

*O V E R V I E W*

**T**EACHER  
**E**DUICATION  
**L**EARNING  
**C**OLLABORATIVE



**CEDR**  
Center for Education  
Data & Research

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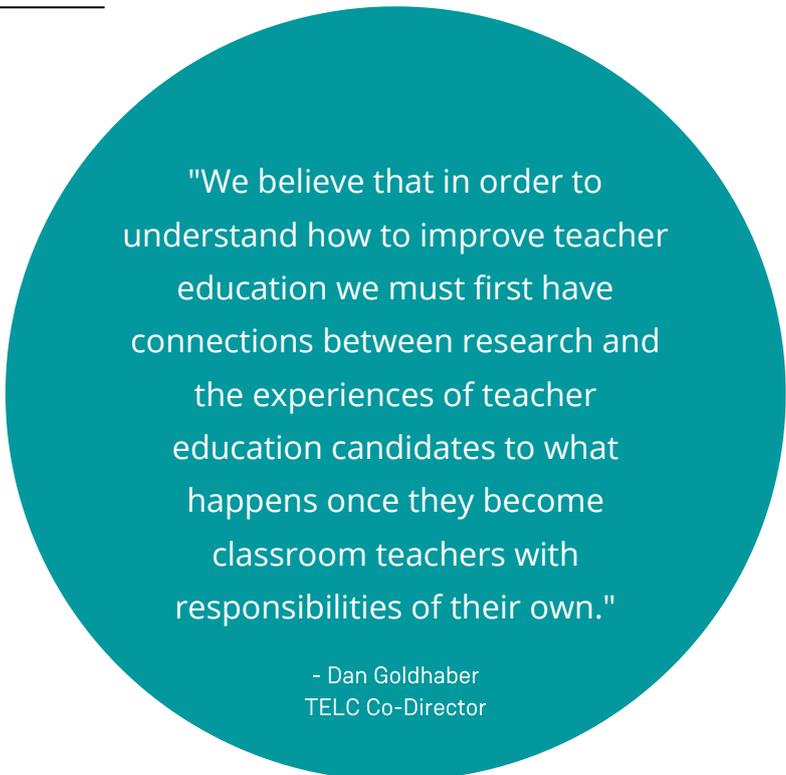
# What is TELC?

The Teacher Education Learning Collaborative (TELC) was created to address the need for feedback loops that connect the experiences of teacher candidates in their teacher education programs (TEPs) to their in-service K-12 students and experiences.

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TELC brings together a large community of TEPs and researchers to better understand how specific teacher education experiences affect the development and labor market outcomes of teacher candidates and the students they serve.

The primary objective is to develop a robust evidence base about what constitutes effective teacher education to improve policy and practice.



"We believe that in order to understand how to improve teacher education we must first have connections between research and the experiences of teacher education candidates to what happens once they become classroom teachers with responsibilities of their own."

- Dan Goldhaber  
TELC Co-Director

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## TELC is a collaborative.

TELC is a unique partnership between TEPs and researchers. It leverages data about teacher education experiences to learn about the effective preparation of teachers. It is only possible to connect teacher candidate experiences to in-service teacher and student outcomes because the Washington State Legislature and the Institute of Education Sciences have invested in a data infrastructure that facilitates research on teachers and their students.

# TELC Members

The research that TELC conducts would not be possible without the collaborative data structure set up in Washington by the legislature and education agencies. Thank you for your continued support in TELC research!

## TEACHER EDUCATION PROGRAMS



Tariq Akmal 5\*\*, Washington State University  
 Kim Bartel 2\*\*, Central Washington University  
 Scott Calahan 2\*\*, Central Washington University  
 Vivien Chen 5\*\*, Education Research Data Center  
 Gail Coulter 4\*, Western Washington University  
 Jenny Dechaine 1PI, Central Washington University  
 Glenna Gallo 4\*, Office of the Superintendent of Public Instruction  
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 Mark Windschittl 5\*, 6\*, University of Washington Seattle  
 Jim Wyckoff 5\*, University of Virginia

### TELC PROJECTS

- 1 = Gates The Teacher Pipeline in Washington State
- 2 = IES CTE Teachers for Students with Disabilities
- 3 = IES Cooperating Teacher Project
- 4 = IES Special Education Teacher Pipeline Project
- 5 = NSF Noyce Applicants Project
- 6 = NSF STEM Teacher pipeline

### ROLE

- D = TELC Directors
- PI = Co-PI
- \*\* = Senior Personnel
- \* = Advisory Board

## STATE AGENCY PARTNERS



## PROJECT FUNDERS



# What makes TELC unique?

TELC is a consortium of TEPs across Washington state. What makes it unique, not only in Washington but in the United States is the level of collaboration among researchers, TEPs, and state agencies. TELC creates an alliance among TEPs and researchers that collects annual comprehensive teacher preparation data for all candidates that complete teacher preparation in these TEPs. **As a result, we have assembled a longitudinal dataset that tracks more than 27,000 teacher candidates.**

We are then able to:

- Leverage the state's investment in cross-sectional data to better understand the full teacher development pipeline; and
- Explore connections between teacher preparation and later student and teacher outcomes.



## **Provides a broad range of TEP experiences**

TELC examines the role of mentors, class demographics, and background of student teachers as they transition to becoming teachers.



## **Specifically links teacher candidates to their cooperating teachers**

It includes comprehensive teacher preparation data for more than 27,000 teacher candidates who received their teacher education in participating TEPs.



