may have different circumstances and needs, which can make it more difficult for SEAs to provide effective guidance and support. In addition, it can take time to solve issues; an LEA might not receive immediate help with its teacher recruitment and retention needs by reporting teacher shortages and vacancies to an SEA, but they can collaborate on more long-term strategies such as alternative certification or credentialing opportunities.

The New Mexico Public Education Department launched the first phase of a secure data dashboard that will provide educator preparation programs real-time information to adjust their programs and recruitment. The dashboard also will identify gaps in the educator pipeline that can be addressed by the state education agency.

In Jefferson County Schools (KY), all certified jobs must be posted on the state educator placement website as well as the LEA website. The SEA uses data from these job postings to track trends in vacancies and develop critical shortage lists. These data also inform workforce development matters such as approval of educator preparation programs.

In Wisconsin, each district makes decisions about its data systems, policies, and processes. State data leaders assert that the lack of standardization and difficulty comparing data across districts make working with local education agencies to gather and use educator workforce data challenging.

Leveraging data from multiple systems through interoperability or data sharing solutions can help reduce duplicate data collections and improve the quality of the authoritative source data. The Kentucky Department of Education's use of student information system (SIS) data demonstrates how data from multiple systems can support educator workforce activities:

- LEAs' course code and teacher assignments from the SIS are compared to credential requirements for state course codes. The SEA uses these data to verify that teachers assigned have the appropriate subject- and grade-level credentials. Variances are reported as out-of-field teachers or emergency certified teachers as required for annual school report cards (SRCs). New or inexperienced teachers also are reported on the SRC based on these data.

- Aggregated counts of students are used to report on the demographics of students in classrooms. This information is made available in the Kentucky Field Experience Tracking System to educator preparation programs to ensure that their students have multiple student-teaching opportunities. Using the tracking system removed the burden of contacting schools directly to find suitable placements for student teaching.

The Illinois State Board of Education is working with the Illinois Association of Regional School Superintendents to coordinate the state education agency's (SEA) annual quantitative collection of unfilled positions with a survey tool that collects more qualitative information about the impacts of shortages locally and how local education agencies (LEAs) are trying to mitigate them. SEA data leaders expect that working together on these collections and analyses will better inform the SEA and LEAs about shortages and vacancies and allow them to develop solutions together.

A Key Concern: Using Data to Address Teacher Vacancies

Data from the U.S Department of Education's *Condition of Education 2023* show an increase in the percentage of schools that had at least one open teaching position schoolwide and reported having difficulties filling open teaching positions in particular subject areas.[1]

- In August 2022, 53 percent of public schools reported feeling that their school was understaffed entering the 2022–23 school year. In October 2022, after the 2022–23 school year started, 44 percent of public schools reported having one or more vacant teaching positions.
- A higher percentage of schools reported hiring for at least one open teaching position schoolwide in 2020–21 than in 2011–12.
- Forty percent of public schools hiring for open teaching positions in special education in 2020-21 reported having difficulties filling these openings, compared with 17 percent in 2011–12.

Although education agencies collect different levels of workforce information, the types of data that they collect and use to track the educator workforce vary and sometimes can be insufficient to meet the needs of SEAs and LEAs, as well as policymakers and researchers.[2][3] Some SEAs report using proxy measures to estimate the number of vacant positions. These measures include the number of teachers or full-time equivalent (FTE) positions teaching out of field,[4] the number

[1] National Center for Education Statistics. (2023). Teacher Openings in Elementary and Secondary Schools. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences. Retrieved May 13, 2024, from **https://nces.ed.gov/programs/coe/indicator/tls**.

[2] Saenz-Armstrong, P. (2022). *Do States Have the Data they Need to Answer Important Questions about their Teacher Workforce?* Washington, DC: National Council on Teacher Quality. Retrieved October 12, 2024, from **https://www.nctq.org/publications/Do-States-Have-the-Data-they-Need-to-Answer-Important-Questions-about-their-Teacher-Workforce**.

[3] Nguyen, T., Lam, C., and Bruno, P. (2022). *Is there a national teacher shortage? A systematic examination of reports of teacher shortages in the United States* (EdWorkingPaper: 22-631). Providence, RI: Annenberg Institute at Brown University. Retrieved October 12, 2024, from **https://doi.org/10.26300/76eq-hj32**.

[4] In this context, teaching out of field refers to "teachers teaching subjects for which they have little education or training." Source: Ingersoll, R. M. (1999). The Problem of Underqualified Teachers in American Secondary Schools. *Educational Researcher, 28*(2), 26–37. Retrieved October 12, 2024, from **https://doi.org/10.3102/0013189X028002026**.

of teachers teaching with provisional or emergency licenses, or the difference in employment numbers between the first and last days of school. Moreover, educator workforce data maintained by LEAs are not always available to SEAs. This lack of information limits SEAs' ability to understand and address staffing shortages.

SEAs and LEAs differ in the number of workforce data they collect regarding teacher placement and vacancies, as well as the sophistication of their collection processes. For example, the Virginia Department of Education (VDOE) is increasing its data collections in multiple areas surrounding educator workforce data. Currently, data linking students and teachers, as well as whether educators are properly licensed and endorsed in their subject area are collected in the Master Schedule Collection. The agency's relatively new Positions and Exits Collection assesses the number of positions needed and those unfilled at both the school and district levels. The combination of these two collections allows VDOE to calculate critical shortage areas, staffing and vacancy rates, effective teacher rates, and teacher turnover rates.

In Kentucky, LEAs are required to post teacher vacancies to the Kentucky Educator Placement Service (KEPS) but many LEAs have their own local hiring websites as well. It can be a challenge for the SEA to know whether local vacancies are updated as positions are filled. The SEA and LEAs continue to work to improve reporting, avoid duplication, and improve data quality.

West Virginia's Department of Education and LEAs similarly are required to post vacancies so that legislators can review them at any time. LEAs report a range of workforce data, including current employees, teachers' salaries and classifications, and benefits such as retirement plans. These data are used beyond the LEAs for funding decisions and federal reporting. Connections between the SEA and LEAs allow the SEA to be a key source of much critical data about the workforce. State data staff can connect teacher placement data to the state's certification database, as well as to course offerings. These connections provide a view of the subjects that teachers are assigned to and whether they have the appropriate credentials for the subject.

In Granite School District (UT), the SEA tracks teacher credentials and qualifications while the LEA maintains data about teacher assignments. If a teacher is licensed in the state, their information can be accessed through the state system. In Mesa Public Schools (AZ), the primary source of data about teachers is human resources (HR) data. Although this information provides student-teacher

Institute of Education Sciences (IES) Resources on Teacher Mobility and Retention

To support state and local education agencies in its region, the Regional Educational Laboratory Northeast & Islands developed two reports that provide guidance on analyzing data related to retention, mobility, and turnover.

