STATE CAPITOL
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California Legislature

California's Teacher Shortage

Joint Informational Hearing - February 22, 2017

AGENDA

I. **Welcome**

II. **Presentation on Teacher Supply**

- Linda Darling-Hammond, *Professor of Education Emeritus, Stanford University; President, Learning Policy Institute*
- Mary Vixie Sandy, Ed.D., *Executive Director, Commission on Teacher Credentialing*

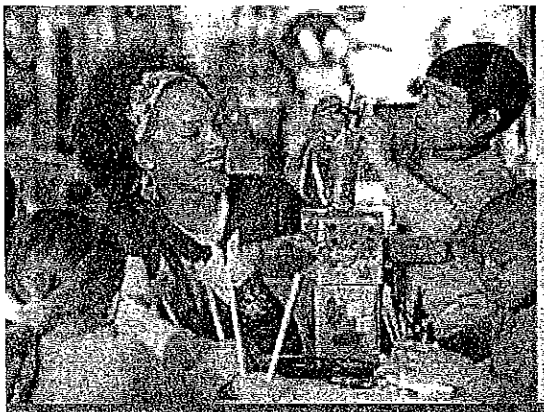
III. **From the Field: Local Approaches to Attract & Retain Teachers**

- Daina Lujan, *Principal, Millbrae School District; Vice President of the South San Francisco Unified School District Board of Trustees*
- Ryan Ruelas, *History Teacher, Anaheim High School; Chair of CTA's State Council on Education Credentials and Professional Development Committee; President, Anaheim Elementary School Board*
- Kilian Betlach, *Principal, Elmhurst Community Prep, Oakland Unified School District*
- Christina Wong, *Special Assistant to the Superintendent, San Francisco Unified School District*

IV. **Programs to Attract & Retain Teachers**

- Brittany Villalobos-Gillett, *Science Teacher, Visitacion Valley Middle School, San Francisco Unified School District*
- Irene Castillon, *Academic Dean/Mexican-American History Teacher, Luis Valdez Leadership Academy, The Foundation for Hispanic Education*
- Bob Capriles, *Math and Engineering Teacher, Fremont High School, Fremont Union High School District*

V. **Public Comment**



California Teacher Workforce Trends Signal Worsening Shortages

In the past year, overall teacher workforce trends in California have worsened, with especially severe consequences in special education, math, and science, and significant threats in bilingual education. Survey data suggest that, in addition to canceling courses and increasing class sizes, districts are responding to shortages by hiring underprepared teachers (teachers who have not yet completed the subject matter and teacher preparation requirements for a full credential); assigning some teachers out of their fields of preparation; and hiring substitutes, who need only pass a basic skills test.[1] Relying on underprepared, out-of-field, and substitute teachers is a cause for concern. Evidence shows that these teachers typically depress student achievement and have higher attrition rates.[2] The high attrition rates of underprepared teachers create continuous demand for new teachers and exacerbate shortages.[3] Moreover, schools serving the most vulnerable students, including students in high-poverty, high-minority, and high-English Learner schools, disproportionately turn to underprepared teachers to meet their hiring needs.[4]

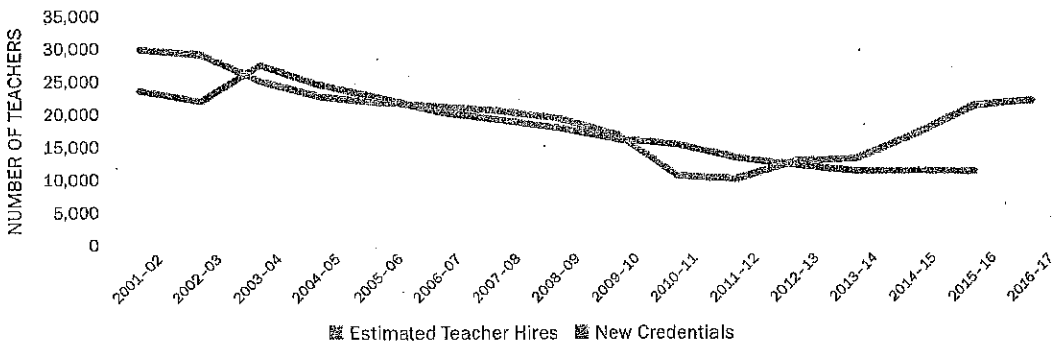
Current California Teacher Workforce Trends

- **Stagnant teacher supply is insufficient to meet growing teacher demand.** New California credentials have remained constant at 11,500 since 2013–14, while the number of projected new hires has exceeded 20,000 (see Figure 1).

Figure 1

Teacher Demand Continues to Grow

New preliminary teaching credentials issued and district-estimated new hires, 1999–2000 to 2016–17



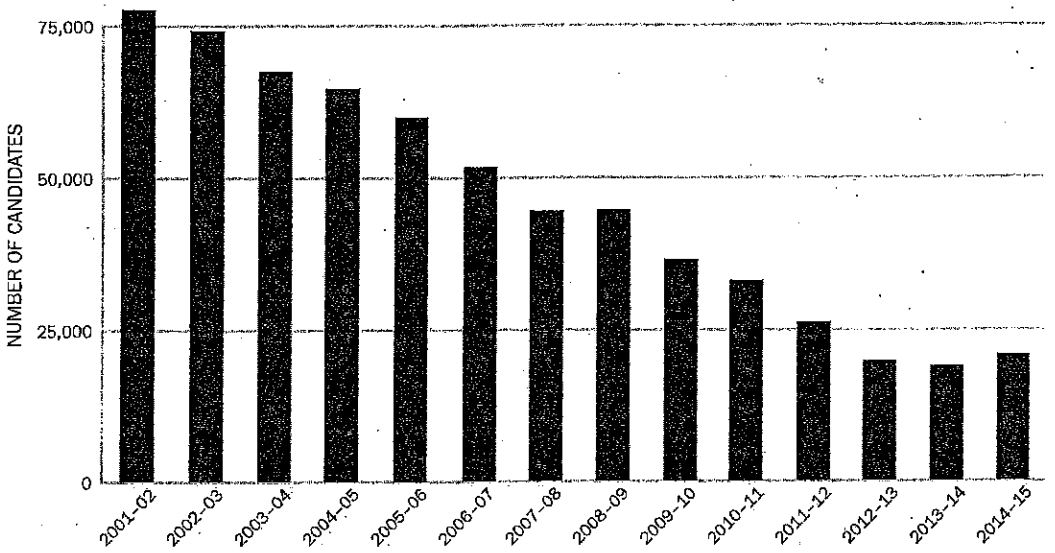
Note: The 2015–16 credential data represent preliminary credentials issued to new California-prepared teachers who have met all initial credential requirements.

Source: Data on estimated teacher hires are from the California Department of Education. Data on new credentials are from the California Commission on Teacher Credentialing.

- **Enrollment in teacher preparation remains near historic lows.** Despite a 10% increase in teacher preparation enrollments between 2013–14 and 2014–15, the number of teaching candidates enrolled in 2014–15 was just one-quarter of the number enrolled in 2001–02 (see Figure 2).
- **There have been significant increases in substandard credentials and permits.** In 2015–16, California issued more than 10,000 intern credentials, permits, and waivers, more than double the number issued in 2012–13 (see Figure 3). These authorizations to teach were granted to those who had not completed—or sometimes not even started—preparation for teaching. The greatest growth has been in emergency-style permits known as Provisional Intern Permits (PIPs) and Short-Term Staff Permits (STSPs).

