EXECUTIVE SUMMARY | JANUARY 2010

Boosting the Supply and Effectiveness of Washington's STEM Teachers

Low student achievement in STEM subjects will persist unless Washington implements a comprehensive strategy to maximize teacher effectiveness.

Introduction

In the spring of 2009, the Partnership for Learning (PFL) asked The New Teacher Project (TNTP) to analyze challenges Washington faces in science, technology, engineering and mathematics (STEM) instruction and to make recommendations to overcome these challenges as part of a new STEM initiative. This initiative aims to dramatically raise student achievement in STEM subjects and close the achievement gap in math and science—ensuring that all Washington students graduate from high school college- and career-ready.

Research has shown that teachers have a greater impact on student success than any other school factor,[1] which means that teachers are a critical part of any solution to Washington's STEM challenges. With this in mind, TNTP drew on its experience studying human capital challenges in education to identify the policies and practices that prevent Washington's STEM teachers from performing at the highest possible level.

To conduct the analysis, TNTP partnered with three districts[2] that have the leadership and determination to improve STEM instruction: Nooksack Valley School District, Renton School District and Spokane Public Schools. TNTP's analysis included the following components:

	Spokane Public Schools	Renton	Nooksack Valley
Students	28,844	14,021	1,737
Free/Reduced Lunch	54%	48%	53%
Special Education	15%	13%	18%
Migrant	0%	0%	5%
Transitional Bilingual	5%	15%	10%
On-Time Graduation Rate	60%	70%	69%
Teachers	1,769	901	110
Average Years Experience	13	12	12
With Masters Degree	72%	66%	64%
Highly Qualified	99%	93%	94%
Schools	51	26	5

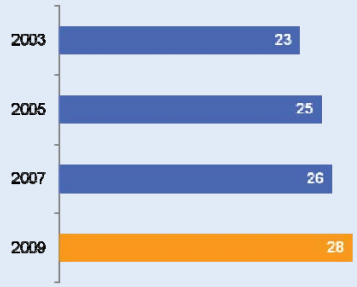
- Input from an advisory panel composed of a diverse set of stakeholders from across the state.
- An analysis of relevant state laws and local collective bargaining agreements.
- An analysis of human resources data from two partner districts (Nooksack Valley School District and Spokane Public Schools) on teacher hiring, transfer, separation and evaluation.

- Online surveys of 1,469 teachers (58 percent of all teachers surveyed), 858 teacher applicants (25 percent), 215 recently separated teachers (35 percent), and 102 administrators (84 percent) in the three partner districts.
- Interviews with state education leaders and university faculty.

Washington's STEM Challenge

Only about half of all students in Washington meet state standards in math and science by the time they reach 8th grade. Achievement among African American and Hispanic students is even lower, and the gap between these students and their White peers is growing.

Gap in NAEP 8th Grade Math Scores for Low-Income and Non-Low Income Washington Students



This gap was the 12th largest in the nation in 2009.

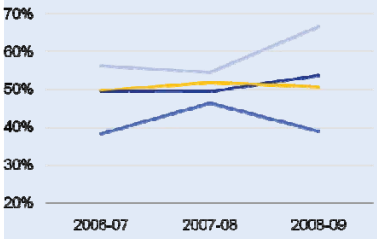
On the NAEP, in 8th Grade Math, Washington is...

1 of 9 states where the White – African American gap is growing

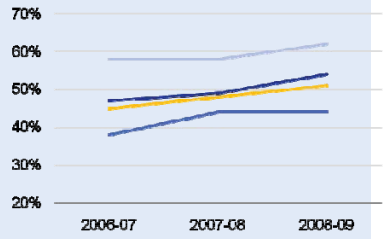
1 of 7 states where the White – Hispanic gap is growing

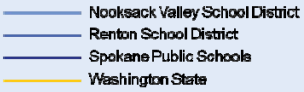
1 of 18 states where the gap between low-poverty and high-poverty students is growing.

Percent of 8th Grade Students Meeting Standards in Math on WASL



Percent of 8th Grade Students Meeting Standards in Science on WASL





Findings

TNTP's analysis identifies several problems that are contributing to this disturbing trend:

1. Washington does not attract a sufficient quantity of STEM teacher candidates, and the quality of STEM instruction is markedly lower than in other subject areas.

University STEM teacher preparation programs in Washington are not producing enough teachers to meet the projected rise in demand over the coming years, or to allow districts and administrators to be selective in their hiring. Although state policies allow alternate route programs to help fill this gap, only 4 percent[3] of Washington's teachers come from those programs, a far lower percentage than in some other states. Administrators confirm this supply problem: they are significantly less satisfied with the size and quality of the candidate pool for STEM subjects than for other subjects. This problem has forced at least one district to be less selective in hiring STEM teachers. Furthermore, administrators are far less satisfied with the quality of math and science instuction in their schools than they are with the quality of instruction in other subjects, where the candidate pools are larger.

2. Access to high-quality STEM teacher candidates and effective STEM instruction is most limited in the highest-need schools.