Analyzing Teacher Mobility and Retention: Guidance and Considerations Report 1 (**https://ies.ed.gov/ncee/rel/regions/northeast/pdf/REL_2021080.pdf**) provides foundational information needed to answer policy-relevant research questions related to teacher mobility and retention.

Analyzing Teacher Mobility and Retention: Guidance and Considerations Report 2 (**https://ies.ed.gov/ncee/rel/regions/northeast/pdf/REL_2021081.pdf**) is a guide for state and local education agency policymakers to analyze teacher mobility and retention.

course connections, the LEA faces challenges in sharing this information with the SEA, as the HR data must first be mapped into the SIS. Data staff must ensure that unique identifiers for teachers align clearly from the source system to the ancillary system.

Putnam County Schools (WV) uses teacher turnover and vacancy data to determine how to best recruit the types of teachers in its schools. Data leaders in Brandywine School District (DE) also strategize teacher recruitment by considering contextual data of both teacher preparation programs and K-12 schools. Regional Educational Laboratory (REL) researchers working with agency staff in Missouri note that these education leaders focus on contextual data at the regional level, as opposed to the district level, which offers them a more useful perspective on labor markets. A regional approach also allows data staff from multiple LEAs to work together to address vacancies. Brandywine School District (DE) data leaders take this view as well, asserting that they cannot only understand local data but also need to understand the surrounding market.

Highlight: Missouri's Teacher Predictor Model

When the Missouri Department of Elementary and Secondary Education wanted to analyze teacher shortages to ensure access to high-quality teachers, the department and the Regional Educational Laboratory–Central collaborated to identify a relevant, understandable, and rigorous approach to describing historical and current demand for teachers and predicting shortage areas in Missouri, including vacancy trends by grade level and certification area. The result was the teacher predictor model (TPM), which was designed for department staff to use independently with a spreadsheet editor and existing administrative data. The information from the model can guide decisions throughout the teacher pipeline by teacher preparation programs, school districts, and state administrators and policymakers. The information also can be used to make potential teachers aware of future opportunities, support planning and teacher preparation programs in areas with predicted shortages, and help districts meet federal reporting requirements.

The TPM uses student enrollment and teacher assignment data from recent academic years to make predictions for future academic years. It has three main components: inputs, intermediate statistics, and predicted model outputs.

- Inputs consist of historical and current student enrollment and teacher data, including counts of all employed teachers, teachers who leave their districts ("teacher leavers"), new hires, and teachers who are not appropriately certified.
- The inputs are used to calculate four intermediate statistics: student enrollment progression rate, teacher-student ratio, teacher attrition rate, and not appropriately certified teacher rate.
- The intermediate statistics are used to calculate the predicted model outputs: predicted student enrollment and predicted teacher workforce, including the numbers of employed teachers, teacher leavers, new hires, and not appropriately certified teachers.

In the Missouri model, the number of not appropriately certified teachers was used as a shortage indicator.

The TPM uses data that are commonly available in state administrative data systems. The Missouri model was applied using data from the Missouri Student Information System, which contains historical and current individual-level data on students and educators in Missouri public schools.

Chapter 3: What Challenges Exist to the Use of Educator Workforce Data, and How Are They Solved?

Chapter 3 describes challenges that agencies may face in collecting and using educator workforce data, as well as the strategies that they have developed in response to these challenges. For example, state and local education agencies (SEAs and LEAs) may not have systems in place to share these data and may have varying needs and priorities related to which data are collected. Additionally, many agencies have identified concerns related to the interoperability of the different systems that house and process the data.

Challenges in Collecting and Using Educator Workforce Data

SEAs and LEAs face many challenges in collecting and reporting crucial data such as teacher attendance, timely and other demographics data including out-of-field teaching. Part of the challenge stems from differences between human resources (HR) systems and other SEA and LEA data systems. Additionally, small schools and LEAs may need to suppress teacher data on report cards due to small numbers of teachers in particular categories, which could allow individuals to be identified.

Many challenges also arise due to questions about data definitions. For example:

- How are terms like vacancy, quality, or mobility operationally defined?
- Do these definitions differ between an SEA and LEA, or among LEAs?
- How accurately are these definitions aligned with data collection methods and analyses?

Lack of alignment in data definitions can lead to confusion and influence how an indicator is used or how an issue is addressed.

Along with varying definitions, agencies can experience challenges related to data identifiers. Teacher licensure for the Oregon Department of Education is handled by an agency separate from the SEA and postsecondary institutions. Although the agencies do exchange data, lack of a common identifier means that data matching is limited.

Agencies also struggle with incompatible data systems. The Connecticut State Department of Education uses a roster system for certified staff, unlike the point-in-time collection used for noncertified staff, including paraprofessionals. Challenges arise because busy data entry staff may not be able to enter all changes promptly, including staff changing roles, going on leave, or leaving the district. In the New Mexico Public Education Department, the licensure system and the reporting system do not communicate, so data analysts are unable to track a teacher's journey consistently from recruitment into an educator preparation program, to completion of that program, and through their teaching career in the state. The Illinois State Board of Education also struggles with tracking educator trajectories. The SEA has data on the candidates who enroll in and

complete educator preparation programs, as well as data on the educators hired into positions at districts and schools, but it does not have data about the steps in between. The SEA also does not have information that would demonstrate how hiring practices impact staffing and shortages.

Challenges in Educator Workforce Data Collections

SEA and LEA data experts report multiple challenges within each of the broad categories of data that most agencies collect.

Candidate Searches, Recruiting, and Hiring

LEAs use various means of identifying and hiring educators, and these processes require extensive data collection both during and after the hiring process. Agencies face challenges when they cannot acquire or use these data effectively. For example, LEAs that recruit candidates outside their state may be hampered by qualification validation, accreditation issues, transfer equivalency requirements, and variations in course and degree titles. In other cases, the timing of collections may not be ideal for providing key information about staffing, and useful connections or trends may be missed. For example, a collection that happens before the beginning of the school year may miss changes that occur in the early days of the year. Finally, data systems may not be able to communicate information that could help in hiring crucial employees such as custodial or transportation staff.

> The Illinois State Board of Education is exploring unifying its educator preparation and licensure systems with its employment information system to improve longitudinal tracking, with the goal of providing insight into the hiring phase of the educator workforce pipeline.