Figure 2
Enrollment in Teacher Preparation Remains Low

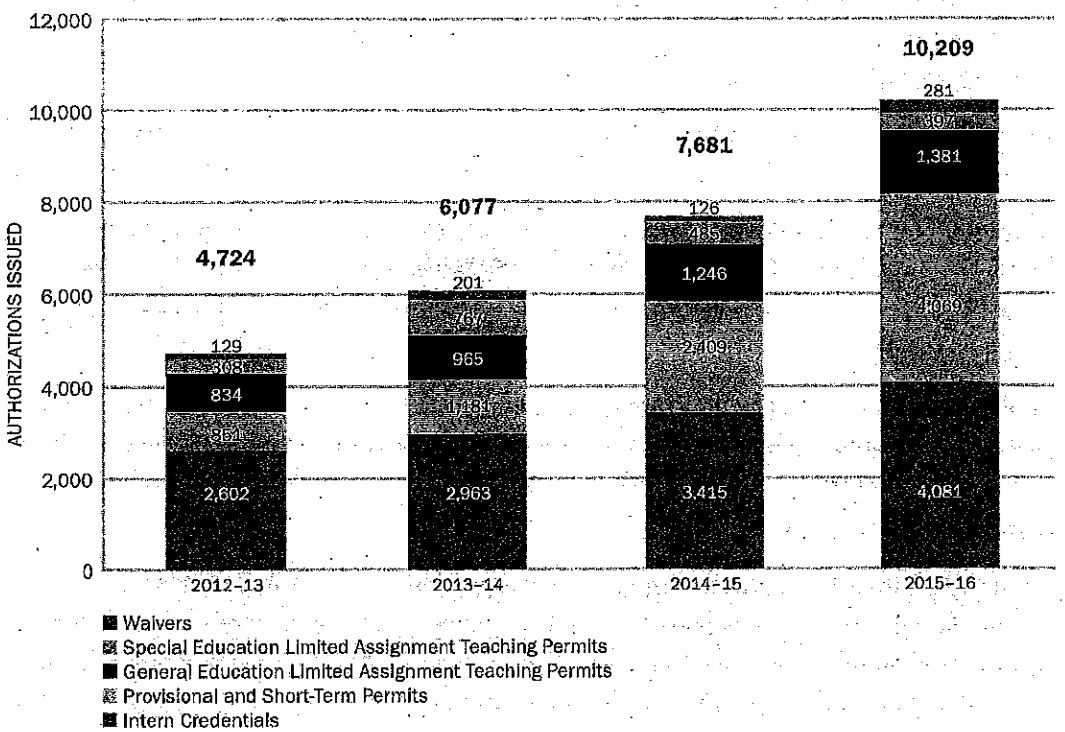
Number of candidates in California enrolled in teacher preparation programs, 2001–02 to 2014–15



Source: California Commission on Teacher Credentialing. Data available at http://www.ctc.ca.gov/reports/data/titleII-prog-info.html.

- **In 2015–16, California had more than 4,000 teachers on PIPs and STSPs, nearly five times as many as in 2012–13.** About 1,700 PIPs and STSPs were issued in special education, and more than 450 in math and science.
- **More special education teachers are entering the classroom on substandard credentials or permits than are entering with full teaching credentials.** Just 36% of new special education teachers in 2015–16 had a preliminary credential. The remaining 64% of new special education teachers—more than 4,000 teachers—entered the field as interns or with permits or waivers. No other major teaching field issues most of its credentials to underprepared candidates.

Figure 3
Substandard Credentials and Permits Doubled Between 2012–13 and 2015–16

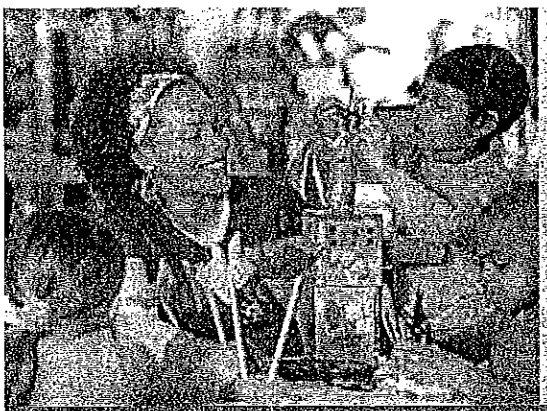


Note: Number of substandard credentials and permits issued between July 1 of each year and June 30 of the following year.

Source: Data provided by the California Commission on Teacher Credentialing by request.

- **The pipeline of prepared math and science teachers continues to shrink.** Between 2012 and 2016, the proportion of math and science teachers entering the field on substandard credentials or permits doubled, going from 20% to nearly 40% of the total, while the number of such teachers entering with full credentials dropped from 3,200 to only 2,200 over that time frame.
- **California may be unprepared to meet the expected increase in demand for bilingual education teachers as schools develop and expand bilingual programs under Proposition 58.** At 700 new bilingual teachers in 2015–16, California authorizes fewer than half the number of new bilingual teachers it did when bilingual education hiring was at its peak in the mid–1990s.
- **Shortages disproportionately impact low-income and minority students.** Teachers hired on emergency-style credentials are twice as likely to teach in high-poverty schools than in low-poverty schools and are three times more likely to teach in high-minority schools than in low-minority schools.

In the past year, California's teacher shortage has worsened as teacher demand grows and teacher supply stagnates. As a result, districts are having to hire a growing number of teachers on substandard permits and credentials, which are increasing more quickly than are preliminary credentials. Fortunately, recent California legislation demonstrates a concern for addressing the worsening teacher shortages through funding recruitment efforts, 4-year integrated bachelor degree and teaching credential programs, and up to 5 years of postsecondary and teacher preparation training for classified staff.[5]



LEARNING POLICY INSTITUTE RESEARCH BRIEF FEB. 2017

California Special Education Teacher Shortages Grow More Severe

Desiree Carver-Thomas and Linda Darling-Hammond

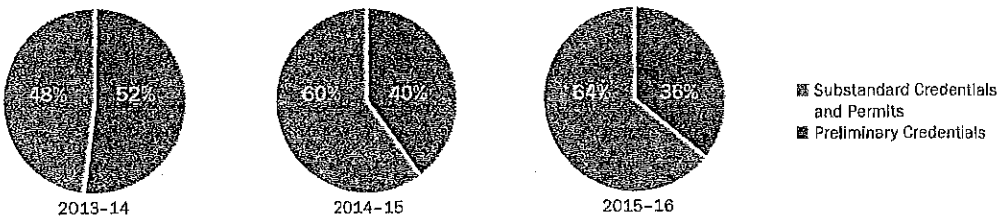
California schools have had persistent difficulties filling special education vacancies, but in the past two years, these shortages have skyrocketed, as evidenced by the growth of substandard special education authorizations. When schools struggle to fill a position with a qualified teacher, they often hire teachers who are still in training or who hold emergency-type permits without training.[1] Research has found that special education training significantly improves teachers' capacity to effectively teach students with special needs.[2] Special education teachers with more extensive pedagogical training and practice teaching are better prepared to handle key teaching duties, such as planning lessons, managing the classroom environment, fulfilling professional duties, and using a variety of instructional methods.[3] Those teachers who are not prepared to meet the needs of their students may contribute to classroom conditions that negatively impact student learning and well-being.[4]

Special Education Teacher Workforce Trends

- **New, underprepared special education teachers outnumber those who are fully prepared 2:1.** No other major teaching field issues most of its new authorizations to underprepared candidates (see Figure 1).

Figure 1: New, Underprepared Special Education Teachers Outnumber Those Who Are Fully Prepared 2:1

Proportion of preliminary and substandard special education authorizations issued, 2013–14 to 2015–16



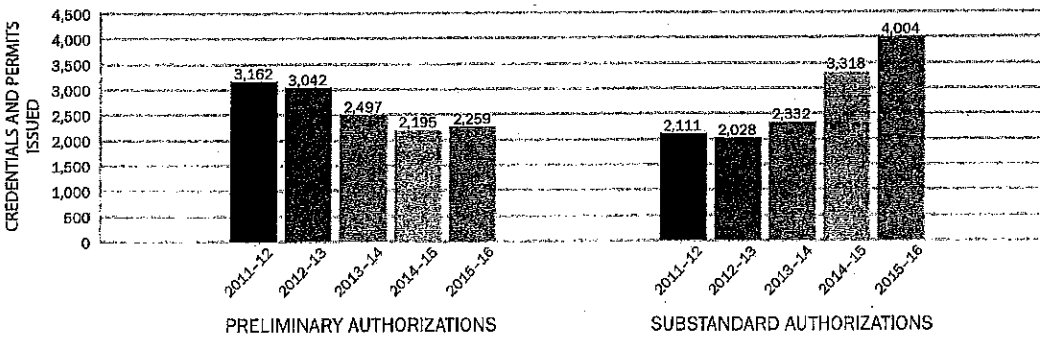
Source: California Commission on Teacher Credentialing.