## **Links teacher preparation experiences to workforce outcomes**

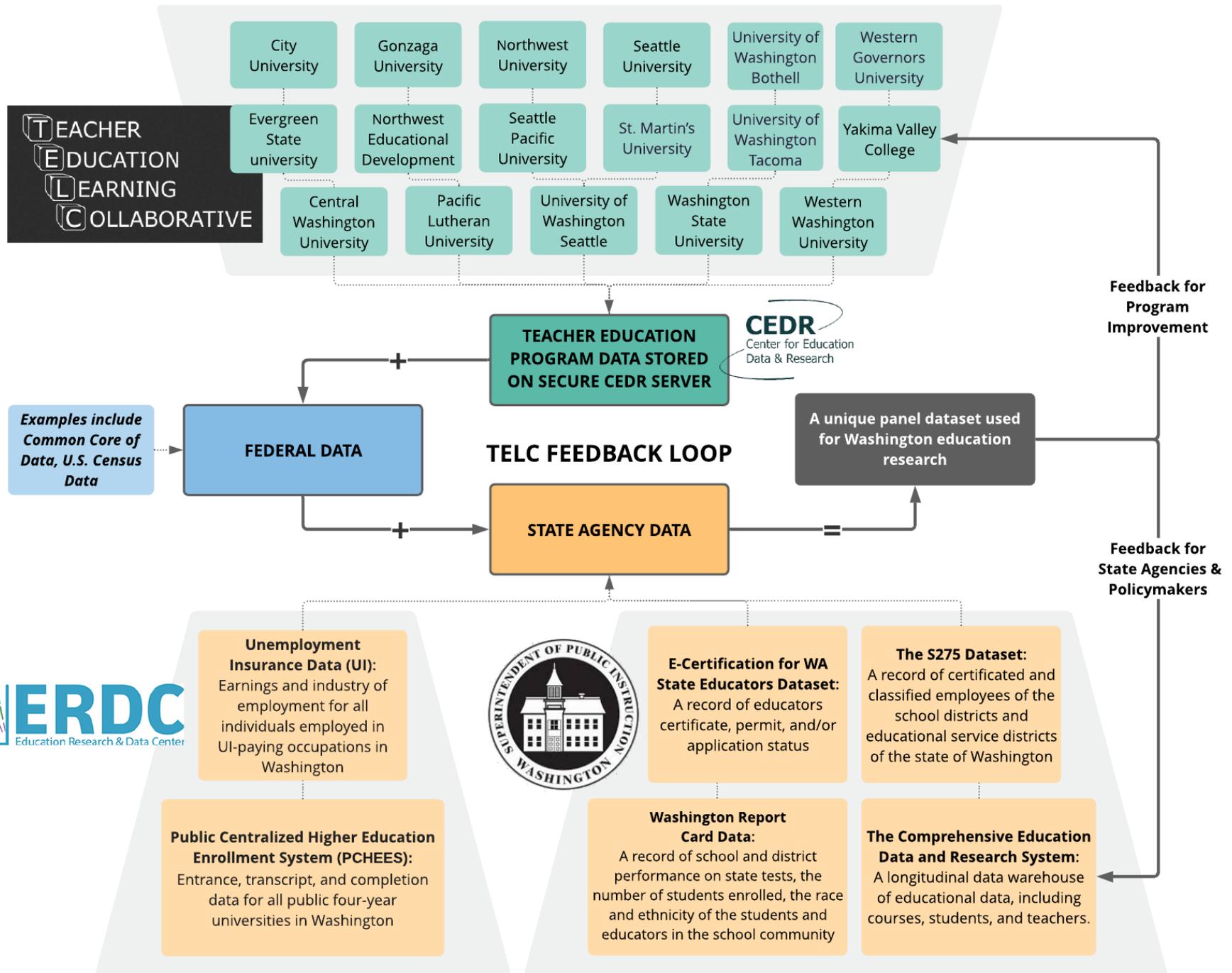
The TELC dataset is the largest dataset that links the teacher preparation experiences to later workforce outcomes. It contains more than three times as many teacher candidates as comparable state-level datasets from prior work in Washington and other states.

# The TELC Feedback Loop

The diagram on the following page illustrates the TELC ecosystem. Each entity serves an important role to ensure the success of the TELC feedback loop.

This work would also not be possible without the participation of a diverse group of TEP partners statewide who have provided information on teacher preparation experiences including Central Washington University, City University, Evergreen State University, Gonzaga University, Northwest Educational Development, Northwest University, Pacific Lutheran University, Seattle Pacific University, Seattle University, St. Martin's University, The University of Washington Bothell, The University of Washington Seattle, The University of Washington Tacoma, Washington State University, Western Governors University, Western Washington University, and Yakima Valley College.

- It starts when **the TEPs participating in TELC share data about teacher candidates with researchers at the Center for Education Data and Research (CEDR) at the University of Washington**. These data are then cleaned and stored on a secure server at CEDR.
- At CEDR, **the candidate data from TEPs is then merged with other administrative data** from state agencies such as Education Research & Data Center (ERDC) and Office of the Superintendent of Public Instruction (OSPI), and federal data sources such as Common Core of Data and U.S. Census Data.
- After the datasets have been merged and cleaned for each specific TEP, **datasets are returned to each TEP, along with personalized reports about employment outcomes for graduates of that specific TEP**. TEPs may use this information for program improvement.
- Back at CEDR, once data is analyzed, **preliminary results are shared with participating TEPs and state agencies through working papers, project updates, and roundtable meetings**. These results are shared to help TEP administrators and policymakers make informed decisions.



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# Why TELC?

“There is currently little definitive evidence that particular approaches to teacher preparation yield teachers whose students are more successful than others. Such research is badly needed” (National Research Council Committee (NRCC) Report, 2010).

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Teacher education programs have received a great deal of policy and research attention of late. Yet we are only at the beginning stages of learning which features of teacher education programs influence the effectiveness of candidates.

As is clear from the above quote, the implications of particular preservice preparation features are not well qualified. Even a decade later, the NRCC believes that a comprehensive data system with a feedback loop between teacher preparation programs and the school systems they serve is one potential mechanism that could help education stakeholders as they make determinations (NRCC Report, 2020). We believe that through collaboration we can learn how to improve teacher preparation.

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The fundamental mission of TELC is to use new kinds of data to build knowledge and capacity for both teacher education programs and K-12 systems so that we make better policy/practice decisions

We know, for instance, that inservice teachers improve significantly early in their teaching careers (Clotfelter, Ladd, & Vigdor, 2006; Harris & Sass, 2011; King-Rice, 2010; Kraft & Papay, 2014; Papay & Kraft, 2015; Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004). And surveys of newly minted teachers suggest they often feel ill-prepared for the myriad challenges facing them in the classroom, particularly in terms of classroom management, where only slightly more than half of beginning teachers reported feeling well-prepared.

Ultimately the success or failure of TEPs, at least as far as this can be measured by the outcomes of the teachers they graduate, depends on the ability of TEPs to learn more about what constitutes effective teacher candidate education. Central to this is the creation of more systemic feedback loops that connect the experiences of teacher candidates in their TEPs to inservice teacher and student outcomes. It is an opportune time to focus on feedback loops as new data connections afford the potential for new insights into teacher preparation.

Goldhaber, D. (2018). Evidence-Based Teacher Preparation: Policy Context and What We Know. *Journal of Teacher Education*, 70(2), 90–101. <https://doi.org/10.1177/0022487118800712>

# TELC Projects

TELC conducts research in the following four broad areas. Below are the specific ongoing TELC projects. You can learn more about individual projects by clicking the link in each project title or visiting our website at [telc.us/projects](http://telc.us/projects).

**1**

TEP Admission  
& Selection Processes

**2**

Teacher  
Diversity

**3**

Teacher Shortages  
& Quality Gaps

**4**

Teacher Effectiveness  
& Retention

## **Gates Foundation - The teacher pipeline in Washington State:**

Examining the transition from teacher preparation to the classroom and implications for workforce diversity and student achievement

*(Research Areas: 2, 3 & 4)*

## **IES - The special education teacher pipeline in Washington State:**

A comprehensive analysis of preservice predictors of special education teacher career paths and effectiveness

*(Research Areas: 3 & 4)*

## **NSF - The STEM teacher pipeline in Washington State:**

A comprehensive analysis of preservice predictors of STEM teacher career paths and effectiveness

*(Research Areas: 2, 3 & 4)*

## **IES - What is the value of apprenticeship for teachers?**

Linking pre-service mentor quality to in-service teacher and student outcomes

*(Research Area: 4)*

## **NSF - Applicant information, selection, and STEM teacher retention and effectiveness:**

Applicant information, selection, and STEM teacher retention and effectiveness

*(Research Areas: 1, 2, 3 & 4)*

## **IES - CTE teacher preparation and effectiveness for students with disabilities:**

Career and Technical Education, Inclusion, and Postsecondary Outcomes for Students With Disabilities