Educator Qualifications and Quality

Although handling educator qualification data such as licensure at the state level seems relatively straightforward for SEAs, many LEAs experience challenges with qualification data in several areas. First, some struggle with the amount of data collected—such as large numbers of certifications—and how to distill the data into useful information. Others note that qualifications are relevant only if they match what someone is teaching, and LEAs often have many out-of-field educators. Data about teacher quality can be particularly challenging. Some grades and subjects are not tested, making evaluations that rely on assessments more difficult. The nature of teaching assignments, such as coteaching or project-based learning across different courses, can make it hard to define the precise number of students that an educator teaches. Agencies may evaluate quality differently, making comparisons across agencies difficult and leading to questions about how to gauge an educator's impact on students.

Placement and Assignment

Challenges to collecting and using placement and assignment data tend to relate to data systems and sources of information. In some agencies, data about educators from the HR system do not automatically connect with data in the student information system (SIS). Unique identifiers are needed to move data from their source system to ancillary systems. Arrangements such as group

teaching also can lead to data complications, as can variations in whether particular data are tied to classroom teachers or to particular classes like music or physical education.

Attendance and Engagement

Many agencies have struggled with questions about teacher attendance. For example, should "absent" refer only to time off from work, or should it include any time a teacher is not in the classroom for any reason? The differences in these situations are critical if attendance data are used in teacher evaluation. Similar complications can arise if teacher engagement is not clearly defined, or if data collection processes do not align with stated definitions. With many variations in how engagement data are collected—for example, self-reports, observations, or stakeholder surveys—determining the accuracy and comparability of the data can be difficult.

In West Virginia, local education agencies traditionally have used their own codes and definitions of teacher attendance, mainly because those data were predominantly used to compute teacher pay and benefits. Attendance codes were developed by local staff to track how many leave days staff took, help keep pay records, or track leave donations. As such, educator attendance was seen as a finance issue for a long time, rather than as a measure of teacher engagement. The state education agency's data team has considered how to reconceptualize the data for other uses: Data collected for one purpose cannot always be used for other purposes.

Retention, Mobility, and Turnover

Collecting and using data related to educator retention, mobility, and turnover also depend on how each term is defined and operationalized. Retention rates might reflect retention in a particular role versus retention within the school or district. Similarly, mobility data can vary based on definitions of "stayers," "movers," and "leavers." These concepts also lead to variations in turnover data—some locations look at any transfer of position as turnover, whereas others may narrow the definition to refer only to an educator leaving the district. Not only are these definitions critical to the meaning of the data, they also can influence the data's usefulness. For example, an SEA could do more with data that show the percentage of educators who moved between LEAs versus those who left the school system altogether, as well as reasons for leaving; retirements likely have different meaning than quitting due to unhappiness with the job.

Jefferson County Schools (KY) developed an exit survey that includes two less common questions: What actions did employees take before deciding to leave the local education agency (LEA), and what will be their next employment? These questions offer LEA leaders greater context about educators' choices, which may inform future decision-making.

Exit surveys, a common data collection tool upon job separation, may provide useful information regarding turnover, but data experts acknowledge their weaknesses. LEAs may struggle to collect the data, and any data collected may be skewed by respondents not feeling comfortable sharing honestly or by the likelihood that those choosing to respond in more detail may be more unhappy with the job or the LEA than those who do not answer extensively. In some states, LEAs are required to give exit surveys but have freedom in how they do so, which makes comparisons across agencies ineffective.

Best Practices for Collecting, Managing, and Using Educator Workforce Data

Based on challenges faced in collecting and working with educator workforce data and related data systems, SEA and LEA data experts offer several best practices:

- Recognize that the timing of data collections affects their use, and schedule collections to best serve agency needs.
- Consider how concepts such as turnover and retention are defined and how the definitions influence the nature of the data collected.
- Think about the intended purposes of particular metrics. Are they meant to evaluate the quality of education for students, or are they designed to identify potential HR issues for the district? Defining these intended purposes may clarify how metrics such as turnover rates are defined.
- Use data about educator qualifications and experience to forecast mentoring or professional development needs and opportunities.
- Consider how best to use mandated data. For example, several states are required to collect teachers' reasons for leaving. How can these data be applied to improve conditions and keep teachers in the profession?
- Use trends in vacancies and staffing data to inform and collaborate with teacher preparation programs.
- Maximize data connections by aligning educator workforce data with standards such as the Common Education Data Standards (CEDS, **https://ceds.ed.gov/**) or School Courses for the Exchange of Data (SCED, **https://nces.ed.gov/forum/sced.asp**).
- Identify educator workforce data needs for compliance, reporting, administration, planning, and any other necessary uses. Document the data elements needed, their definitions, their sources, and their intended uses.
- Specify which agency (or agencies) are responsible for different types of educator workforce data, such as vacancies, qualifications, placements, and assignments. Ensure that all partnering agencies are fully informed about the processes and definitions used in the collection and management of those data. Use data governance relationships to ensure ongoing communications and collaboration for elements used across agencies or for multiple purposes.
- Ensure the interoperability of multiple data systems. Systems should be able to work together to align the processing and use of data elements from multiple sources or data systems.
- Share the data requirements and business rules for educator workforce data elements with stakeholders at all levels and across partnering agencies. Use plain language to promote maximum understanding.
- Establish error checks and other proactive procedures to ensure that data are accurate upon entry or can be corrected as soon as possible after entry.

- Build partnerships among SEA staff, LEA staff, and researchers to explore the relationships among different data elements, such as teacher engagement and retention or turnover, teacher qualifications or experience, and student outcomes. Assess the implications of the findings and develop meaningful plans for supporting educators, such as additional professional development, incentive programs, recognitions, or mentoring.

A Key Concern: Handling Incomplete Data About Teacher Vacancies

Educator staffing shortages continue to increase throughout the country, and agencies may struggle to collect related data accurately, relying instead on incomplete or anecdotal information. Agencies' efforts to attract and recruit more candidates may not be sufficient, particularly if they are based on incomplete or inaccurate data. True vacancy rates may be unknown from day to day, week to week, or month to month. SEAs do not always have access to timely data from LEAs, making it more difficult to provide support. Even if an SEA has a robust licensure system that provides information about potential candidates, tracking vacancies at the local level can be challenging, and the types of information tracked by agencies vary. Some SEAs and LEAs track exit reasons when educators leave positions but find that leaders are asking for greater levels of detail in response to teacher shortages. There may be questions about what exit information can be shared legally. Some agencies have adequate systems for tracking certified staff but lack centralized systems for noncertified staff.

As SEAs and LEAs expand their means of using workforce data strategically to place teachers and fill vacancies, they still face challenges when data are missing or insufficient. For example:

- The Iowa Department of Education traditionally has had a central location for reporting vacancies and job listings, but the SEA found that some LEAs addressed open positions by shifting teaching assignments and splitting classes. These methods sometimes made it appear that vacancies were being filled when they were not. The SEA has implemented a new collection for staffing and open positions in hopes of offering more complete and accurate data.
- In Brandywine Public Schools (DE), the state certification group provides data on teacher certifications, years of experience, and experience in the district, state, or other states. Although payroll data generally provide good information, workforce data become complicated when teachers have multiple strands of pay, such as a position partially paid by grant funding. These variations make it difficult for LEA data staff to identify actual vacancies.