In the three partner districts, only 44 percent of administrators in high-poverty schools are satisfied with the quality of instruction in their schools, compared to 71 percent of administrators in low-poverty schools.[4] This disparity is even greater in STEM subjects. Administrators in high-poverty schools report that 27 percent of their teachers are "ineffective or somewhat effective," compared to the 17 percent reported by administrators at low-poverty schools.[5] Administrators at high-poverty schools are also less satisfied with both the quantity and quality of new STEM teacher applicants. One district's low-poverty principals have nearly three times as many high school science teachers to choose from than their peers at high-poverty schools.

3. Formal evaluation processes do not differentiate teachers based on their ability to help students learn, nor do they give teachers the feedback they need to improve their instruction. Without robust evaluation data, districts are limited in their ability to make strategic decisions about the teacher workforce.

Rather than setting a high bar, Washington state law sets minimal standards for teacher evaluation. In partner districts, neither teachers nor administrators believe that Washington's current evaluation systems provide an accurate picture of teacher effectiveness or help to improve teacher effectiveness. Even though both teachers and administrators report wide variations in teacher performance in their schools,[6] 99.8 percent of teachers in one district and 100 percent of teachers in another earned the highest evaluation rating in each of the past several years[7]. Less than half of teachers and less than one-fifth of administrators believe that their district's evaluation process helps teachers improve their instructional performance—the stated purpose of the evaluations. Almost no teachers report having received an "area of improvement" on their last evaluation. The lack of rigor extends to conferral of non-provisional status, which few administrators believe is based on a rigorous process, and which nearly all teachers are confident they will earn.

4. Certain financial incentives and career growth opportunities hold promise as strategies to encourage more of Washington's STEM undergraduates to choose teaching over the many other career opportunities available to them.

Undergraduates with STEM majors must weigh major financial tradeoffs when considering whether to enter the teaching profession. Prior research by the Center for Strengthening the Teaching Profession indicates that more than 80 percent of STEM undergraduates considering teaching would be more likely to enter the classroom if presented with any of a number of different subsidies and professional growth opportunities.[8] Reduced certification costs and requirements could also increase the number of current teachers who earn STEM endorsements.

5. Districts could improve retention of STEM teachers by providing resources—including strong school leadership and improved working conditions—that maximize teachers' ability to impact student learning.

Teachers report that the ability to impact student learning is the predominant factor motivating them to continue teaching. STEM teachers also reported that their working conditions and the quality of their school's leadership could make the difference in their decision to remain in the classroom. In fact, over a third of teachers who recently resigned from two partner districts cited "school leadership/administration" as the most important factor in their decision to leave.[9] Additionally, while teachers in partner districts are largely satisfied with the mentoring they receive, they say they could benefit from more opportunities to observe experienced colleagues.

Recommendations

To accelerate student achievement in STEM subjects and close the STEM achievement gap, Washington needs to ensure that every student has highly-effective teachers. Getting there will require the right strategies, new resources, and a willingness to change and innovate. Given its fiscal situation, Washington must take full advantage of the opportunity to earn unprecedented amounts of federal education funding through "Race to the Top" and other grants.

Potential New and Expanded Funding Sources for Addressing STEM Education Challenges

- Race to the Top ($4.35B): Competitive grant for states, with most weight given to planned reforms that improve and retain effective teachers and principals, especially in schools with high-need students.
- Investing in Innovation Fund (i3) ($650M): Competitive grant for districts that "close achievement gaps" and "improve teacher and school leader effectiveness."
- Teacher Incentive Fund ($200M through the ARRA with an additional $487M proposed): District grant that "supports efforts to develop and implement performance-based teacher and principal compensation in high-need schools."
- Title I School Improvement: Ongoing state and district funding targeted to improve lowest performing schools.

TNTP recommends the following comprehensive approach to maximizing effective teaching. All of these strategies rest on developing and publicly reporting fair, accurate and credible measures of teacher effectiveness that are based primarily on student academic growth—something this study indicates would have the support of large numbers of teachers and administrators.

1. Increase the number of STEM candidates graduating from traditional and alternative preparation programs by creating new funding incentives and targets for state universities and encouraging partnerships between districts and alternative preparation programs and the development of dual-degree track programs.

2. Hire from preparation programs with track records of producing effective teachers by increasing the frequency with which university programs must be re-approved and basing re-approval predominantly on evidence of graduates' effectiveness.

> "The applicant pool cannot support holding provisional teachers to higher standards. We accept less than we want because we know we are very unlikely to find more qualified candidates."
>
> *- Third-year assistant principal*

3. Boost the effectiveness of all teachers through effective evaluation processes by amending state law to require annual evaluations for all teachers based on multiple measures of teacher effectiveness —with impact on student academic growth accounting for more than 50 percent of the evaluation outcome[10] —and by helping districts train administrators to conduct rigorous evaluations and use the results to help all their teachers improve. Develop district-level expectations for strong instructional performance. Require principals to be evaluated based on their record of meaningfully differentiating the effectiveness of their teachers, providing personalized professional development and career growth opportunities, improving or removing poor performers and retaining top performers.