*(Research Areas: 3 & 4)*

*Executive Summary*

# WHAT WE'RE LEARNING

- 1. Teacher candidates that work with effective mentors are more effective once they enter the workforce.**
- 2. Alignment between a candidate's student teaching classroom and their classroom in the workforce matters.**
- 3. Student teaching placements appear to alleviate teacher shortages.**
- 4. Hosting student teachers come with little cost to student achievement in the classrooms in which student teaching occurs, and mentor teachers appear to improve after hosting a student-teacher.**
- 5. There is a large bench of potential teachers who do not enter the public teaching workforce right away.**
- 6. There are substantial differences in the probability that different teacher candidates become public K-12 teachers in the state.**
- 7. There is some information asymmetry in the student-teacher placement process.**
- 8. Dual-licensure in special education is associated with differential teacher mobility patterns.**

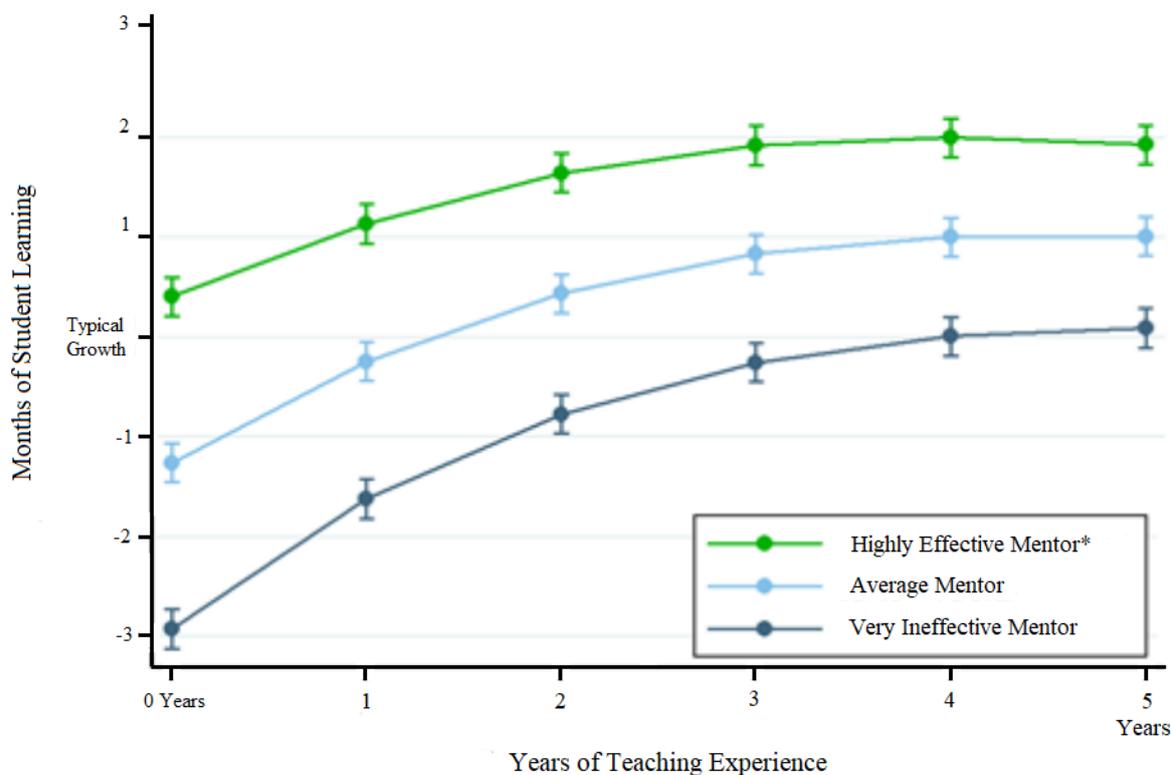
# 1. Teacher candidates that work with effective mentors are more effective once they enter the workforce.

In our study, "Effective like me? Does having a more productive mentor improve the productivity of mentees?" we use student teaching placements from TELC programs to investigate the relationship between mentor effectiveness (as measured by value-added) and the future effectiveness of their mentees.

We found a strong, positive relationship between the effectiveness of a teacher’s mentor and their own effectiveness in math and a more modest relationship in English Language Arts. The relationship in math is strongest early in a teacher’s career.

Overall, teacher candidates who work with a more effective teacher (“mentor”) during their student teaching experience tend to be more effective once they enter the workforce

## Predicted Student Achievement by Time Since Student Teaching and Mentor Effectiveness.



\*Highly effective mentors differ by +/- 2 standard deviations in teacher effective from average mentors

Goldhaber, D., Krieg, J., & Theobald, R. (2020). Effective like me? Does having a more productive mentor improve the productivity of mentees? *Labour Economics*, 63, 101792.

## 2. Alignment between student teaching classrooms and future classrooms matter.

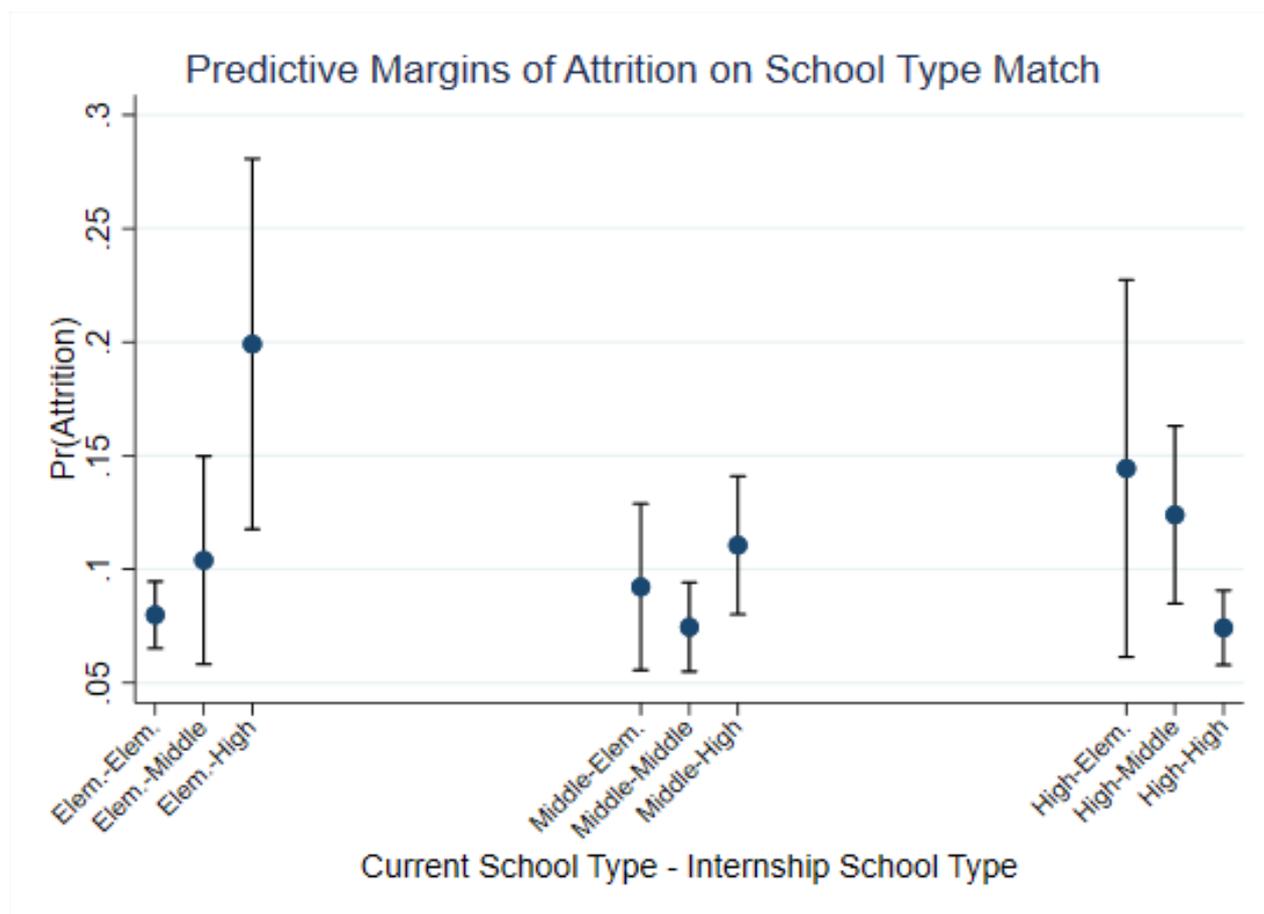
Using a database created of teacher candidates from TELC programs, we investigate the connections between specific teacher preparation experiences (e.g., endorsements, licensure test scores, and student teaching placements) and the likelihood that these candidates enter and leave the state’s public teaching workforce within their first 2 years.