Strategies to Address Educator Vacancies and Shortages

- Many agencies are trying staffing solutions such as hiring teachers from other countries, allowing provisional licenses, or expanding the applicant pool.
- Some SEAs and LEAs recruit teachers from educator preparation programs within the state and help these programs recruit high school students. Such recruitment often is the goal of "grow your own" staffing programs.

- Many LEAs focus on expanding the educator pipeline. San Bernardino City Unified School District (CA) offers job interviews to all student teachers when they have completed their requirements. The district also has expanded its college student intern program, which provides work opportunities for college students with an emphasis on becoming future employees.
- Some agencies have relied heavily on paying retired teachers to come back to work due to teacher shortages. In LEAs such as Milwaukee Public Schools (WI), these teachers were coded as limited-term employees (LTEs). These recruitment efforts were used particularly during the COVID-19 pandemic and have continued in many locations as districts face ongoing shortages.
- Some state legislatures have tried to address workforce issues by increasing salaries and compensation.

> "There is a difference between being ideally staffed and 'business effective' staffed. Proxy measures tend to include things like being ideally staffed. We try to let parents know that vacancies may exist overall, but not those that would affect your children's education."
>
> — ***LEA Administrator***

Strengthening Educator Workforce Data

Many resources are available to help education agencies collect and use quality educator workforce data, including the following.

Forum Guide to Data Quality

https://nces.ed.gov/forum/pub_2023086.asp

This resource provides best practices from districts and states for maintaining quality data as these agencies regularly review and revise their methods for working with data, as well as their expectations for all staff who are responsible for education data and their quality. It also highlights the U.S. Department of Education (ED) efforts to improve data quality. This resource is intended to help districts and states seeking to improve or further develop their policies and practices related to data quality.

Forum Guide to Data Governance

https://nces.ed.gov/forum/pub_2020083.asp

This resource highlights the multiple ways that data governance programs can benefit education agencies. It addresses the management, collection, use, and communication of education data; the development of effective and clearly defined data systems and policies to handle the complexity and necessary protection of data; and the continuous monitoring and decision-making needed in a regularly shifting data landscape.

Forum Guide to Strategies for Education Data Collection and Reporting (SEDCAR)

https://nces.ed.gov/forum/pub_2021013.asp

This resource was created to provide timely and useful best practices for education agencies that are interested in designing and implementing a strategy for data collection and reporting, focusing on these as key elements of the larger data process. This resource is designed to be relevant to the state and local education agencies of today, in which data are regularly collected for multiple purposes and data collection and recording may be conducted by many different individuals within an agency.

Forum Guide to Staff Records

https://nces.ed.gov/forum/pub_2021094.asp

This resource was developed to help education agencies effectively collect and manage staff data, protect the privacy of staff data, and ensure that requests for data access and data releases are managed appropriately. It includes a discussion of types of staff records, updated best practices for data collection and management, and case studies from state and local education agencies.

Forum Guide to the Teacher-Student Data Link: A Technical Implementation Resource

https://nces.ed.gov/forum/pub_2013802.asp

This resource is a practical guide for implementing a teacher-student data link (TSDL) that supports a range of uses at the local, regional, and state levels. The guide addresses the considerations for linking teacher and student data from multiple perspectives, including governance, policies, data components, business rules, system requirements, and practices. It provides references to promising practices for high-quality data linkages, including TSDL-specific processes such as roster verification and the establishment of the Teacher of Record.

Chapter 4: Case Studies from State and Local Education Agencies

Chapter 4 features case studies from SEAs and LEAs about their experience with educator workforce data, challenges they faced, best practices they use, and lessons learned.

Mesa Public Schools (AZ)

Since 2021, Mesa Public Schools (MPS) has made a targeted effort to increase the efficacy of its education workforce data. Data staff were concerned about the district's high vacancy rates, which did not align with data showing available candidates in the talent acquisition software system. The team focused on reducing vacancy time—or the time between separation of the leaving employee and a new hire—which is one of the district's 10 key performance indicators (KPIs).

Background

LEAs in Arizona have the freedom to be governed by their elected school boards. Although some standardization has occurred in student information systems (SISs) to help LEAs meet Every Student Succeeds Act (ESSA) requirements, the standardization of human resources (HR) and education workforce data has lagged. Two factors that influence Arizona LEAs' ability to improve education workforce data quickly are limited per-student state funding and non-standardized systems throughout the state. Because Arizona's public education systems prioritize essentials such as classroom spending, student support spending, and instructional support spending, limited labor resources are available to maximize data systems and use. Additionally, non-standardized systems across public school districts and limited integration services across source systems sometimes prevent the state from optimizing data flow processes.

Data Collected

MPS collects education workforce data aligned with the employee life cycle. Recruiting data are collected via the application system and include employee demographic information, curriculum vitae and resumes, educational history, and other information from potential hires. Onboarding and development data include information about both annual and on-demand trainings, such as completion of modules, professional development hours, and statutory completion of mandatory trainings. Retention data in the enterprise resource planning system include employees' start date, years of experience, educational degrees, areas of certification, certification identification numbers, fingerprint clearance cycles, and other key elements related to processing payroll and benefits. The district's survey research system also collects ongoing data on employee satisfaction, sense of belonging, and agency. Employee separation data go beyond employment end date and includes data from exit surveys related to reasons for separation and potential means of increasing retention of remaining employees.

Staff Roles

MPS has a data governance team that establishes standards and protocols to ensure data quality and data privacy throughout its source systems. Two HR analysts help ensure that practices meet data governance standards and identify areas for improvement in data quality and data systems. Within the HR office, the HR data specialists are most responsible for data efficacy and quality. Two database managers oversee district systems, with one focused on information systems and the other on systems integration research and evaluation. Serving more than 8,500 district employees, the seven-person data team works diligently to maintain district data to established standards.

Succeeding via Continuous Improvement

MPS regularly evaluates and adjusts its data collections processes for continuous improvement. The data team tries to make data submission easier with data validation processes on the back end for as many data elements as possible. For example, the student registration process allows parents or guardians to enter data in district portals and then uses automatic validation procedures to ensure data quality. Similarly, the data team works consistently to transform employees from data collectors to data validators or data analysts. Employee data collection is ongoing as the district onboards employees throughout the year. Analyzing data, like the KPI related to duration from vacancy to fill, is a semiannual process.