- **Substandard credentials and permits nearly doubled between 2011–12 and 2015–16, while preliminary credentials to fully prepared teachers dropped 29%.** The annual pool of new special education teachers has increased by nearly 30% over the past two years, but these increases are being driven entirely by teachers on substandard authorizations (see Figure 2).
- **Over 1,700 underprepared special education teachers in 2015–16 were hired on emergency-style permits,**[5] which are issued to teachers with little to no preparation to teach.
- **Substandard credentials and permits are growing in every special education subspecialty, with the greatest increases since 2012 in the areas of moderate/severe disabilities, where they have more than doubled, and mild/moderate disabilities, where they increased by more than 60%.** These types of special education authorizations are needed to teach students with complex learning needs, including students diagnosed with autism, intellectual disabilities, and serious emotional disturbance.[6]
- **Shortages in special education are most likely to disproportionately affect English Learners, who are overrepresented in special education by nearly 30%, and Black students, who are overrepresented in special education by nearly 50%.**[7]

- **Researchers project that over a quarter of California's special education teachers who were teaching in 2014 will retire by 2024, more than in any other subject area.**[8] In addition, in some counties, up to 86.5% may retire. With an aging teacher workforce and fewer qualified new special education teachers, special education shortages may become even worse in future years.

Figure 2: Trends in Special Education Teacher Supply

Preliminary and substandard authorizations issued, 2011–12 to 2015–16



Source: California Commission on Teacher Credentialing.

Teacher shortages across the state significantly impact the already-limited supply of qualified special education teachers. In the past two years, schools have seen a sharp increase in the number of underprepared special education teachers entering the field, which can undermine student achievement and well-being while creating much greater turnover, because such teachers leave at higher rates. Solving the teacher shortage requires more than an influx of new teachers. New teachers must also be well-prepared, well-mentored, and well-supported so that they stay in the profession and contribute to a long-term solution.

As we describe in our report on California teacher shortages,[9] strategies to accomplish this can include service scholarships that support training for those who will teach in high-need fields for several years; one-year residency programs that train teachers in apprenticeships linked to credential coursework and mentoring in urban or rural districts where they pledge to stay and teach; and incentives to keep strong teachers in high-need fields who would otherwise retire.

Endnotes

1. Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2016). *A coming crisis in teaching? Teacher supply, demand, and shortages in the U.S.* Palo Alto, CA: Learning Policy Institute.
2. Feng, L., & Sass, T. R. (2013). What makes special-education teachers special? Teacher training and achievement of students with disabilities. *Economics of Education Review, 36*, 122–134; Nougaret, A.A., Scruggs, T.E., & Mastropieri, M.A. (2005). Does teacher education produce better special education teachers? *Exceptional Children. 71*(3): 217–229; Sindelar, P. T., Daunic, A., & Rennells, M. (2004). Comparisons of traditionally and alternatively trained teachers. *Exceptionality, 12*, 209–223; Boe, E., Shin, S., & Cook, L.H. (2007). Does teacher preparation matter for beginning teachers in either special or general education? *Journal of Special Education, 41*(3): 158–170; Brownell, M.T., Haager, D., Bishop, A.G., Klingner, J.K., Menon, S., Penfield, R., & Dingle, M. (2007, April). *Teacher quality in special education: The role of knowledge, classroom practice, and school environment.* Paper presented at the annual meeting for American Education Research Association, Chicago, IL.
3. Boe, E., Shin, S., & Cook, L.H. (2007). Does teacher preparation matter for beginning teachers in either special or general education? *Journal of Special Education. 41*(3): 158–170. Nougaret, A.A., Scruggs, T.E., & Mastropieri, M.A. (2005). Does teacher education produce better special education teachers? *Exceptional Children. 71*(3): 217–229.
4. Mohr, W.K. & Anderson, J.A. (2001). Faulty assumptions associated with use of restraints with children. *Journal of Child and Adolescent Psychiatric Nursing. 14* (3): 141–151.
5. About 1,700 special education Provisional Intern Permits (PIPs) and Short-Term Staff Permits (STSPs) were issued in 2015–16.
6. Education specialist instruction credential. (2016). Sacramento: Commission on Teacher Credentialing. http://www.ctc.ca.gov/credentials/leaflets/cl808ca.pdf (accessed 12/14/17).
7. In 2015–16, Black students made up approximately 8.7% of students enrolled in special education and 5.8% of total student enrollment (California Department of Education DataQuest, accessed 12/27/16). In 2012–13, English learners made up approximately 27.8% of students enrolled in special education (California Task Force on Special Education 2015 Report) and 21.6% of total student enrollment (California Department of Education DataQuest, accessed 12/27/16).
8. Fong, A.B., Makkonen, R., & Jacquet, K. (2016). *Projections of California teacher retirements: A county and regional perspective.* (REL 2017–181). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory West. http://ies.ed.gov/ncee/edlabs (accessed 12/7/16).
9. Carver-Thomas, D. & Darling-Hammond, L. (2017). *Addressing California's growing teacher shortage: 2017 update.* Palo Alto, CA: Learning Policy Institute.

For the full report, go to learningpolicyinstitute.org/product/ca-teacher-shortage-2017-update.

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Bilingual Teacher Shortages in California: A Problem Likely to Grow

Desiree Carver-Thomas and Linda Darling-Hammond

The passage of Proposition 58 in November 2016 removes restrictions on bilingual education programs for California's English Learner (EL) students, allowing California school districts to more easily create or expand bilingual and immersion programs. Proposition 58 amends and removes key components of Proposition 227 that, when passed in 1998, severely limited the extent to which schools could offer bilingual education. Now, schools and families have greater latitude to seek bilingual education, which will likely lead to increased demand for teachers with bilingual authorizations. Teachers in bilingual programs must be fluent in both English and the second language of instruction, as well as pedagogically skilled to support language acquisition and academic content mastery. Teacher shortages pose a unique challenge in this context. As districts and schools attempt to create or expand bilingual programs, they will have to vie for an already limited supply of fully prepared teachers, in addition to recruiting teachers with bilingual authorizations.

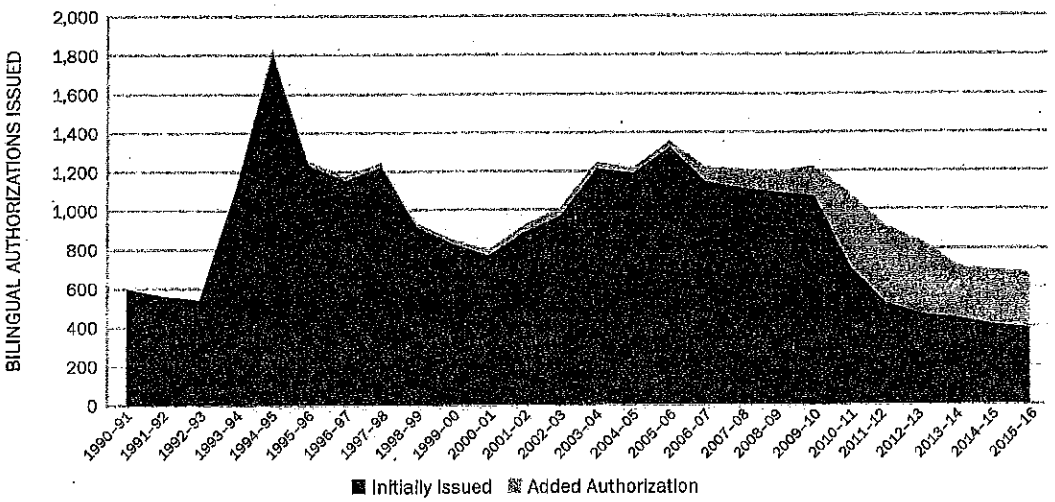
Bilingual Education Trends

- **There are 1.4 million English Learners in California, or about one in five students.**[1] Before the passage of Proposition 227, about 30% of ELs were served by bilingual programs. A decade later, the number of EL students served by bilingual programs decreased to just 5%.[2] English learners are impacted by bilingual teacher shortages as well as shortages in special education, in which they are overrepresented by nearly 30%.[3]
- **Few teacher preparation institutions offer bilingual authorization training programs.** After the passage of Proposition 227, bilingual teacher preparation programs were greatly reduced across the state.[4] In 2009, the Commission on Teacher Credentialing approved a set of standards that would allow teachers to pursue bilingual authorization through multiple routes, with both coursework and examination options,[5] likely contributing to a greater share of bilingual authorizations being issued to existing teaching credentials than to new teaching credentials (see Figure 1). Currently, only 30 teacher preparation institutions offer bilingual authorization training programs, compared with over 80 that grant secondary and elementary teaching certifications (see Figure 2).[6]
- **California authorizes fewer than half the number of new bilingual teachers than it did when bilingual education was at its peak in the mid-1990s.** At its peak, California granted over 1,800 bilingual authorizations in 1994–95. Even after the passage of Proposition 227, California issued over 1,200 bilingual authorizations a year between 2003–04 and 2009–10. Since then, there has been a steady decline in new bilingual authorizations, with fewer than 700 teachers authorized in 2015–16.