We find large differences in hiring rates over time, as candidates who graduated in the years prior to and during the Great Recession are far less likely to be hired than candidates in recent years.

Finally, teacher candidates hired into the same school type (elementary, middle, or high school) or into schools and classrooms with similar student demographics as their student teaching placement are more likely to stay in the teaching workforce than other candidates who experience less alignment.

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### Probability of Attrition Based on School Type Match Between Current and Internship School Type



Goldhaber, D., Krieg, J., & Theobald, R., & Goggins, M. (2020). Front End to Back End: Teacher Preparation, Workforce Entry, and Attrition. CALDER Working Paper No. 246-1220.

### 3. Student teaching placements appear to alleviate teacher shortages.

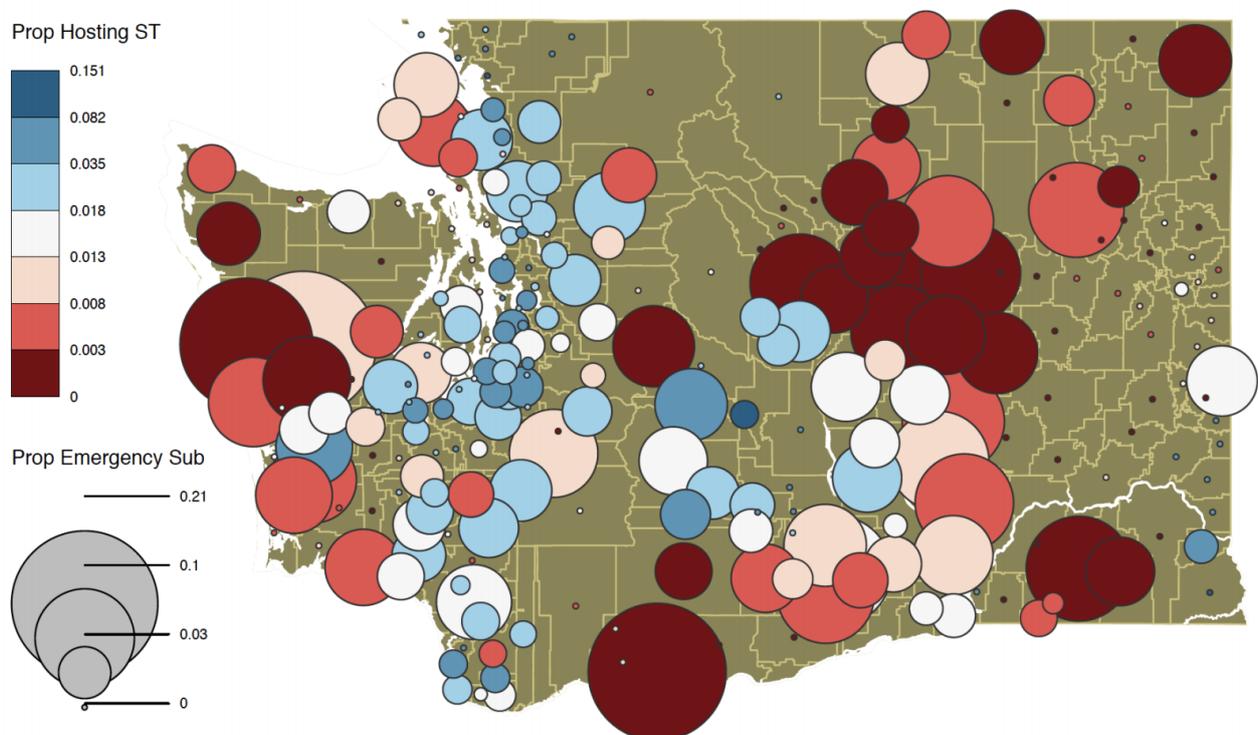
In addition to a unique dataset of student teaching placements from TELC programs, we use a proxy for teacher shortages, the proportion of new teacher hires in a school or district with emergency teaching credentials, to provide the first empirical evidence of a relationship between student teaching placements and teacher shortages.

We find that schools and districts that host fewer student teachers or are nearby to districts that host fewer student teachers tend to hire significantly more new teachers with emergency credentials the following year.

These relationships are robust to district fixed-effects specifications that make comparisons across schools within the same district. This descriptive evidence suggests exploring efforts to place student teachers in schools and districts that struggle to staff their classrooms.

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### Proportion of Emergency Substitute Teachers and Proportion of Teachers Hosting Student Teachers, by District



Goldhaber, D., Krieg, J., Naito, N., & Theobald, R. (2020). Student teaching and the geography of teacher shortages. *Educational Researcher*, 1-11.