With limited resources for business systems labor and software systems, employee professional development helps bolsters MPS's data collection by ensuring that staff understand the data collection processes and the essential nature of the data elements.

These continuous improvement efforts have shown great promise. Between 2022 and 2024, MPS reduced the time between a former employee separating from a position to a new employee starting in the position by almost 2 business weeks. The district also has improved communication and practices to shorten the time from an employee being hired to starting in their job.

Educator workforce data also have given MPS an opportunity to increase the certification pathways permitted by the Arizona Department of Education. The district has a "grow your own" pathway called Path2Teach that offers a change of career for individuals with alternative degrees or a change in certification for educators desiring to move into high-needs subject areas. More data also helped MPS expand its career and technical education (CTE) options in its Educational Professions program. The district has expanded the program to more than 700 high school students, primarily in 11th and 12th grades. This professional pathway helps these students prepare for a career in teaching and learning while still in high school.

Finally, MPS implemented a Next Education Workforce model after data from the annual staff survey suggested that enhanced teacher collaboration was needed to increase workforce satisfaction. This model allows teacher teams to work with small groups of students on deeper and personalized learning concepts and has made the district's work culture more collaborative.

Moving Forward

Through these continuous improvement efforts, MPS's data team has reinforced the importance of accurate, timely, and high-quality data. Without high-quality data collection processes and procedures linked to professional development of key staff, data decrease in quality. Low-quality data lead to time spent cleaning data, imputing data, and attempting to interpret signal in data with heavy noise. Implementing best practices can take time and effort and temporarily divert employees' attention from other workflows, but they are worth the cost.

The MPS data team hopes to expand opportunities for effective data use by seamlessly integrating systems in its data architecture in the future. Expecting that use of machine learning and artificial intelligence (AI) will increase, the team is focused on identifying relevant patterns and nuances within educator workforce data that will allow the MPS to make decisions and design structures that improve student outcomes.

Putnam County Schools (WV)

In recent years, the Putnam County Schools (PCS-WV)[5] has focused on improving and better implementing educator workforce data in three areas: streamlining data from multiple systems, expanding applicant pools to identify the most qualified candidates, and tracking the effects of incentives to attract and retain educators.

When collecting data, the data team in the LEA first considers the level of need for the data, as well as risks versus benefits of the collection activities:

- Do these data meet a federal or state requirement, or do they allow for analyses of whether students are receiving the best education possible?
- Will the collection be worth the time and disruption, or do these data exist elsewhere already?

These considerations have helped the district maintain good relationships with stakeholders, including the county's educators. They also limit unnecessary data activities so that data staff can treat the data with greater time and care.

Streamlining Educator Workforce Data From Multiple Systems

Historically, PCS-WV has used eight different systems to maintain and reference educator workforce data. Three of these systems are provided by the West Virginia Department of Education (WVDE) and contain data required for federal and state submissions:

1. West Virginia Education Information System (WVEIS), a state-mandated system that maintains employee data necessary for items such as payroll, certification, and budgets;
2. an online employee certification system maintained by WVDE; and
3. a discipline data system on all state education staff, which helps PCS-WV make important hiring decisions.

[5] Because these case studies include both Putnam County Schools and Pasco County Schools, each includes the state in its abbreviation (PCS-WV and PCS-FL) to minimize confusion.

The remaining five systems are maintained by the LEA and include

4. a system for application tracking and records to store documents required for employment;
5. a system that maintains data about seniority, classification details, extra duty, and leaves of absence;
6. a system that tracks employee absences and contacts certified substitute teachers when needed;
7. a professional learning system that tracks data on employee trainings and helps provide required and supplemental training for staff; and
8. a new online timesheet program.

Expanding Applicant Pools

PCS-WV also collects data related to its efforts to expand applicant pools and identify the most qualified candidates. The COVID-19 pandemic pushed the data team to modernize the applicant process and record storage. These changes not only saved staff hours and allowed easier access to data about all candidates, but also made it much easier for PCS-WV staff to reach out to applicants beyond the county and state. Replacing the internal system and expanding access to certification data expanded the applicant pool and made it easier to identify the most qualified candidates for PCS-WV schools.

Tracking Data on Educator Incentives

Key parts of PCS-WV's workforce data are elements that track methods for attracting quality candidates and incentives offered to teachers and other educators to remain in their roles once hired. Data about high school "grow your own" programs, college fairs, and social media campaigns can be assessed in relation to the quantity and quality of job applicants. Once educators are hired, each new teacher is assigned a mentor. The LEA also offers incentives such as salary increases, supplemental pay for high-needs areas, and extended benefits for those educators who stay with the district or obtain higher certifications. PCS-WV collects and evaluates data on these incentive programs to strategize and adjust incentive programs when needed.

Lessons Learned

Expanded reporting requirements that necessitate additional collections and new data elements have challenged PCS-WV. The LEA needs more time and resources to reach potential candidates and support them if they struggle with the application process. The data team also tries to enforce data security standards as new collections progress and more data are received. The PCS-WV team also tries to purchase data systems that link together to minimize manual data entry and ensure more accurate data. These integrated systems allow PCS-WV to continue streamlining data processes for its current employees and applicants and to ensure the highest quality data.

Jefferson County Public Schools (KY)

Serving nearly 97,000 students, Jefferson County Public Schools (JCPS) is the largest school district in Kentucky. The LEA's HR department is responsible for educator recruitment, retention, and support through the employment life cycle. Under the leadership of the current superintendent, JCPS has increased its focus on the effective use of data, expanding further its existing comprehensive approach to collecting and evaluating workforce data. These efforts also support the LEA's commitment to ensuring that all students have access to the same quality programs and academic experiences.

Using Teacher Retention Data

JCPS traditionally has required data collection and reporting about the educator workforce, including new hire reports, monthly employee counts, and various educator recruitment and retention report. All LEAs in Kentucky are required to use a software program designed for municipalities that collects and reports monthly counts, allowing HR and its retention team to monitor employee attrition and analyze workforce data.

Around 2015, JCPS began seeing decreased enrollment in and completion of teacher preparation programs. The LEA therefore increased its focus on retaining current teachers, attempting to minimize potential vacancies. This effort led to JCPS's districtwide engagement survey, which provides key information to principals about how their teachers are faring and any challenges they may be facing. The data are disaggregated in various ways, including by level of experience and other demographic data. Examining more granular information and producing specialized reports based on local needs allows principals to have targeted conversations with teachers to support their work. The data indicate which actions they can take that will be most important to the teachers in their building and how they can make the greatest difference in facilitating teacher engagement and retention.

