National **Charter School**
Resource Center

Recruiting Science, Technology, Engineering, and Mathematics (STEM) Teachers for Charter Schools

Tips & Tools

Recruiting Science, Technology, Engineering, and Mathematics (STEM) Teachers for Charter Schools

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NATIONAL COMPREHENSIVE CENTER
FOR TEACHER QUALITY

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SCENARIO

Jean McKinney is the principal of Edgewood Charter High School, and as such, is in charge of the school's teacher recruitment efforts. Because the school primarily employs younger teachers, it is not experiencing the wave of retiring Baby Boomers like so many traditional public schools are.

Nevertheless, the relatively new charter school seems unable to overcome ongoing mathematics and science teacher shortages. Mathematics and science have been high-need, critical shortage areas since the school's inception six years ago. When strong teachers have been identified in these areas, they rarely remain at the school for more than one or two years. McKinney knows that up to half of all mathematics and science teachers in the state leave the profession within their first five years of teaching. From what she has read and heard, McKinney believes that these teachers leave for reasons related to low salary, inadequate administrator support, and unsatisfactory working conditions.

McKinney recognizes the need for Edgewood Charter High School to develop a comprehensive human capital strategy that addresses each dimension of the educator's career continuum (i.e., from aspiring to retiring) if it is to secure effective teachers. However, while her assistant works diligently on a comprehensive strategy, students are sitting in some mathematics and science classrooms waiting for the opportunity to learn from qualified teachers.

Moreover, her school already engages in several teacher recruitment efforts. For example, it has a strong partnership with a local alternative route program for former military personnel, business executives, and other nontraditional teacher candidates. Individuals who commit to teach mathematics, science, or special education for five years receive a tuition waiver and reimbursements from the state. In addition, the school awards signing bonuses of $6,000 to mathematics and science teachers who sign a six-year contract with the school.

Although these incentives show some promise, they have not solved the ongoing dilemma of recruiting qualified mathematics and science teachers for all students. How should McKinney approach her school's recruitment dilemma? What data-based and viable strategies can she design and implement? How can the effectiveness of the recruitment initiatives she implements be measured to ensure that the charter school's resources are spent wisely on sustainable outcomes? Finally, how should McKinney think about recruitment within the context of her charter school's larger human capital strategy?

Tips & Tools

BENEFITS

STEM Teachers

A STEM teacher is one who teaches in the fields of science, technology, engineering, and mathematics. Most STEM teachers in Grades K–12 instruct mathematics and science classes, which continue to be critical shortage areas.

As part of a comprehensive human capital strategy, designing recruitment initiatives to attract qualified STEM teachers will help charter schools do the following:

- **Ensure the recruitment of enough qualified mathematics and science teachers.** Shortages of mathematics and science teachers are pervasive in underserved schools. Students in high-need classrooms without successful teachers will ultimately be left behind. A strong recruitment strategy can help charter schools more effectively compete for teachers in shortage areas. Strategies such as partnerships with universities, financial incentives, and alternative licensure can keep charter schools competitive in the job market.

- **Design a systematic and seamless recruitment and hiring effort that requires the expenditure of fewer resources for greater outcomes.** Schools spend an inordinate amount of time randomly searching for teachers, especially in shortage areas such as mathematics and science. The New Teacher Project's study of hiring practices in urban school districts in need of teachers in shortage areas revealed that many districts and schools are caught up in red tape and bureaucracy to the extent that even when good candidates apply in shortage areas, they are not hired (Levin & Quinn, 2003). A systematic recruitment effort designed to meet the needs of a particular school or district not only attracts the right candidates but also streamlines the process, so the candidates applying for the positions are most likely a good fit for the job.

- **Retain effective mathematics and science teachers through better job-candidate matches.** Charter schools need not only to effectively recruit mathematics and science teachers but also to keep them in their positions. Research shows that almost half of new teachers leave within the first five years of their careers, and this number increases in underserved districts and schools. Compared to traditional school teachers, the probability of a charter school teacher leaving the profession is 130 percent greater, and the probability of a charter school teacher switching schools is 76 percent greater. These figures more than double for start-up charter schools (Smith & Ingersoll, 2004; Stuit & Smith, 2010). Schools and teachers must be committed to students in order to raise their achievement, and continuity is needed in key positions such as mathematics and science to bolster the quality of learning environments. First, a strong recruitment program places the right teachers in the right classrooms, and then it supports them through strong induction, mentoring, and professional development programs. A strong commitment to this process gives charter schools a better opportunity to retain the high-quality teachers they desperately need.

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TIPS AND CAUTIONS

When developing targeted mathematics and science teacher recruitment strategies to address your charter school's needs, remember to do the following:

- Gather and analyze available data to inform the design and implementation of recruitment initiatives.

- Begin recruiting *before* prospective teachers graduate or complete their clinical internships. Do not expect early access to prospective teachers if you are not willing to build strong partnerships with college- or university-based teacher preparation programs.

- Consider interventions on multiple fronts, including increases in teacher pay, to help recruit and retain high-quality mathematics and science teachers.

- Provide prospective teachers with adequate information about the charter school and the community to ensure that they understand the teaching opportunities and gather adequate information to make well-informed and appropriate job decisions.

- Work with all stakeholders to raise awareness and understanding of effective recruitment and hiring practices as well as the importance of creating learning environments that attract, support, and retain qualified mathematics and science teachers.

- Provide high-quality induction and professional development experiences to ensure successful recruitment and retention outcomes.

- Create and foster productive learning communities to which prospective teachers will be attracted and in which they will be successful.