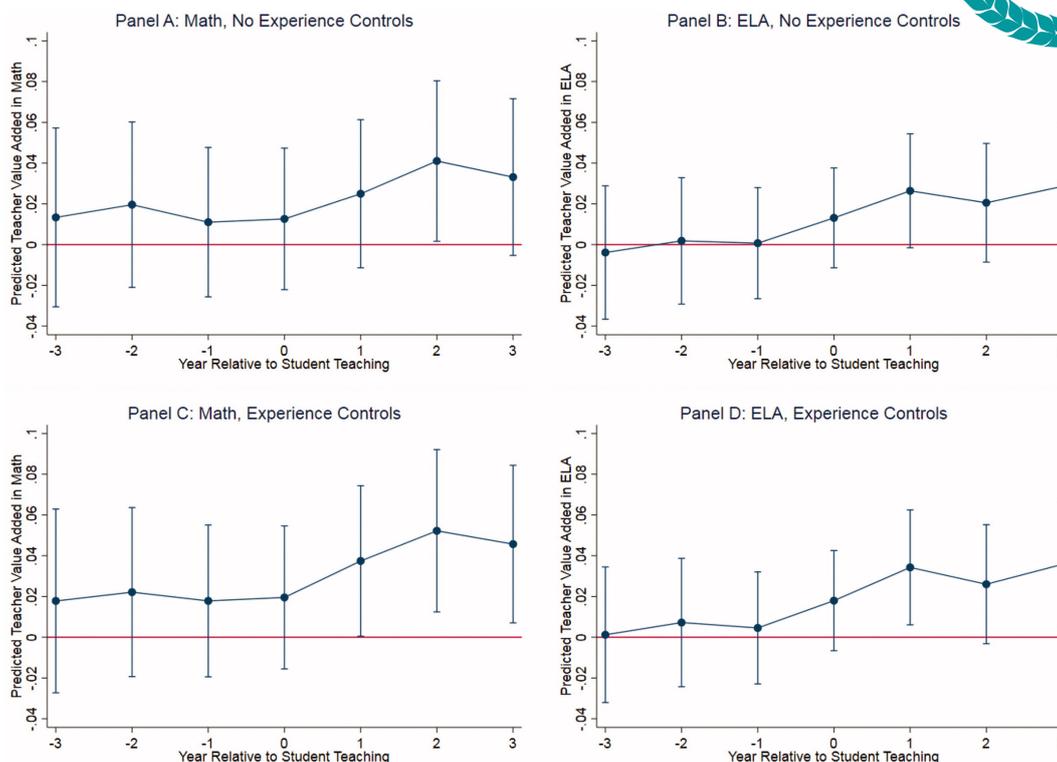
## 4. Hosting student teachers come with little cost to student achievement in the classrooms in which student teaching occurs, and mentor teachers appear to improve after hosting a student-teacher.

Some schools and districts are reluctant to host student teachers because of perceived costs to student performance, so we investigated student test scores in teachers' classrooms in years they did and did not host a student-teacher.

We found no impact of hosting a student-teacher on student test scores in the student teaching year, and that hosting a student-teacher has modest positive impacts on student math and reading achievement in a teacher's classroom in following years.

These findings suggest that schools and districts can participate in the student teaching process without fear of short-term decreases in student test scores, while potentially gaining modest long-term test score increases.

### Average Changes in Value-Added for Mentor Teachers Before, During, and After Hosting a Student-Teacher.



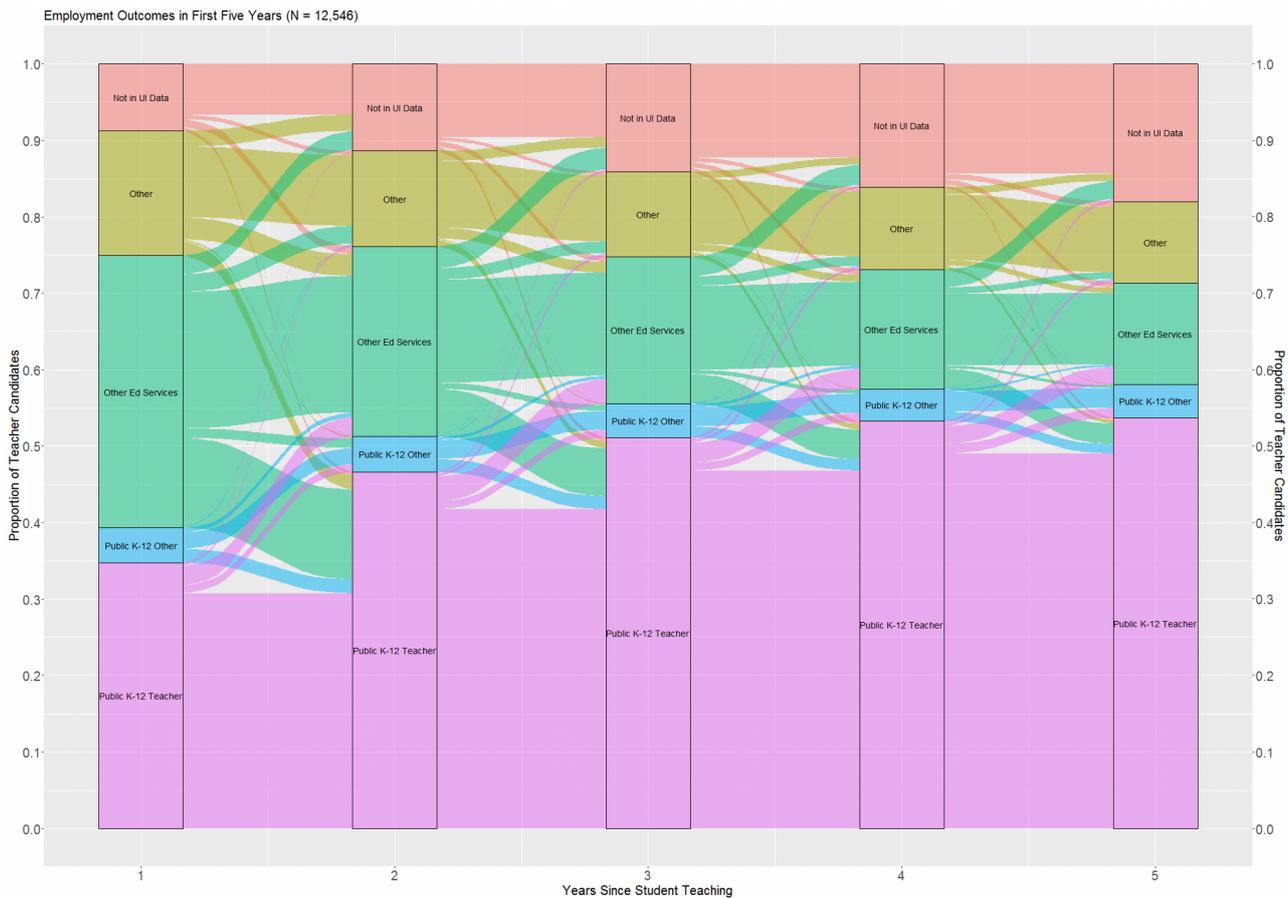
Goldhaber, D., Krieg, J., & Theobald, R. (2020). Exploring the impact of student teaching apprenticeships on student achievement and mentor teachers. *Journal of Research on Educational Effectiveness*, 13(2), 213-234.

## 5. There is a large bench of potential teachers who do not enter the public teaching workforce right away.



We use the TELC data, merged with employment data from the state’s public schools and unemployment insurance system, to investigate the career paths of teacher candidates inside and outside of the state’s K-12 public school system. Around 75% of candidates are employed in some education positions in each of the five years after student teaching, but we find considerable movement from education positions outside of public schools into public school teaching positions in the first few years after candidates complete student teaching.