Individual coaches support school principals as they produce these reports and work with their teachers. These coaches are current or retired administrators and superintendents, and some are former turnaround school principals. Principals have told the JCPS HR team that they appreciate these coaches; the relationships are seen as beneficial not only to the principals themselves but also to the schools and educators they serve. This coaching and support is especially important given that the majority of JCPS principals have been in their roles for less than 5 years.

Similarly, the teachers' union has offered support and buy-in for the engagement survey and subsequent guidance from principals. Teachers feel that their voices are being heard, and they are reassured to see the LEA directly using the survey data to make adjustments and provide support. HR leaders report that applying engagement data in this way has improved retention within the LEA.

Principals as Talent Management

Giving principals the engagement data and coaching them to support their educators more effectively also inspired an important ideological shift toward seeing principals as responsible for talent management. Rather than counseling teachers out of the profession or encouraging them

to leave, JCPS took a different approach to strengthening its teaching staff. With concerns about retention, the LEA began devoting more time to speaking with school leaders and ensuring that they had tried every possible development opportunity with struggling teachers. Vacancies could not always be remedied by HR, and the onus was on principals to lose as few teachers as possible.

Becoming More Intentional with Teacher Attrition and Retention Data

JCPS has made a clear shift to using its retention data deliberately and thoughtfully. Detailed attrition data allowed the HR team to work with a small cohort of schools with the highest attrition rates and then expand its support across the LEA. Principals worked with their coaches to identify critical needs at different schools. After losing teachers in the years following the COVID-19 pandemic, JCPS has seen its educator numbers rebounding. The HR team is working with other data leaders to identify additional data sources and secure more funding for teacher recruitment and retention efforts.

Moving Forward

As JCPS continues its employment recovery, leaders also must respond to various data collection and reporting requirements from the state legislature and state department of education. HR staff acknowledge that these tasks could be easier if LEAs had additional data tools and if state engagement surveys were aligned with local measures. The latter change could decrease potential assessment fatigue and raise response rates.

JCPS data leaders also recognize the increasing risk of data breaches as the use of data for workforce strategy increases and more employees work with data. Many LEA staff may be used to working freely within the data system and not being responsible for data security. Along with their wish for more data tools, the LEA's data experts are considering stronger data security measures, such as guidance on data security from the SEA.

Virginia Department of Education

Teacher and staff vacancies are an essential and ongoing data issue for SEAs and LEAs. These vacancies significantly impact the education ecosystem and influence decisions made in areas ranging from recruitment practices and bonus structures to class size and program offerings, all of which ultimately can impact student outcomes. As the Virginia Department of Education (VDOE) evaluated data related to vacancies, data experts understood that the SEA needed a better way to identify critical shortage areas. Although VDOE produced a Hard-to-Staff Schools Report, it did not provide the level of detail and type of data disaggregation needed to truly address staffing concerns. In response, VDOE developed the Positions and Exits Collection (PEC).

Positions and Exits Collection

The PEC was designed to enable the SEA, its LEAs, and regional schools to comply with requirements to report and address critical staff shortages by position and geographic region. The PEC measures variations in required staffing levels and evaluates the reasons that educators leave

the field.[6] Because data experts at VDOE continuously monitor teacher and administrator pipelines, the PEC is essential to making better connections between vacancies, teacher qualifications, and teacher placement.

The PEC is intended to collect the number of staff positions and the number of vacancies by full-time equivalency (FTE) in the following categories: teacher, administrator, paraprofessional, pupil personnel, and transportation.

PEC's design differs significantly from past collections about educator shortages:

- Data are collected at the school level for positions such as classroom teachers, librarians, and principals and at the district level for all other personnel employed by the district.
- The position codes for educators align to the School Courses for the Exchange of Data (SCED) subject areas and the subsections within each SCED subject area.
- The position codes for other licensed personnel, primarily administrators, are based on existing endorsement codes.
- The position codes for all other staff employed by the district are based on existing staffing categories.
- The data are collected by FTE, which allows for a single person to be reported in more than one position code with the appropriate proportion of time allocated to the respective positions.

School Courses for the Exchange of Data (SCED) is a voluntary, common classification system for prior-to-secondary and secondary school courses. It can be used to compare course information, maintain longitudinal data about student coursework, and efficiently exchange course-taking records. More information is available at **https://nces.ed.gov/forum/sced.asp**.

Virginia's use of SCED in this application is a new approach to educator workforce data. In a separate collection called the Master Schedule Collection (MSC), course roster data are collected by SCED code. This SCED link between the PEC and the MSC reduces reporting burden for LEAs and allows for analysis of the number of students affected by teacher shortages.

The data collected in the PEC are aggregated and used to create the Staffing and Vacancy Report (**https://p1pe.doe.virginia.gov/apex_captcha/home.do?apexTypeId=320**), an interactive report that allows users to create custom data tables. Within that reporting tool, users can aggregate the data at four levels: school, district, geographic region, and state. Analysis of critical shortage areas by geographic regions is invaluable to identifying shortage areas specific to a region that may be masked by overall state rates. The Staffing and Vacancy Report amplified a previous assumption about the state's teacher pipeline: Shortages are not the same across the different regions.

In addition to unmasking shortages within geographic regions, the Staffing and Vacancy Report helps put percentages into perspective by providing the number of positions, the number of

[6] Virginia Department of Education. (2024). "Positions and Exits Collection." Retrieved March 4, 2024, from **https://www.doe.virginia.gov/data-policy-funding/data-reports/data-collection/positions-and-exits-collection**.

unfilled positions, and the vacancy percentage by position. For example, two unfilled positions in a rural region could be harder to address than 12 unfilled positions in a suburban region with two universities offering educator preparation programs. Similarly, a shortage of 5 percent in one area could represent only three teachers, while a 2.3 percent vacancy rate in another area could total 1,243 teachers.

Lessons Learned

The SEA and its LEAs experienced some challenges in the first year of the PEC's implementation. The PEC is collected by the same office that collects most student data and is designed to function similarly to student data collections because the teacher position codes are tied via SCED codes to courses taught. VDOE quickly learned that most LEAs store staff data outside the SIS and could not easily create the data in the prescribed format. In the first year of implementation, most LEAs had to prepare their PEC data manually, which was more challenging. The VDOE data team and the LEA data stewards developed a collaborative environment with frequent webinars and other engagement opportunities to help ameliorate these difficulties.

Additionally, when the PEC was first developed, some LEAs did not have an educator exit survey. Even in those that did, the survey was optional and not completed by all leaving educators. As a result, the exit surveys could suffer from response bias, where the majority of respondents were either unhappy or excited to move on to a new career. This sample leaves out many people in the middle whose experiences might provide more useful data about why teachers leave their positions or the profession altogether.