Despite the fact that bilingual education was seriously hampered in California for nearly two decades, districts already report shortages of bilingual education teachers. In a fall 2016 survey of more than 200 California school districts, 14% reported shortages of bilingual teachers.[7] Now that Proposition 58 allows for the expansion of bilingual programs, these shortages are likely to grow. In other high-demand fields like math, science, and especially special education, schools are filling vacancies with underprepared teachers at an alarming rate.[8] The same should not be so for bilingual education. Research shows that English Learners in well-implemented bilingual programs outperform ELs in English immersion programs in every subject by middle or high school and are more likely to achieve at or above grade level.[9] A review of the research on bilingual education shows that bilingual students also experience cognitive, social, and economic advantages.[10] They have better focus, memory, and problem-solving skills; a better sense of self; better relationships with their parents; and are more likely to graduate high school and go to college than their monolingual peers. However, successful program models require well-prepared teachers, and teacher shortages can undermine the programs' effectiveness. In anticipation of a growing need for qualified bilingual education teachers, state policymakers should consider strategies for increasing the supply of these teachers in the near and long term.

These can include service scholarships that support training for those who will teach in high-need fields for several years; one-year residency programs that train teachers in apprenticeships linked to credential coursework in urban or rural districts where they pledge to stay and teach; and incentives to keep strong teachers in high-need fields who would otherwise retire.

Figure 1
Bilingual Authorizations Issued 1990–91 to 2015–16

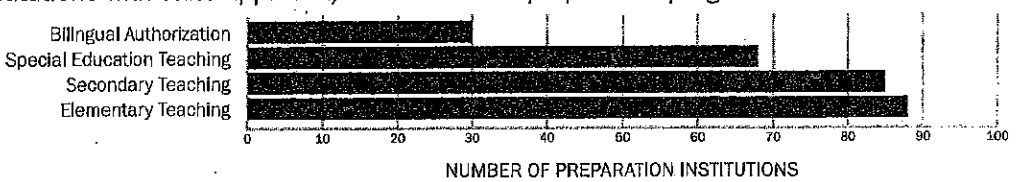


Note: Initially issued bilingual authorizations are those issued on a new teaching credential. Added authorizations are those that have been issued on an existing credential.

Source: Data provided by the California Commission on Teacher Credentialing by request.

Figure 2
Few California Institutions Offer Bilingual Teacher Training

Institutions with state-approved, active educator preparation programs



Source: California Commission on Teacher Credentialing. Data available at http://www.ctc.ca.gov/reports/data/app-edu-prep-prog.html.

Endnotes

1. California Department of Education DataQuest, http://data1.cde.ca.gov/dataquest/, (accessed 12/20/16).
2. Legislative Analyst's Office. Proposition 58. http://www.lao.ca.gov/ballot/2016/Prop58-110816.pdf (accessed 12/13/2016).
3. In 2012–13, English Learners made up approximately 27.8% of students enrolled in special education (California Task Force on Special Education 2015 Report) and 21.6% of total student enrollment (California Department of Education DataQuest, http://data1.cde.ca.gov/dataquest/, accessed 12/27/16).
4. *Bilingual authorization program standards.* (2015). Sacramento: Commission on Teacher Credentialing, http://www.ctc.ca.gov/educator-prep/standards/bilingual-authorization-handbook.pdf (accessed 11/21/16).
5. *Bilingual authorization program standards.* (2015). Sacramento: Commission on Teacher Credentialing, http://www.ctc.ca.gov/educator-prep/standards/bilingual-authorization-handbook.pdf (accessed 11/21/16).
6. *Commission-approved educator preparation programs.* Sacramento: Commission on Teacher Credentialing. http://www.ctc.ca.gov/reports/data/app-edu-prep-prog.html (accessed 12/20/16).
7. Podolsky, A. & Sutcher, L. (2016). *California teacher shortages: A persistent problem (brief).* Palo Alto, CA: Learning Policy Institute and California School Boards Association. The demographics of this sample are generally representative of the average district demographics in the state.
8. Carver-Thomas, D. & Darling-Hammond, L. (2017). *Addressing California's growing teacher shortage: 2017 update.* Palo Alto, CA: Learning Policy Institute.
9. Valentino, R.A. & Reardon, S.F. (2015). Effectiveness of four instructional programs designed to serve English Learners: Variation by ethnicity and initial English proficiency. *Educational Evaluation and Policy Analysis,* 37(4), 612–637; Umansky, I. & Reardon, S.F. (2014). Reclassification patterns among Latino English Learner students in bilingual, dual immersion, and English immersion classrooms. *American Educational Research Journal, 51,* 879–912; Thomas, W.P. & Collier, V.P. (2002). *A national study of school effectiveness for language minority students' long-term academic achievement.* Santa Cruz, CA: Center for Research on Education, Diversity, and Excellence.
10. Gandara, P. (2015). Rethinking bilingual instruction. *Educational Leadership,* 60–64.

For the full report, go to learningpolicyinstitute.org/product/ca-teacher-shortage-2017-update.

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California Teacher Shortages: A Persistent Problem

JANUARY 2017

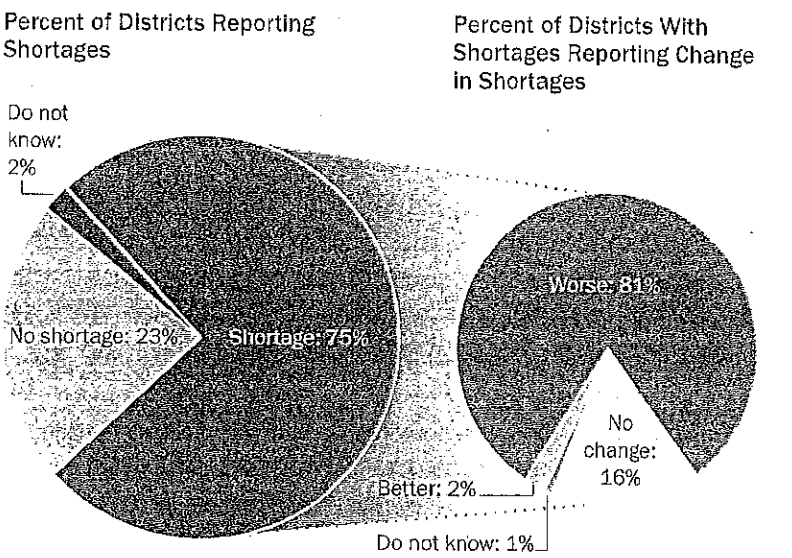
In the fall of 2016, a survey[1] of 211 school districts in the California School Boards Association's Delegate Assembly revealed that they are experiencing alarming rates of teacher shortages. Approximately 75% of surveyed districts report having a shortage of qualified teachers for the 2016–17 school year. Over 80% of these districts say that shortages have worsened since the 2013–14 school year (see Figure 1). As one district administrator noted, "I believe the worst is still to come. ... [i]n the end, the students lose."

While teacher shortages are concentrated in districts serving high-need students, large majorities of all kinds of districts are experiencing shortages.

- 83% of districts serving the largest concentrations of low-income students report having shortages, compared to 55% of districts with the fewest.
- 83% of districts with the largest concentrations of English learners report having shortages, compared to 64% of districts with the fewest.

Figure 1

Teacher Shortages Are Getting Worse



Shortages are greatest in the areas of special education, math, and science. Of the districts reporting shortages:

- Nearly nine in 10 districts report shortages of special education teachers.
- A majority of districts report shortages of math (58%) and science (57%) teachers.
- More than one-third of districts report shortages of elementary teachers.
- 14% of districts report shortages of bilingual teachers, a number likely to increase because of the passage of Proposition 58.

Districts are experiencing shortages for a variety of reasons, with the most commonly reported cause being a shrinking supply of newly credentialed teachers.