### Employment Outcomes and Transitions, First 5 Years (All Candidates Student Teaching 2012–13 or Earlier)



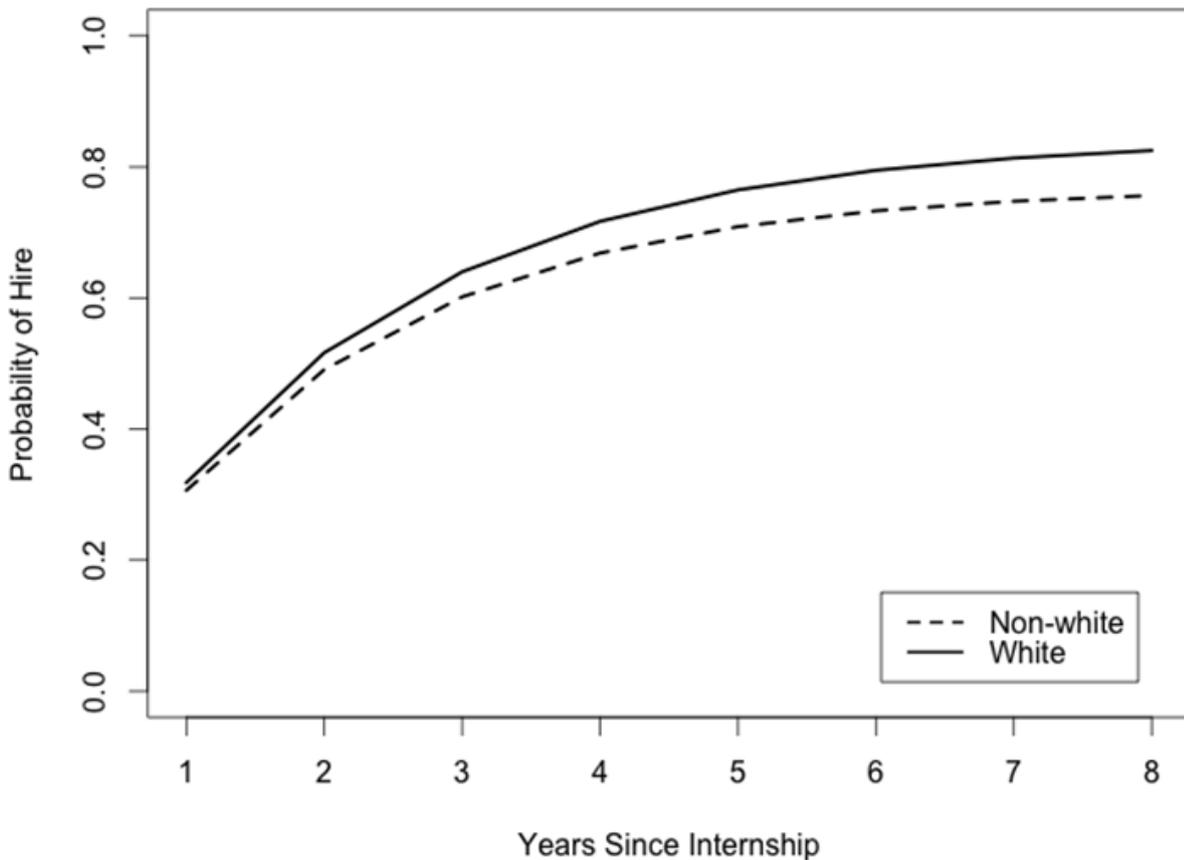
Goldhaber, D., Krieg, J., Theobald, R., & Liddle, S. (2021). Lost to the System? A Descriptive Exploration of Where Teacher Candidates Find Employment and How Much They Earn. CALDER.Org.  
[https://caldercenter.org/sites/default/files/CALDER%20WP%2020251-0421\\_0.pdf](https://caldercenter.org/sites/default/files/CALDER%20WP%2020251-0421_0.pdf)

## 6. There are substantial differences in the probability that different candidates become public K-12 teachers in the state.



We investigated patterns of workforce entry for graduates of the 6 original TELC participating TEPS. By far the greatest predictor of workforce entry is teacher endorsement area; not surprisingly, candidates endorsed to teach in “difficult-to-staff” areas like STEM and special education are more likely to find employment as public school teachers than teacher candidates endorsed in other areas. We also find (and as shown below) that candidates of color are less likely to become public school teachers than white candidates, all else equal.

### White and Non-White Teacher Candidate Hiring Probability Since Internship, First 8 Years



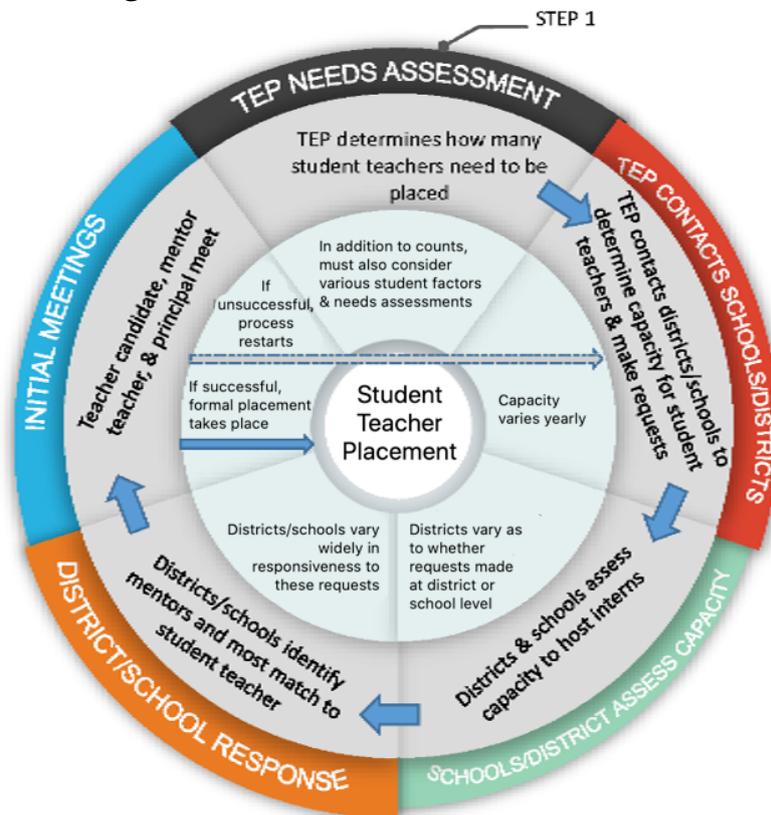
Goldhaber, D., Krieg, J., & Theobald, R. (2014). Knocking on the door to the teaching profession? Modeling the entry of prospective teachers into the workforce. *Economics of Education Review*, 42, 106-124.

## 7. There is some information asymmetry in the student teacher placement process.



In this qualitative study in the Journal of Education Human Resources, we examined the student-teacher placement process as well as the factors that influence these placement decisions. We also explored how, if at all, practices vary across TEPs, districts, and schools. We found that, in broad terms, the process for matching student teachers to mentor teachers is similar across educational institutions, although TEPs and school systems sometimes face competing priorities when placing student teachers in classrooms. We also identified a problem of information asymmetry in the placement process, which leaves TEPs with questions about how cooperating teachers are selected and districts and schools with limited information with which to make thoughtful and intentional matches between candidates and cooperating teachers. Finally, we documented the important role of social networks in placements and how they can advantage some TEPs, districts, and schools in this process.