Moving Forward

VDOE data staff are encouraged by the data they have evaluated so far and particularly by the more detailed picture available when teacher vacancy data are aligned with SCED codes. As data collection continues, the team is ready to evaluate trends in the data and consider issues like the return on investment of teacher incentive programs. Additionally, the team hopes to use the SCED-aligned data for purposes beyond identifying critical shortage areas, including using teacher-student data links to assess the impact of qualified teachers on student outcomes.

Kentucky Department of Education

Creating school environments where educators can thrive is a key focus of the Kentucky Department of Education (KDE). KDE also is committed to ensuring that all Kentucky students are taught by highly qualified teachers. In line with these goals, KDE uses educator workforce data for multiple purposes, including validating credentials and assessing educator satisfaction and work climate.

Validating Workforce Credentials

KDE uses educator workforce data to help ensure that students enrolled in courses in the state's SIS are taught by qualified teachers. Historically, this review has been based on a snapshot of data twice a year, but with increased interoperability between systems, the analysis is performed weekly and soon will be run daily, via the Kentucky Educator Credentialing System (KECS).

Kentucky's Office of Educator Licensure and Effectiveness officially launched KECS in May 2022. The new system was part of a multiphase project to transition educator certification, educator preparation, and educator-related legal processes to an online platform to help streamline user experiences, decrease turnaround time, and increase accuracy and efficiency. KECS provides a comprehensive solution that allows educators to apply and pay fees for initial certifications or renewals online though a streamlined process. The system also maintains admissions and exit data for educator preparation programs. Field experience and cooperating teacher information also can be entered and viewed. The Education Professional Standards Board (EPSB) uses KECS to track educator complaints and cases. Postsecondary institutions soon will be able to add and update their programs and program participants in the same system.

Local educator assignment data are loaded regularly into KECS to verify educator credentials and ensure appropriate classroom assignments. This review of workforce credentials flags teachers in the KECS dashboard, alerting school and district staff if the teacher assigned to the course does not meet grade, subject, or other requirements for teaching the course or the student population enrolled. Increasing the timeliness of the review helps ensure that students are assigned appropriately and taught by certified teachers. An annual snapshot of these data is used for reporting out-of-field teachers publicly in Kentucky's School Report Card.

In addition, the EPSB is charged with

- establishing standards of performance both for preparation programs and practitioners;
- accrediting educator preparation providers and approving educator preparation programs at colleges, universities, local school districts, and private contractors;
- selecting assessments for teachers and administrators;
- overseeing programs for new teachers and new principals;
- administering Kentucky's National Board for Professional Teaching Standards certification; and
- issuing, renewing, suspending, and revoking Kentucky certificates for professional school personnel.

Measuring Educator Work Climate and Satisfaction

The work climate and satisfaction of the state's educators is an important element in KDE's efforts to support teachers and encourage them to thrive. Every other year, KDE administers a working conditions survey to certified teachers across the state. All public schools can participate; almost 40,000 teachers participated in the 2023-24 survey. The data collected is shared on the Impact KY Working Conditions website (**https://www.impactky.org/**) to help state and local leaders reflect on what is going well and areas for improvement. KDE uses these data to drive positive actions for educators.

Appendix: Related Resources

National Forum on Education Statistics Resources

Forum Guide to Data Quality (2023)

https://nces.ed.gov/forum/pub_2023086.asp

This resource provides best practices from districts and states for maintaining quality data as these agencies regularly review and revise their methods for working with data, as well as their expectations for all staff who are responsible for education data and their quality. It also highlights the U.S. Department of Education's efforts to improve data quality. This resource is intended to help districts and states seeking to improve or further develop their policies and practices related to data quality.

Forum Guide to Understanding the School Courses for the Exchange of Data (SCED) Classification System (2023)

https://nces.ed.gov/forum/pub_2023087.asp

This resource offers a comprehensive overview of the voluntary, common SCED classification system. SCED was developed to meet the need among local, state, and federal agencies for widely understood, standardized prior-to-secondary and secondary school course codes. The guide provides information on the development process, code structure, and element descriptions. Additionally, it offers best practices for SCED implementation and use. A companion publication, SCED Uses and Benefits, highlights user benefits and features case studies to illustrate SCED use.

Forum Guide to Staff Records (2021)

https://nces.ed.gov/forum/pub_2021094.asp

This resource was developed to help education agencies effectively collect and manage staff data, protect the privacy of staff data, and ensure that requests for data access and data releases are managed appropriately. It includes a discussion of types of staff records, updated best practices for data collection and management, and case studies from state and local education agencies.

Forum Guide to Strategies for Education Data Collection and Reporting (SEDCAR) (2021)

https://nces.ed.gov/forum/pub_2021013.asp

This resource was created to provide timely and useful best practices for education agencies that are interested in designing and implementing a strategy for data collection and reporting, focusing on these as key elements of the larger data process. This resource is designed to be relevant to the SEAs and LEAs of today, in which data are regularly collected for multiple purposes and data collection and recording may be conducted by many different individuals within an agency.

School Courses for the Exchange of Data (SCED) Uses and Benefits (2021)

https://nces.ed.gov/forum/pub_2021023.asp

This resource was developed to provide a brief overview of SCED, highlight the research application and benefits of SCED to users, and illustrate SCED uses with case studies. SCED is a voluntary, common classification system for prior-to-secondary and secondary school courses. It can be used to compare course information, maintain longitudinal data about student coursework, and efficiently exchange course-taking records. SCED is a free resource intended for federal, state, and local education agencies.

Forum Guide to Data Governance (2020)

https://nces.ed.gov/forum/pub_2020083.asp

This resource highlights the multiple ways that data governance programs can benefit education agencies. It addresses the management, collection, use, and communication of education data; the development of effective and clearly defined data systems and policies to handle the complexity and necessary protection of data; and the continuous monitoring and decision-making needed in a regularly shifting data landscape.

Forum Guide to the Teacher-Student Data Link: A Technical Implementation Resource (2013)

https://nces.ed.gov/forum/pub_2013802.asp

This resource is a practical guide for implementing a teacher-student data link (TSDL) that supports a range of uses at the local, regional, and state levels. The guide addresses the considerations for linking teacher and student data from multiple perspectives, including governance, policies, data components, business rules, system requirements, and practices. It provides references to promising practices for high-quality data linkages, including TSDL-specific processes such as roster verification and the establishment of the Teacher of Record.