> "I have never received feedback from an administrator on what I should improve in the classroom. I know I am not that proficient as a first or second year teacher to have nothing to work on."
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> *- Third-year high school math teacher*

4. Provide all teachers with targeted professional development by requiring and allocating funding for districts to align professional development with teachers' individual needs (as indicated by their evaluations), assessing the effectiveness of professional development and mentoring programs according to their impact on teacher effectiveness, and extending the provisional period from two to three years to give novice teachers more time to improve before a decision is made on non-provisional status.

> "I believe that if there was more flexibility in schedules and higher pay for stronger performers, schools would retain stronger educators."
>
> *-Fourth-year English teacher who now works as a technology consultant*

5. Retain and reward the most effective teachers by funding programs that give recognition and bonuses to effective teachers in the shortage-area subjects of math and science, and setting goals for districts to increase retention of effective STEM teachers and decrease retention of ineffective teachers who do not improve, especially in schools with high-need students.

6. Prioritize effective teachers for high-need students by providing additional funding to preparation programs that produce effective teachers for high-need schools, funding signing and retention bonuses for STEM teachers in high-need schools, and rewarding schools and districts with strong retention rates of effective teachers—especially STEM teachers— in high-need schools.

7. Improve or remove persistently less effective teachers and replace them with more effective teachers by requiring that non-provisional status be awarded only to teachers who demonstrate and ability to promote student achievement.

About The New Teacher Project

The New Teacher Project (TNTP) works to end the injustice of educational inequality by providing excellent teachers to the students who need them most and by advancing policies and practices that ensure effective teaching in every classroom. A national nonprofit organization founded by teachers, TNTP is driven by the knowledge that although great teachers are the best solution to educational inequality, the nation's education systems do not sufficiently prioritize the goal of effective teachers for all. In response, TNTP develops customized programs and policy interventions that enable education leaders to find, develop and keep great teachers and achieve reforms that promote effective teaching in every classroom. Since its inception in 1997, TNTP has recruited or trained approximately 37,000 teachers—mainly through its highly selective Teaching Fellows™ programs—benefiting an estimated 5.9 million students. TNTP has also released a series of acclaimed studies of the policies and practices that affect the quality of the nation's teacher workforce, most recently including *The Widget Effect: Our National Failure to Acknowledge and Act on Differences in Teacher Effectiveness* (2009). Today TNTP is active in more than 40 cities, including Baltimore, Chicago, Denver, New Orleans, New York, and Oakland, among others. For more information, please visit www.tntp.org.

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[1] Heather Jordan, Robert Mendro, and Dash Weerasinghe, *The Effects of Teachers on Longitudinal Student Achievement*, 1997. Steven E. Rivkin, Eric A. Hanushek, and John F. Kain, *Teachers, Schools, and Academic achievement*, 2005.

[2] Office of the Superintendent of Public Instruction http://reportcard.ospi.k12.wa.us/Summary.aspx. Graduation rate from 2007-2008 school year.

[3] Feistritzer, C. E. (2007). *Alternative Teacher Certification: A State-by-State Analysis 2007.* National Center for Education Information. http://www.teach-now.org/intro.cfm, Total number of teachers certified from 2008 Title II reports at https://title2.ed.gov. Number of teachers certified through alternative routes from National Center for Education Information, via http://www.teach-now.org/Table1_09.pdf

[4] Total number of administrator respondents from high-poverty schools (schools with 51-100% of students on Free or Reduced Price Lunch (FRPL)) = 45. Total number of administrator respondents from low-poverty schools (0-50% FRPL) = 41.

[5] Total number of administrator respondents from high-poverty schools (51-100% FRPL) = 41. Total number of administrator respondents from low-poverty schools (0-50% FRPL) = 38.

[6] When asked to rate the performance of teachers at their school, administrators in TNTP partner districts rated 6% of their teachers as "ineffective" and 16% as only "somewhat effective." When asked the same question, teachers in partner districts rated 5% of the teachers at their school as "ineffective" and 10% as "somewhat effective."

[7] Review of evaluations in Nooksack Valley School District (498 evaluations between 2003-04 and 2008-09) and Spokane Public Schools (6,822 evaluations between 2005-06 and 2008-09).

[8] Elfers, A.M., Plecki, M.L., St. John, E.. and Wedel, R. (2008). *Undergraduates View of Teaching as a Career Choice*. Center for Strengthening the Teaching Profession.

[9] 35% (22 of 63) of recently separated teacher respondents indicated "working conditions" as one of the top two most important reasons for leaving the district (Spokane and Renton only. Recently separated teachers were not surveyed in Nooksack Valley.).

[10]TNTP recommends the state develop **credible models for measuring student growth** in all grades and subject areas, and that this standardized model should account for, at least, the majority of the measurement of teacher impact on student growth for formal evaluation outcomes.