- 79% of the districts that reported shortages say that they are experiencing shortages because of the shrinking supply of newly credentialed teachers.
- Other frequently cited explanations for shortages include teachers retiring (54%), teachers leaving the district (34%), reductions in class size (32%), and a high cost of living (29%).

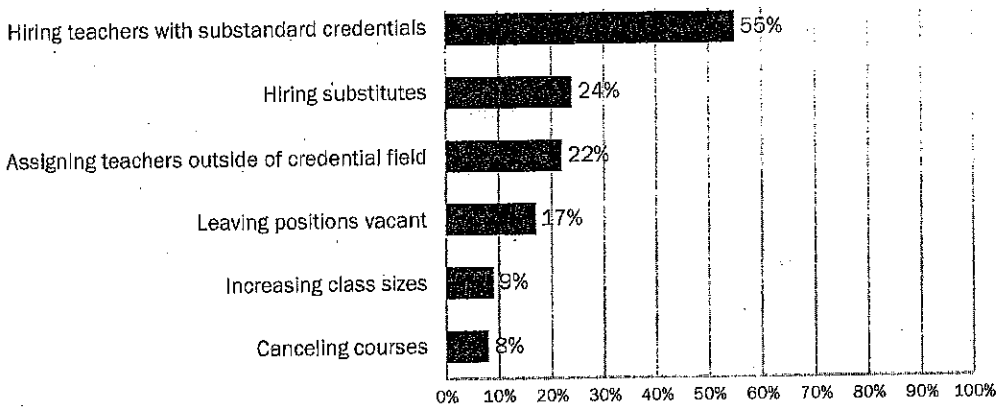
Of districts that report having trouble filling their vacancies, nearly two-thirds are unable to staff all positions with teachers who have full credentials in the appropriate subject area or grade level.

- 55% of districts with shortages report that they are hiring teachers with substandard credentials.
- Districts are also hiring substitutes at high rates (24%), assigning teachers to positions outside of their credential field (22%), leaving positions vacant (17%), increasing class sizes (9%), and canceling courses (8%) (see Figure 2).

Figure 2

How Are Districts Filling Vacant Teaching Positions?

Percent of districts with shortages that used the staffing solution to fill vacant positions



Districts report adopting a variety of strategies to recruit and/or retain qualified teachers. These strategies include policies and practices that affect teachers' preparation and pathway into the profession, compensation, hiring and management, and working conditions. Districts most frequently cite the following policies:

- 72% of districts are working with teacher preparation programs to coordinate student teaching placements, and 62% of districts are working with teacher preparation programs to communicate hiring needs.
- 56% of districts are developing differentiated roles for teacher leadership opportunities, and 53% of districts offer additional compensation for this increased responsibility.

Districts alone cannot solve teacher shortages—there are just not enough qualified teachers to go around. With an inadequate statewide supply of teachers, districts must compete with each other to staff their classrooms. Even when districts are successful in recruiting teachers, they often cannot hold on to them. High-poverty districts report teacher turnover as a reason their districts are facing shortages twice as often as low-poverty districts. The state needs to consider investments in evidence-based teacher recruitment and retention strategies to increase the overall supply of qualified teachers in California, particularly in subjects and schools with persistent shortages. At the same time, districts need to evaluate their local contexts to determine what local policies will be most effective to recruit and retain competent, committed teachers.

Endnote

1. The California School Boards Association (CSBA) and the Learning Policy Institute partnered in 2016 to create and administer a survey of district-level leaders. The CSBA's Delegate Assembly represents 244 of California's 1,025 school districts. Our sample includes 211 unique districts that fully completed the survey—representing a response rate higher than 84%. The sample generally reflects the demographics of California's districts. For a more comprehensive description of the survey and the findings, please see the full brief: Podolsky, A. and Sutcher, L. (2016). California Teacher Shortages: A Persistent Problem (brief). Palo Alto, CA: Learning Policy Institute, https://learningpolicyinstitute.org/sites/default/files/product-files/California_Teacher_Shortages_Persistent_Problem_BRIEF.pdf.

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Teacher Residencies in California

As teacher shortages are once again becoming widespread in California and across the nation, discussions of how to recruit and retain high-quality teachers are again beginning to take center stage in policy circles. Newly emerging residency programs offer an innovative approach to recruiting and retaining high-quality teachers. These programs:

- Create a vehicle to recruit teachers for high-needs fields and locations,
- Offer recruits strong clinical preparation specifically for the kinds of schools in which they will teach,
- Connect new teachers to early career mentoring that will keep them in the profession, and
- Provide financial incentives that will keep teachers in the districts that have invested in them.

Case Study: A Residency at Work

In 2010, the San Francisco Unified School District (SFUSD) partnered with the University of San Francisco (USF), Stanford University, and United Educators of San Francisco to create the San Francisco Teacher Residency (SFTR). Residents complete a year-long apprenticeship teaching alongside an expert teacher in a high-needs school, while taking courses at night that are tightly integrated with their clinical placement. The 32 residents come together once a week for additional coursework taught by SFTR and SFUSD leaders on topics particularly relevant to district teachers, including implementing restorative justice practices, developing trauma-informed classrooms, and understanding the SFUSD common core curriculum.

As part of the SFTR program, residents also participate in "clinical instructional rounds," modeled on medical "rounds," in which they visit classrooms in other schools to observe expert instructional practices, and then debrief with their supervisors. Upon successful completion of the program, residents are guaranteed a job teaching

There are at least 10 teacher residency programs in California currently meeting critical hiring needs for a number of districts and charter schools in urban and rural areas across the state. These include:

1. Alliance Teacher Residency Program (Los Angeles)
2. Aspire Teacher Residency (statewide)
3. Central Coast Partnership for Teaching Excellence at California State University Monterey Bay and Cal Poly San Luis Obispo
4. Kern Rural Teacher Residency at California State University Bakersfield
5. Fresno Teacher Residency
6. Los Angeles Urban Teacher Residency
7. Residency in Secondary Education (RiSE) at California State University Chico
8. San Francisco Teacher Residency
9. STEM Teachers in Advanced Residency at California State University Dominguez Hills
10. UCLA IMPACT Urban Teacher Residency

in SFUSD and receive two years of additional intensive coaching and mentoring support—known as Induction—from SFTR. As one SFTR graduate observed:

> *"I set up the classroom with my cooperating teacher the week before the first day of school... and I started from the very, very first day of school. I got to see an entire year, five days a week. Just seeing the full year, I knew what to expect, and I felt like I had so much more experience."*

The San Francisco Teacher Residency offers a more affordable pathway into teaching for many prospective teachers while providing intensive preparation for the challenges of teaching in a high-needs school. In exchange for a commitment to teach for at least three years in SFUSD, residents receive a 50 percent tuition remission at USF and significant scholarship support and loan forgiveness at Stanford. Residents also receive more than $17,000 in stipends (in part from AmeriCorps), $15,000 in housing grants, and free health care benefits. Many residents identify this strong financial support as a key reason why they chose SFTR over other pathways into teaching.

Mentor teachers are carefully chosen based on a demonstrated track record of successful teaching as well as their interest in mentoring the next generation of teachers. They are provided significant professional learning opportunities through SFTR (with paid substitutes) and a $2,500 stipend. As one SFTR mentor teacher stated:

> *"What I really enjoy about being a mentor teacher is the fact that it doesn't keep me stale in my teaching. It really keeps me young. It keeps me engaged."*

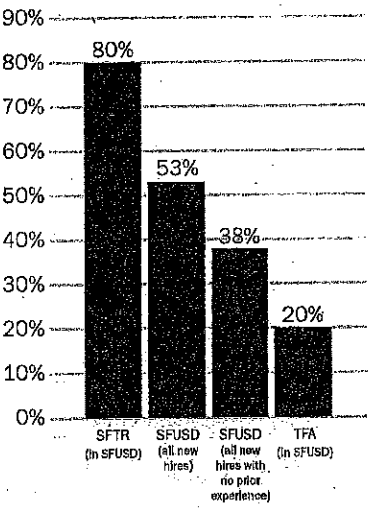
Additionally, building on the professional development school model, SFTR places residents in a small number of "teaching academies." These schools, which serve primarily low-income students of color, have been identified as "hard to staff" by the district while at the same time having strong leadership and teaching practices. As one principal who has hired multiple SFTR graduates observed:

> *"The residents who are now teaching here definitely have a leg up. They understand the students and the micro-systems we have created to accomplish specific tasks ... They know the curriculum, and they usually know the parents ... The kids already know their faces! It would be great if all new teachers could come in with that sort of knowledge, able to start off without being overwhelmed by everything and anything."*

Since 2010, SFTR has prepared nearly 150 aspiring teachers to work in high-needs schools within the San Francisco Unified School District. Now in its sixth year, the district's investment appears to be paying off.[1]

- **SFTR graduates show remarkably high retention rates.** After five years, 80 percent of SFTR graduates are still teaching in SFUSD, compared with 38 percent of other beginning teachers hired by SFUSD and 20 percent of Teach for America corps members placed in SFUSD. Of all SFTR graduates over the past five years (including first-, second-, third-, and fourth-year teachers), 97 percent are still teaching, with 89 percent still teaching in SFUSD.
- **SFTR grads are helping to diversify the SFUSD teacher workforce.** 66 percent of SFTR grads are teachers of color, compared with 49 percent of SFUSD teachers as a whole.
- **SFUSD principals say SFTR graduates are more effective than other new teachers.** One hundred percent of principals agree that SFTR graduates are more effective than other new teachers from both university-based and alternative route programs.
- **Students taught by SFTR graduates have high levels of confidence in their teachers' competence.** On the YouthTruth Student Survey administered to more than 1,700 middle and high school students taught by SFTR graduates, students were especially confident in their teachers' ability to engage, develop personal relationships, and employ academic rigor, high expectations, and strong instructional methods with them. High school students also rated their teachers as having strong expertise in creating a positive classroom culture.

Comparison of Five-Year Teacher Retention Rates: SFUSD



Source: SFUSD Human Resources Department; San Francisco Teacher Residency

Endnotes

1. Retention data are drawn from materials prepared by the SFUSD Human Resources Department as well as SFTR. Additional data on SFTR's impact are drawn from http://www.sfteacherresidency.org/impact/, last visited on 1/2/16, including Urban Teacher Residency United, Measuring UTRU Network Program Impact, August 2015.

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How Effective Are Loan Forgiveness and Service Scholarships for Recruiting Teachers?

By Anne Podolsky and Tara Kini

Abstract

Recruiting and retaining talented individuals into the teaching workforce, especially in schools in underserved urban and rural communities, is challenging when college graduates face more lucrative professional alternatives and often carry significant student debt. Two promising approaches to attracting and keeping teachers in the profession are to offer loan forgiveness or service scholarships to prospective teachers—similar to what the medical profession has used to attract practitioners into underserved communities. Existing research on teacher and physician loan forgiveness and service scholarship programs suggests that, when the financial benefit meaningfully offsets the cost of professional preparation, these programs can successfully recruit and retain high-quality professionals into fields and communities where they are most needed.

External Reviewers

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Introduction

Teacher shortages pose a recurring problem in American education. Teacher salaries lag behind those of other occupations that require a college degree, and young people often accrue significant debt to prepare for the profession. Recruitment and retention challenges are typically greatest in underserved urban and rural communities, as well as in subjects like math, science, and special education in which people can earn significantly higher starting salaries in private sector jobs. Even after adjusting for the shorter work year, beginning teachers nationally earn about 20% less than individuals with college degrees who enter other fields, a gap that widens to 30% by mid-career.[1] Compounding this challenge, more than two-thirds of those entering the education field borrow money to pay for their higher education, resulting in an average debt of $20,000 for those with a bachelor's degree and $50,000 for those with a master's degree.[2] College loans represent a significant debt burden for many prospective teachers and a potential disincentive to enter the profession.[3]

As in other professions, such as medicine, a promising approach to attracting and keeping teachers in the profession involves offering subsidies for preparation—loan forgiveness or service scholarships—tied to requirements for service in high-need fields or locations. If recipients do not complete their service commitment, they must repay a portion of the scholarship or loan, sometimes with interest and penalties.

The federal government and the states have long offered such incentives to medical professionals to fill needed positions and have periodically done so for teachers as well.[4] In both medicine and teaching, research suggests that these programs have been successful when the subsidies are large enough to substantially offset training costs. More affordable than across-the-board salary increases, loan forgiveness and scholarship programs offer a targeted, short-term approach to increasing teachers' overall compensation package at the time that it matters most to individuals' career decisions.[5]

Loan Forgiveness & Service Scholarship Programs in Medicine

Multiple studies have found that loan forgiveness and service scholarship programs are effective at recruiting and retaining healthcare professionals into geographic and practice areas with shortages. An analysis of 43 studies exploring the effectiveness of financial incentive programs in recruiting and retaining healthcare workers in underserved areas found that financial incentives (including service scholarships, loan forgiveness, and loan repayment programs) contributed to large numbers of healthcare workers working in underserved areas.[6] In addition, participants in these programs were more likely than non-participants to work in underserved areas in the long run.[7] One study of state loan repayment programs and service scholarships for physicians who committed to work in underserved communities for a designated period of time found that 93% of participants completed their commitment, and approximately two-thirds remained in these communities for more than eight years.[8] Another study of 229 medical students found that students who were more competitive at the time of their admission to medical school were more likely to say that they would be less likely to accept a service scholarship if it contained a penalty provision.[9] In addition, 48% said they would be more likely to return to an underserved community in their home state if they received loan forgiveness to do so.[10]

Loan Forgiveness & Service Scholarship Programs for Teachers

The federal government and more than 40 states offer loan forgiveness and/or service scholarship programs to individuals interested in teaching.[11] These programs are typically smaller and less consistently available than those for the medical profession. Nonetheless, the research that exists indicates that well-designed programs can influence the recruitment and retention of talented teachers in high-need areas and locations.

The more debt college students incur, the less likely they are to choose to work in a lower-wage profession. A recent study of students at a highly selective undergraduate institution found that incurring debt increased the odds that students chose "substantially higher-salary jobs" and "reduce[d] the probability that students [chose] low-paid 'public interest' jobs." The influence of debt on job choice was "most notable on the propensity to work in the education industry."[12] In other words, the top-performing students were more likely to pursue a career in education when they did not have a large debt. Other research has found that minority students and students from low-income households perceive student loans as a greater burden than other students with similar student debt earning similar salaries.[13] This research suggests that loan forgiveness and service scholarships may be especially effective for recruiting teacher candidates from low-income and minority backgrounds.

Research on loan forgiveness and service scholarship programs for teachers has found these programs are effective at attracting individuals into the teaching profession and particularly into high-need schools. For example, the **National Science Foundation Robert Noyce Teacher Scholarship** provides scholarships for prospective teachers in science, technology, engineering, and mathematics who commit to teach in high-need schools for at least two years per each year of funding. A 2007 survey of 555 recipients found that 56% of recipients identified the scholarship as influential in their decision to complete a teacher certification program. Approximately 70% of recipients noted that the scholarship influenced their commitment to teach in a high-need school and remain in such a school for the full term of their commitment.[14] The higher the percentage of tuition covered by the scholarship, the greater the influence the funding had on the recipients' decisions to become teachers and to teach in high-need schools.[15]

A study of the **Woodrow Wilson Fellowship** program found that its recipients were more likely to teach students in high-need schools and more effective teachers. The program provides a one-year $30,000 service scholarship to high-achieving candidates who complete a master's degree program in a STEM-focused teacher preparation program and commit to teach in a high-need school for three years. Based on data from the first year of the program in Michigan, the study found that recipients were two times more likely to teach low-income students and three times more likely to teach English language learners, as compared to non-fellows. The study also found that in Indiana, which had multiple years of data, recipients were more effective than both experienced and inexperienced non-recipients at raising minority students' test scores in middle-school math, middle-school science, and algebra. Recipients were also almost twice as likely to persist in Indiana's public high-needs schools as compared to non-recipients.[16]

A study of **California's Governor's Teaching Fellowship** (GTF) program, which also looked at participants in **California's Assumption Program of Loans for Education** (APLE) loan forgiveness program, found that both programs had attracted teachers to low-performing schools and kept them in these schools at rates higher than the state average retention rate, despite such schools usually having much higher attrition.[17] In exchange for teaching at least four years in a low-performing school, APLE provided loan forgiveness of $11,000 to $19,000, while the GTF provided $20,000 scholarships to a more selective group of prospective teachers.[18] The authors of the study suggest that the GTF recipients "had weaker predispositions" to teach in low-performing schools than the non-recipients in their study (i.e., individuals who only received APLE loan forgiveness), and that about two of every seven fellowship recipients would not have taught in such schools in the absence of the incentive.[19]