Institute of Education Sciences (IES) Resources

Characteristics of 2020–21 Public and Private K–12 School Teachers in the United States: Results From the National Teacher and Principal Survey (NTPS) (2022)

https://ies.ed.gov/pubsearch/pubsinfo.asp?pubid=2022113

The 2020–21 NTPS is a nationally representative sample survey of public and private K–12 schools, principals, and teachers in the 50 states and the District of Columbia. The purpose of NTPS is to collect data to provide a detailed picture of U.S. elementary and secondary schools and their staff. State-level data are also available for public schools, principals, and teachers. NTPS collects data on core topics including teacher and principal preparation, classes taught, school characteristics, and demographics of the teacher and principal labor forces. The survey is developed by the National Center for Education Statistics (NCES) of IES within the U.S. Department of Education (ED), and data are collected by the U.S. Census Bureau. The selected samples included about 9,900 public schools and their principals, 68,300 public school teachers, 3,000 private schools and their principals, and 8,000 private school teachers.

Condition of Education: Preprimary, Elementary, and Secondary Education Indicators

https://nces.ed.gov/use-work/resource-library/report/compendium/condition-education-2023

Each year, the Annual Reports group within NCES summarizes data from more than 25 surveys administered by NCES and other government agencies. The key responsibility of Annual Reports is to produce the congressionally mandated *Condition of Education*—a system of indicators on all levels of education and labor force outcomes in the United States, as well as international comparisons. The preprimary, elementary, and secondary education indicators include teaching turnover, characteristics of public school teachers, teacher openings in elementary and secondary schools, and staff in rural public elementary and secondary school systems.

An Approach to Using Student and Teacher Data to Understand and Predict Teacher Shortages (2020)

https://nces.ed.gov/use-work/resource-library/resource/other-resource/approach-using-student-and-teacher-data-understand-and-predict-teacher-shortages

This report describes an approach to identifying patterns of teacher shortages that was collaboratively developed by the Missouri Department of Elementary and Secondary Education and the Regional Educational Laboratory–Central. The approach is implemented using widely available software. It can be adopted or adapted by education agencies that wish to understand and predict teacher shortages, including shortage trends in content and certification areas, in their own contexts. Education agencies may also use teacher shortage predictions to inform efforts to address inequities in students' access to excellent educators.

Analyzing Teacher Mobility and Retention: Guidance and Considerations Report 1 (2021)

https://ies.ed.gov/ncee/rel/Products/Region/northeast/Publication/5125

This applied research methods report is a guide for state and local education agency policymakers and their analysts who are interested in studying teacher mobility and retention. This report provides the foundational information needed to answer policy-relevant research questions related to teacher mobility and retention and presents the decision points and steps necessary for conducting basic mobility and retention analyses.

Analyzing Teacher Mobility and Retention: Guidance and Considerations Report 2 (2021)

https://ies.ed.gov/ncee/rel/Products/Region/northeast/Publication/5126

This applied research methods report is a guide for state and local education agency policymakers and their analysts who are interested in studying teacher mobility and retention. This report is the second in a two-part set and builds on the foundational information in the first report. This report presents guidance on how to interpret differences in mobility and retention rates by teacher, school, or district characteristics; analyze year-to-year trends in mobility and retention; compare mobility and retention rates across districts or states; and examine how the implementation of a policy related to teachers might be associated with teacher mobility or retention.

Indicators of Successful Teacher Recruitment and Retention in Oklahoma Rural Schools (2018)

https://files.eric.ed.gov/fulltext/ED576669.pdf

The Oklahoma State School Boards Association reported 500 teacher vacancies at the beginning of the 2015/16 school year, according to a survey of school districts, and 53 percent of respondents said the teacher shortage was worse than in the previous year. The state's teacher shortage, as well as the unique context of rural schools in Oklahoma, led members of the Regional Educational Laboratory–Southwest Oklahoma Rural Schools Research Alliance to seek information about factors associated with successful teacher recruitment and retention in Oklahoma. This study covers the 10 school years between 2005/06 and 2014/15 and uses teacher and district data from the Oklahoma State Department of Education, Oklahoma Office of Educational Quality and Accountability, and community characteristics from data in federal noneducation sources and publicly available geographic information systems (GISs).

Mapping Teacher Workforce Needs to Strengthen the Teacher Pipeline: Using Geographical Information Systems (2021)

https://ies.ed.gov/ncee/rel/Products/Region/southwest/Blog/90163

In Louisiana, REL Southwest is helping the state understand GIS mapping technology to examine teacher workforce needs and strengthen the teacher pipeline. Through the Southwest Teacher Preparation and Professional Development Research Partnership, staff at REL–Southwest and the Louisiana Department of Education partnered to develop a set of two interactive GIS maps that visualize the local need for appropriately certified teachers across the state. Louisiana's education leaders will be able to use the GIS maps to answer a range of questions about local needs for appropriately certified and in-field teachers as well as critical areas to target.

Reference List

Bleiberg, J., and Kraft, M. (2022). *What Happened to the K-12 Education Labor Market During COVID? The Acute Need for Better Data Systems* (EdWorkingPaper: 22-544). Providence, RI: Annenberg Institute at Brown University. Retrieved October 12, 2024, from **https://doi.org/10.26300/2xw0-v642**.

Ingersoll, R. M. (1999). The Problem of Underqualified Teachers in American Secondary Schools. *Educational Researcher, 28*(2), 26–37. Retrieved October 12, 2024, from **https://doi.org/10.3102/0013189X028002026**.

National Center for Education Statistics. (2023). Teacher Openings in Elementary and Secondary Schools. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences. Retrieved May 13, 2024, from **https://nces.ed.gov/programs/coe/indicator/tls**.

National Forum on Education Statistics. (2021). *Forum Guide to Staff Records* (NFES 2021094). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved October 12, 2024, from **https://nces.ed.gov/forum/pub_2021094.asp**.

Nguyen, T., Lam, C., and Bruno, P. (2022). *Is there a national teacher shortage? A systematic examination of reports of teacher shortages in the United States* (EdWorkingPaper: 22-631). Providence, RI: Annenberg Institute at Brown University. Retrieved October 12, 2024, from **https://doi.org/10.26300/76eq-hj32**.

Saenz-Armstrong, P. (2022). *Do States Have the Data they Need to Answer Important Questions about their Teacher Workforce?* Washington, DC: National Council on Teacher Quality. Retrieved October 12, 2024, from **https://www.nctq.org/publications/Do-States-Have-the-Data-they-Need-to-Answer-Important-Questions-about-their-Teacher-Workforce**.

U.S. Department of Education, Office of Elementary and Secondary Education. (n.d.). *Teacher and School Leader Incentive Program*. Retrieved August 31, 2023, from **https://oese.ed.gov/offices/office-of-discretionary-grants-support-services/effective-educator-development-programs/teacher-and-school-leader-incentive-program/**.

Virginia Department of Education. (2024). "Positions and Exits Collection." Retrieved March 4, 2024, from **https://www.doe.virginia.gov/data-policy-funding/data-reports/data-collection/positions-and-exits-collection**.