### The Student Teaching Placement Process



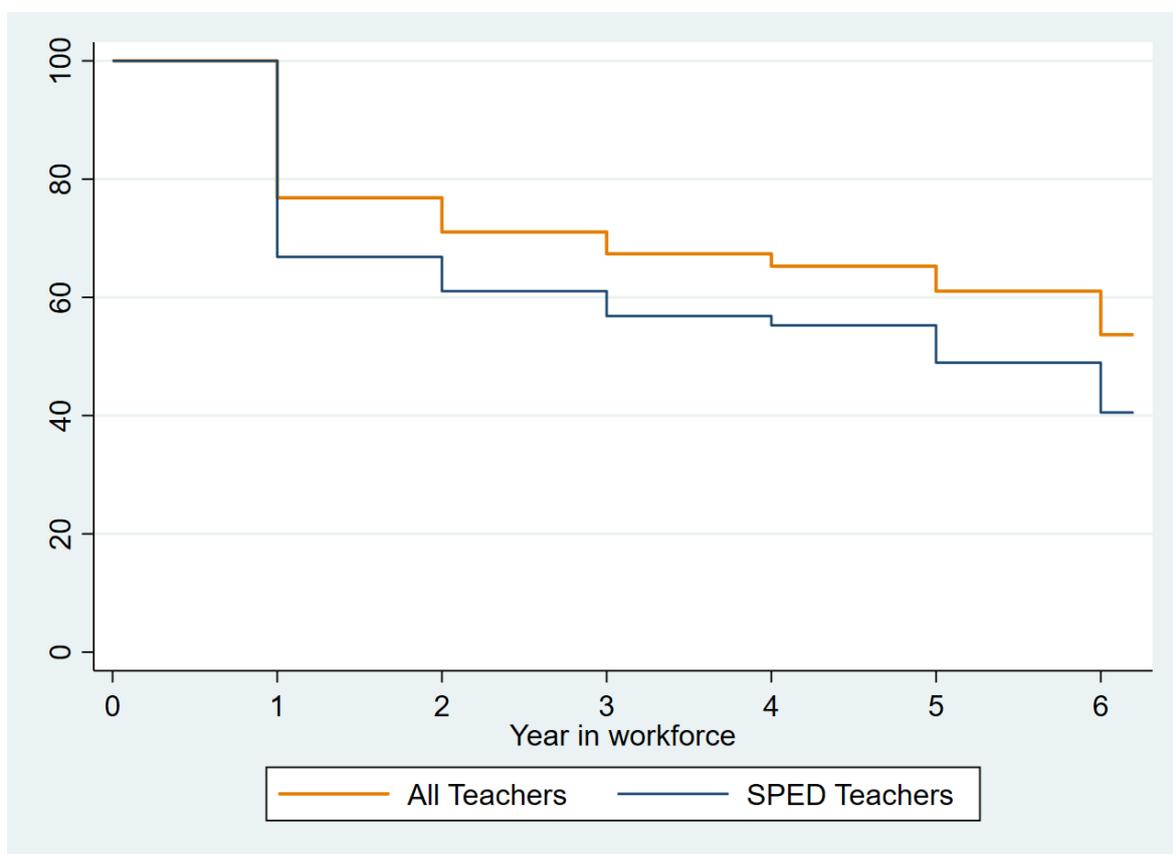
St. John, E., Goldhaber, D., Krieg, J., & Theobald, R. (in press). How the match gets made: Exploring student teacher placements across teacher education programs, districts, and schools. Journal of Education Human Resources.

## 8. Dual-licensure in special education is associated with differential teacher mobility patterns.



In this paper in *Exceptional Children*, we used data on the more than 1,300 graduates of special education TEPs in the TELC data to provide a descriptive portrait of specific measures of special education teacher preparation and their relationships with workforce entry and early-career retention. While rates of workforce entry and retention for these special education candidates are high, we document considerably lower rates of entry into and retention in special education teaching positions for candidates who hold a dual endorsement in special education and another subject. As a result, and as shown in the figure below, less than half of graduates of special education TEPs are teaching in special education classrooms six years after graduation. These patterns have potential implications for the state’s new dual-endorsement requirement and for dual licensure programs more broadly.

### Special Education Teacher Preparation and Workforce Entry and Retention, First 5 Years



Theobald, R. J., Goldhaber, D. D., Naito, N., & Stein, M. L. (2021). The Special Education Teacher Pipeline: Teacher Preparation, Workforce Entry, and Retention. *Exceptional Children*. <https://doi.org/10.1177/00144029211010162>

# ONGOING & FUTURE WORK

## **STEM Teacher Pipeline.**

We are using data from a statewide survey of early-career STEM teachers to better understand the connections between student teaching placements and STEM teachers' perceptions of their preparation and working conditions. We are also using a unique dataset that links the TELC data to unemployment insurance (UI) data to quantify the earnings of candidates in different fields (particularly STEM) who do and do not end up teaching in Washington public schools.

## **Special Education Teacher Pipeline.**

We are using data from surveys of district special education directors and special education TEP faculty in Washington to explore the importance of the instructional practices emphasized in teacher education, the instructional practices emphasized in school districts and their alignment for outcomes of students with disabilities in the state. We are also exploring connections between different special education teacher licensure pathways and instructional settings and outcomes for students with disabilities.

## **Mentor Teachers and Student Outcomes.**

We are leveraging data on the edTPA scores of teacher candidates in Washington to explore the influence of cooperating teachers on edTPA performance and the extent to which this explains cooperating teacher impacts on later candidate outcomes. We are also collecting data on teachers with National Board for Professional Teaching Standards (NBPTS) accreditation to understand how many NBPTS teachers host student teachers in their classroom and their impacts on candidate outcomes.