In 2003, the **Illinois Student Assistance Commission** conducted a study of the state's two loan forgiveness programs that provided $5,000 for each year of postsecondary schooling in exchange for a one-year teaching commitment per each year of subsidy. It found that, of the 1,167 recipients who had passed the grace period of loan deferment, 86% were repaying or had repaid their loans through teaching and 14% were pursuing other careers. Of those who received and accepted teaching positions after graduation, 43% indicated the program was very influential in their decision to become a teacher.[20]

Additional research suggests that loan forgiveness and scholarship programs also attract high-quality individuals to the teaching profession. A survey of 400 National and State Teachers of the Year found that 75% and 64% of the teachers said that "scholarship programs for education students" and "student loan forgiveness programs" were the most effective recruitment strategies for new teachers, respectively.[21]

A longitudinal study of the **North Carolina Teaching Fellows Program** (see next page)—a long-standing scholarship program that recruited high-ability high school graduates and provided them an enhanced teacher preparation program in exchange for a commitment to teach for at least four years in the state—found that these fellows not only had higher rates of retention, but they were also generally more effective educators than their peer teachers as measured by test score gains of their students.[22] As shown in Figure 1, more than 90% of Teaching Fellows returned for a third year, and 75% returned for a fifth year, as compared to other in-state prepared teachers (80% and 68% respectively).[23]

A recent study of the **Florida Critical Teacher Shortage Program** (FCTSP) suggests that loan forgiveness payments to teachers in hard-to-staff subject areas contribute to their decisions to stay in the profession, as long as they are receiving the financial stipend.[24] The FCTSP provided loan forgiveness of $2,500 per year to undergraduates and $5,000 per year to graduates, up to $10,000. The study found that loan forgiveness "significantly reduces the probability of exit" for teachers of middle- and high-school math and science, foreign language, and English as a Second Language.[25]

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The North Carolina Teaching Fellows Program

The North Carolina Teaching Fellows Program "aimed to create a pipeline of exceptional teacher-leaders for public schools throughout the state."[1] To do this, the program provided scholarships of $6,500 annually for four years to high-ability high school students to attend one of 12 public and five private in-state universities to participate in an enhanced teacher preparation program.[2] From 1986 to 2015, the program recruited nearly 11,000 candidates into teaching, representing approximately 10% of all North Carolina teachers credentialed each year.[3] In return, fellows committed to teaching in North Carolina public schools for four years. If fellows did not complete their commitment, their scholarship converted to a loan with 10% interest.[4]

Fellows applied as high school seniors through a highly selective process that included a review of grades and test scores, a detailed application, essays, nominations from their guidance counselors, and multiple interviews. Only one in five were selected. A disproportionate number were men and teachers of color, both typically underrepresented in the teaching force.[5] Once admitted, fellows ranked their desired North Carolina university and were awarded a scholarship depending on acceptance from the university.

As undergraduate students, fellows' identities as teachers were cultivated early on. In addition to receiving the same teacher preparation coursework and clinical training as other teacher preparation candidates, beginning freshman year fellows participated in such enrichment activities as tutoring and field experiences in public schools, summer retreats, and seminars on pedagogy and professional development.

In the 2013–14 school year, more than 4,600 fellows were teaching in public schools in all 100 counties in North Carolina. Many fellows have gone on to become principals and superintendents in the state.[6] Mount Airy City Schools Superintendent Greg Little says the scholarship "allowed me to go to college and not have crippling student loans. I became a superintendent in large part because I did not have crippling school loans that precluded me from pursuing my master's degree and doctorate."[7]

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1. Todd Cohen, "A Legacy of Inspired Educators" (North Carolina Teaching Fellows Program, 2015), http://www.ncforum.org/wp-content/uploads/2013/05/PSP_TeachingFellowsReport_WEB.pdf.
2. *See* Cohen, "A Legacy of Inspired Educators." *See also* Barnett Berry, *Keeping Talented Teachers: Lessons learned from the North Carolina teaching fellows*, North Carolina Teaching Fellows Commission (1995).
3. U.S. Department of Education, "North Carolina, Section I.g Teachers Credentialed," *Title II Higher Education Act*, accessed October 29, 2015, https://title2.ed.gov/Public/Home.aspx.
4. Henry, Bastian, and Smith, "Scholarships to Recruit the 'Best and Brightest' Into Teaching: Who Is Recruited, Where Do They Teach, How Effective Are They, and How Long Do They Stay?"
5. Cohen, "A Legacy of Inspired Educators."
6. Cohen, "A Legacy of Inspired Educators."

Loan Forgiveness: One Teacher's Story

Castillon (right) with a former student at Brown University.

After spending a summer in college teaching low-income students in San Jose, CA, Irene Castillon knew she wanted to work to improve educational opportunities in under-resourced communities. As the first in her family to graduate high school, Castillon understood from personal experience the role education plays in creating pathways to opportunity. Without a service scholarship and a forgivable loan, the cost of a teacher preparation program would have been prohibitive, and Castillon—now a sixth-year teacher—might have instead chosen another role in the education ecosystem.

"Teachers lead by example, and we need more passionate teachers that want to enter the profession to set this example for future generations," says Castillon, who teaches history at Luis Valdez Leadership Academy. Her passion and accomplishments have inspired countless students who identify with her life experiences. The daughter of immigrant parents from Mexico, Castillon grew up in a low-income community outside of Los Angeles and received Perkins and Stafford federal loans to finance her undergraduate studies at Brown University.

As college graduation approached, Castillon knew she wanted to be involved in education, but she was unsure the path to become a teacher was the right one for her. Her parents were struggling financially, and, like many young people, Castillon felt competing tugs—to continue her education at the graduate level or to enter the workforce so she could help to support her family.

Fortunately, Castillon learned about multiple funding sources for her graduate teacher preparation studies. She received loans and service scholarships that covered 100 percent of her graduate studies and helped "fight against her urge" to return home after graduating from Brown, including the Assumption Program of Loans for Education forgivable loan, the Woodrow Wilson-Rockefeller Brothers Fund Fellowship for Aspiring Teachers of Color, and an Avery Forgivable Loan for Stanford students.

"Without the financial assistance, I don't think that I would have enrolled in a teacher preparation program and pursued a Master's degree," says Castillon.

After graduating from Stanford's teacher preparation program six years ago, Castillon taught history and government at Downtown College Prep in San Jose. In 2014 she moved to the Luis Valdez Leadership Academy in East San Jose, where she is the Founding Academic Dean and Mexican-American history teacher. Both schools serve a student population that is more than 90% low-income and Latino—students that the loan forgiveness programs incentivized Irene to teach. Castillon is also pursuing an administrative credential at San Jose State University.

Castillon's passion for teaching has encouraged her first-generation students to believe that higher education, even teaching in their own community one day, is within their reach. One of her students—a DREAMer on a full-ride scholarship at Loyola Marymount University—wrote her this note: "I thank you for ... believing in me when I didn't believe in myself and making me fall in love with history and teaching. Can I be like you when I grow up? I want to be someone's Ms. Castillon one day!"

Conclusion

Existing research on teacher loan forgiveness and service scholarship programs suggests that, when the financial benefit meaningfully offsets the cost of a teacher's professional preparation, these programs can be successful in both recruiting and retaining teachers. Research suggests that the following five design principles could guide the development of loan forgiveness and service scholarship programs:

1. Covers all or a large percentage of tuition.
2. Targets high-need fields and/or schools.
3. Recruits and selects candidates who are academically strong, committed to teaching, and well-prepared.[29]
4. Commits recipients to teach with reasonable financial consequences if recipients do not fulfill the commitment (but not so punitive that they avoid the scholarship entirely).[30]
5. Bureaucratically manageable for participating teachers, districts, and higher education institutions.

Importantly, research finds that these programs are effective at attracting strong teachers into the profession generally and into high-need schools and fields in particular. Research also finds that these programs are successful in promoting teacher retention. Teacher loan forgiveness and service scholarship programs provide states and districts with options for addressing the high rate of attrition at disadvantaged schools that occurs when schools must recruit candidates without the preparation or incentives that would strengthen their commitment.[31]

Endnotes

1. Bruce D. Baker, David G. Sciarra, and Danielle Farrie, "Is School Funding Fair? A National Report Card," (2015): 28, http://www.edlawcenter.org/assets/files/pdfs/publications/National_Report_Card_2015.pdf.
2. Sandra Staklis and Robin Henke, "Who Considers Teaching and Who Teaches?," U.S. Department of Education, National Center for Education Statistics (November 2013): 13, http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014002; U.S. Department of Education, "Web Tables: Trends in Graduate Student Financing: Selected Years, 1995–96 to 2011–12," (2015), http://nces.ed.gov/pubs2015/2015026.pdf.
3. Baker, Sciarra, and Farrie, "Is School Funding Fair? A National Report Card."
4. Such incentives have also been available to public interest lawyers, often provided by law schools. NYU Law School's *Innovative Financial Aid Study*, which randomly assigned applicants to various financial aid packages and debt structures with equivalent net values, found that law students who received scholarships (as opposed to loan forgiveness) had a 37% higher likelihood of their first job being in public interest law, and also appeared to be of a higher quality. See Erica Field, "Educational Debt Burden and Career Choice: Evidence from a Financial Aid Experiment at NYU Law School," *American Economic Journal: Applied Economics* 1, no. 1 (2009): 1.
5. See, e.g., Frank Adamson and Linda Darling-Hammond, "Speaking of Salaries: What It Will Take to Get Qualified, Effective Teachers in All Communities," *Center for American Progress*, (2011): 7, https://edpolicy.stanford.edu/sites/default/files/publications/speaking-salaries-what-it-will-take-get-qualified-effective-teachers-all-communities.pdf.
6. Till Bärnighausen and David E. Bloom, "Financial Incentives for Return of Service in Underserved Areas: A Systematic Review," *BMC Health Services Research* 9 (2009).
7. Ibid.
8. Donald E. Pathman et al., "Outcomes of States' Scholarship, Loan Repayment, and Related Programs for Physicians," *Medical Care* 42, no. 6 (2004): 560–68.
9. John Bernard Miller and Robert A. Crittenden, "The Effects of Payback and Loan Repayment Programs on Medical Student Career Plans," *Journal of Rural Health* 17, no. 3 (2001): 160–64.
10. Ibid.
11. Li Feng and Tim R. Sass, "The Impact of Incentives to Recruit and Retain Teachers in 'Hard-to-Staff' Subjects," Working Paper 141, National Center for Analysis of Longitudinal Data in Education Research (2015), http://www.caldercenter.org/sites/default/files/WP%20141.pdf.
12. Jesse Rothstein and Cecilia Elena Rouse, "Constrained after College: Student Loans and Early-Career Occupational Choices," *Journal of Public Economics* 95, no. 1–2 (2011): 149–63.
13. Sandy Baum and Marie O'Malley, "College on Credit: How Borrowers Perceive Their Education Debt," *Journal of Student Financial Aid* 33, no. 3 (2003): 7–19, http://publications.nasfaa.org/cgi/viewcontent.cgi?article=1068&context=jsfa.
14. Pey Yan Liou, Allison Kirchhoff, and Frances Lawrenz, "Perceived Effects of Scholarships on STEM Majors' Commitment to Teaching in High Need Schools," *Journal of Science Teacher Education* 21, no. 4 (2010): 451–70.

15. Pey-Yan Liou and Frances Lawrenz, "Optimizing Teacher Preparation Loan Forgiveness Programs: Variables Related to Perceived Influence," *Science Education Policy* 95, no. 1 (2011): 139.
16. The study's findings are from an independent external assessment performed by the Center for the Analysis of Longitudinal Data in Education Research at the American Institute of Research, as reported in Woodrow Wilson Foundation, "Answering the Call for Equitable Access to Effective Teachers: Lessons Learned From State-Based Teacher Preparation Efforts in Georgia, Indiana, Michigan, New Jersey, and Ohio," The Woodrow Wilson National Fellowship Foundation (Princeton, NJ: 2015), http://woodrow.org/wp/wp-content/uploads/2015/06/WW_Equitable-Access-to-Effective-Teachers2.pdf.
17. The retention rate of the state-subsidized teachers was 75% in disadvantaged schools. (See Jennifer L. Steele, Richard J. Murnane, and John B. Willett, "Do Financial Incentives Help Low-Performing Schools Attract and Keep Academically Talented Teachers? Evidence from California," *Journal of Policy Analysis and Management* 29, no. 3 (2010): 451–78.) Meanwhile, the overall teacher retention rate for teachers with five years of experience was found to be about 74% in a statewide study around the same point in time. (See Deborah Reed, Kim S. Rueben, and Elisa Barbour, *Retention of New Teachers in California* (San Francisco: Public Policy Institute of California, 2006), http://www.ppic.org/content/pubs/report/R_206DRR.pdf).
18. California Student Aid Commission, "2006-07 Annual Report to the Legislature" (California Student Aid Commission, 2007).
19. Jennifer L. Steele, Richard J. Murnane, and John B. Willett, "Do Financial Incentives Help Low-Performing Schools Attract and Keep Academically Talented Teachers? Evidence from California," *Journal of Policy Analysis and Management* 29, no. 3 (2010): 451–78.
20. Illinois Student Assistance Commission, "Recruiting Teachers Using Student Financial Aid: Do Scholarship Repayment Programs Work?," (Deerfield, IL: Illinois Student Assistance Commission, 2003), https://www.isac.org/dotAsset/5d-02f0ee-b254-48e5-8f93-0a5be9dca913.pdf.
21. Phyllis E. Goldberg and Karen M. Proctor, "Teacher Voices" (Scholastic/CCSSO Teacher Voices Survey, 2000): 6, http://teacher.scholastic.com/professional/teachertoteacher/ttt/voices_part_1.pdf.
22. Gary T. Henry, Kevin C. Bastian, and Adrienne A. Smith, "Scholarships to Recruit the 'Best and Brightest' Into Teaching: Who Is Recruited, Where Do They Teach, How Effective Are They, and How Long Do They Stay?," *Educational Researcher* 41, no. 3 (2012): 83–92.
23. Ibid at 90.
24. Feng and Sass, "The Impact of Incentives to Recruit and Retain Teachers in 'Hard-to-Staff' Subjects."
25. Ibid.
26. Robert Maranto and James V. Shuls, "How Do We Get Them on the Farm? Efforts to Improve Rural Teacher Recruitment and Retention in Arkansas," *Rural Educator* 34, no. 1 (2012): n1.
27. Kay S. Bull, Steve Marks, and B. Keith Salyer, "Future Teacher Scholarship Programs for Science Education: Rationale for Teaching in Perceived High-Need Areas," *Journal of Science Education and Technology* 3, no. 1 (1994): 71–76.
28. United States Government Accountability Office, "Better Management of Federal Grant and Loan Forgiveness Programs for Teachers Needed to Improve Participant Outcomes," (Washington, D.C.: United States Government Accountability Office, 2015).
29. Linda Darling-Hammond and Gary Sykes, "Wanted: A National Teacher Supply Policy for Education: The Right Way to Meet the 'Highly Qualified Teacher' Challenge," *Education Policy Analysis Archives* 11, no. 33 (2003): 1–55; Christopher Day, Bob Elliot, and Alison Kington, "Reform, Standards and Teacher Identity: Challenges of Sustaining Commitment," *Teaching and Teacher Education* 21, no. 5 (2005): 563–77.
30. Many programs provide for leaves of absences or non-consecutive commitments if recipients experience serious illness, military service, pregnancy, other unexpected causes, or reassignments to teaching positions that are beyond their control. Research also suggests that financial consequences for not fulfilling the commitments associated with service scholarships should not be so punitive that recipients avoid the scholarship entirely. Donald E. Pathman, "What Outcomes Should We Expect from Programs that Pay Physicians' Training Expenses in Exchange for Service," *NC Med J* 67, no.1 (2006): 77–82.
31. See, e.g., David M. Miller, Mary T. Brownell, and Stephen W. Smith, "Factors that predict teachers staying in, leaving, or transferring from the special education classroom," *Exceptional Children* 65, no. 2 (1999): 201-218; Erling E. Boe, Lynne H. Cooke, and Robert J. Sunderland, "Attrition of Beginning Teachers: Does Teacher Preparation Matter?," *Research Report No. 2006-TSDQ2* (Philadelphia, PA: Center for Research and Evaluation in Social Policy, Graduate School of Education, University of Philadelphia, 2006).