## **CTE Teachers and Student With Disabilities.**

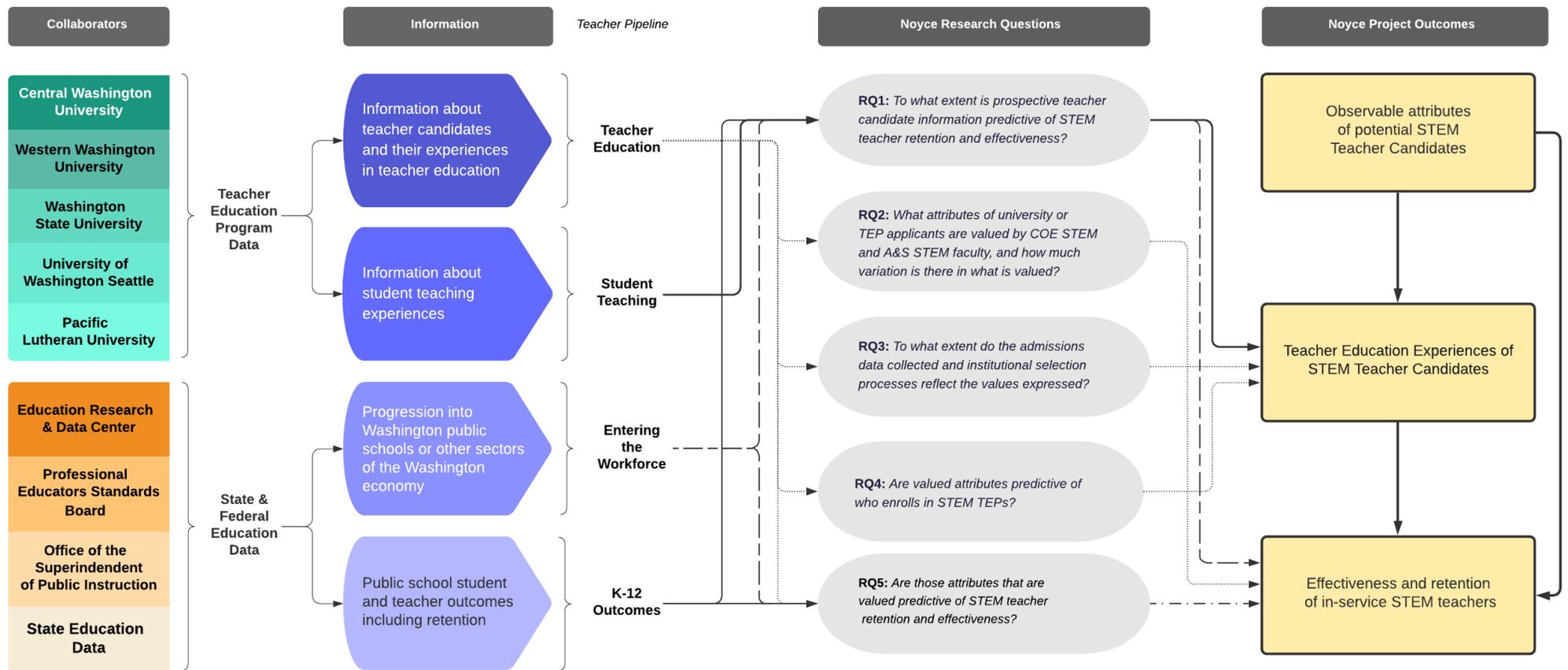
We are providing a first look at career and technical education (CTE) teacher effectiveness for students with disabilities (SWD). We measure effectiveness based on estimates of teacher effects on various non-test and long-run student outcomes (e.g. postsecondary enrollment, employment), and we also assess whether effectiveness varies according to teachers' licensure, pathway into teaching (e.g. traditional vs alternative), and prior work experiences. Finally, we are working with CTE faculty at Central Washington University to explore the training provided to CTE teachers for educating SWD in their classrooms.

## **Applicant information, selection, and STEM teacher retention and effectiveness.**

This mixed-methods project funded by the National Science Foundation's Noyce grant program is a collaboration between the Center for Analysis of Longitudinal Data in Education Research at the American Institutes for Research, the Education Research and Data Center (ERDC) at the Washington State Office of Financial Management, and several Washington State institutions of higher education: Central Washington University, Pacific Lutheran University, University of Washington, Washington State University, and Western Washington University. The project addresses connections between the attributes of potential teacher candidates; their admittance and enrollment in science, technology, engineering, and math (STEM) teacher education programs; and their later retention and effectiveness as STEM teachers (*see next page*).

TELC aims to gain a comprehensive understanding of the full breadth of the teacher pipeline. **Below is an example of TELC in action:**

The goal of **the Noyce Project** is to better understand how the choices that teachers/prospective teachers and institutions make shape the composition of the teacher pipeline, as well as who becomes teachers and the outcomes for their students. To understand this, the Noyce project addresses connections between the attributes of potential teacher candidates; their admittance and enrollment in science, technology, engineering, and math (STEM) teacher education programs; and their later retention and effectiveness as STEM teachers.



## TELC Publications to Date

Theobald, R., Goldhaber, D., Holden, K., & Stein, M. (2021). Special education teacher preparation, literacy instructional alignment, and reading achievement for students with high-incidence disabilities. CALDER Working Paper No. 253-0621.

Choate, K., Goldhaber, D., & Theobald, R. (2021). The effects of COVID-19 on teacher preparation. *Phi Delta Kappan*, 102(7), 52-57.

Goldhaber, D., Krieg, J., & Theobald, R., & Liddle, S. (2021). Lost to the system? A descriptive exploration of where teacher candidates find employment and how much they earn. CALDER Working Paper No. 251-0421.

St. John, E., Goldhaber, D., Krieg, J., & Theobald, R. (2021). How the match gets made: Exploring student teacher placements across teacher education programs, districts, and schools. *Journal of Education Human Resources*.

Theobald, R., Goldhaber, D., Naito, N., & Stein, M. (2021). The special education teacher pipeline: Teacher preparation, workforce entry, and retention. *Exceptional Children*.

Goldhaber, D., Krieg, J., Naito, N., & Theobald, R. (2020). Making the most of student teaching: The importance of mentors and scope for change. *Education Finance and Policy*, 15(3), 581-591.

Goldhaber, D., Krieg, J., Naito, N., & Theobald, R. (2020). Student teaching and the geography of teacher shortages. *Educational Researcher*, 1-11.

Goldhaber, D., Krieg, J., & Theobald, R. (2020). Effective like me? Does having a more productive mentor improve the productivity of mentees? *Labour Economics*, 63, 101792.

Goldhaber, D., Krieg, J., & Theobald, R. (2020). Exploring the impact of student teaching apprenticeships on student achievement and mentor teachers. *Journal of Research on Educational Effectiveness*, 13(2), 213-234.

Goldhaber, D., Krieg, J., Theobald, R., & Goggins, M. (2020). Front end to back end: Teacher preparation, workforce entry, and attrition. CALDER Working Paper No. 246-1220.

Krieg, J., Goldhaber, D., & Theobald, R. (2020). Disconnected development: The importance of specific human capital in the transition from student teaching to the classroom. CALDER Working Paper No. 236-0520.

Krieg, J. M., Goldhaber, D., & Theobald, R. (2020). Teacher candidate apprenticeships: Assessing the who and where of student teaching. *Journal of Teacher Education*, 71(2), 218-232.

Goldhaber, D., Theobald, R., and Tien, C. (2019). Why we need a diverse teacher workforce. *Phi Delta Kappan*, 100(5), 25-30.

Goldhaber, D., Theobald, R., and Tien, C. (2018). Educator and student diversity in Washington State: Gaps and historical trends. *WERA Educational Journal* 10(2), 3-9.

Goldhaber, D., Cowan, J., and Theobald, R. (2017). Evaluating prospective teachers: Testing the predictive validity of the edTPA. *Journal of Teacher Education*, 68(4), 377-393.

Goldhaber, D., Krieg, J. M., & Theobald, R. (2017). Does the match matter? Exploring whether student teaching experiences affect teacher effectiveness. *American Educational Research Journal*, 54(2), 325-359.

Krieg, J., Theobald, R., and Goldhaber, D. (2016). A foot in the door: Exploring the role of student teaching assignments in teachers' initial job placements. *Educational Evaluation and Policy Analysis* 38, 364-388.

Goldhaber, D., Krieg, J., Theobald, R., and Brown, N. (2015). Refueling the STEM and special education teacher pipelines. *Phi Delta Kappan* 97, 56-62.

Goldhaber, D., Krieg, J., & Theobald, R. (2014). Knocking on the door to the teaching profession? Modeling the entry of prospective teachers into the workforce. *Economics of Education Review*, 42, 106-124.