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STRATEGIES

1. Gather and analyze data to inform the design and implementation of recruitment initiatives.

2. Build strong and sustainable relationships with institutions of higher education.

3. Develop differentiated pay systems, and create financial incentives to attract prospective mathematics and science teachers.

4. Provide prospective teachers with adequate information about teaching opportunities.

5. Provide high-quality induction and professional development experiences to attract and retain teachers.

Resources

The following resources provide helpful information about implementing the strategies listed on this page. Some resources highlight the rationale for a strategy or the research base that supports it; others provide examples of how the strategy has been implemented elsewhere or practical toolkits that can assist school leaders in adopting these strategies.

Note: Some of the programs and resources that are highlighted in this document currently do not serve charter schools but represent ideas or approaches that charter schools might want to explore further.

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STRATEGY 1:
Gather and Analyze Data to Inform the Design and Implementation of Recruitment Initiatives

All facets of human capital strategies in education should be supported and informed by valid and reliable data. Charter schools must first have an accurate understanding of applicable recruitment and retention challenges, and they must work to build solid data warehousing structures to facilitate data gathering, analyses, and the development of targeted policy and program initiatives. Education leaders often fail to maintain data on teacher recruitment and retention, which may prevent the development of policies and programs that effectively address charter schools' needs.

Moreover, charter schools should disaggregate their data by teacher and student characteristics to ensure that all students, particularly those with the highest needs, are being taught by effective teachers. Leaders in charter schools should consider collecting and analyzing the following data:

- Number of applicants for each vacant mathematics and science position disaggregated by student and teacher characteristics

- Professional backgrounds of mathematics and science teacher applicants, including their routes into the profession

- Rates of attrition for mathematics and science teachers by teaching assignment

- Rates of migration for mathematics and science teachers

- Dates on which mathematics and science positions are vacated and dates of hire for those positions

- Surveys of working conditions

- Surveys of mathematics and science teachers' professional development needs

- Teachers' views on the charter school's methods of recruitment, selection, and development of new mathematics and science teachers (qualitative analysis)

Resource 1: Data Quality Campaign

Website: http://www.dataqualitycampaign.org/

The Data Quality Campaign (DQC) is a national effort to encourage state policymakers to improve the collection and analysis of state education data and to promote the implementation of longitudinal data systems. The DQC provides states with tools and resources for improving data systems as part of the effort to raise student achievement. Although the DQC does not directly address issues regarding teacher recruitment data, its resources and tools can support states and districts as they develop more robust data systems that address all facets of the education system in general and of educator quality in particular.

Resource 2: Grant Program From the Bill & Melinda Gates Foundation

Bill & Melinda Gates Foundation. (2009). *Foundation invests $22 million in research and data systems to improve student achievement* [Press release]. Seattle, WA: Author. Retrieved January 21, 2011, from http://www.gatesfoundation.org/press-releases/Pages/collect-and-use-data-for-maximum-impact-on-teaching-and-learning-090122.aspx

This press release details a grant program from the Bill & Melinda Gates Foundation that focuses on developing education research and data systems. The grants are designed to assist states, districts, and schools in using data and relying on evidence-based practices to bolster student learning. Although the primary focus is on longitudinal data systems to track and raise student achievement, states may explore opportunities to use these grants to build a system to assess and monitor educator quality, including the recruitment and retention of mathematics and science teachers. Contact the foundation (info@gatesfoundation.org) for more information.

Resource 3: Regional Educational Laboratory Program

Website: http://ies.ed.gov/ncee/edlabs/about/

The 10 regional educational laboratories (RELs) serve their respective regions through applied research and technical assistance efforts geared toward systemic school improvement. The RELs assist regions and states with the collection and analyses of local data and may serve as resources to states and districts that are using data to design and implement recruitment strategies.

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STRATEGY 2:
Build Strong and Sustainable Relationships With Institutions of Higher Education

To fill vacancies in hard-to-staff charter schools and for hard-to-staff subjects in these schools, a strong collaboration is needed between teacher preparation organizations and charter schools or charter management organizations. Charter schools can work with the universities not only to increase the pipeline of teachers in shortage areas such as mathematics and science but also to ensure that those teachers are prepared to meet the challenges of high-need schools. This strategy is particularly viable in states where universities authorize charter schools.

Resource 4: St. Paul Public Schools and State Universities— Educating Teachers for Urban Communities

Website: http://www.teachercenter.mnscu.edu/featuredactivity.html

Six Minnesota state colleges and universities have joined with six St. Paul public schools to form the Urban Teacher Education Partnership (UTEP). UTEP prepares students to teach in hard-to-staff schools and provides experience in the diverse city schools that increasingly resemble Minnesota's classrooms of tomorrow.

Resource 5: Urban Education Scholars Program

Website: http://ase.tufts.edu/education/programs/teacherPrep/projectUTTC.asp

The Urban Education Scholars Program, previously named the Urban Teacher Training Collaborative (UTTC), is a school-university, school-based, master of arts in teaching program developed by Tufts University in conjunction with Boston Public Schools. The collaborative— an example of the Professional Development School model—focuses on the needs of urban students and teachers. The mission of the program is to help meet the need for effective urban teachers through an innovative model for teacher training similar to the residency model used to train medical professionals.

Resource 6: Mathematics, Computer, and Science Instructional Improvement Programs

Website: http://www.rowan.edu/open/mcsiip/

Rowan University was awarded $2.5 million to work with four southern New Jersey school districts in reforming mathematics and science instruction. The project is intended to unite the activities of institutions of higher education, prekindergarten through high school systems, and other partners to better support teacher development in mathematics and science as well as raise student achievement.

Resource 7: NYC Partnership for Teacher Excellence

Website: http://steinhardt.nyu.edu/petrie/

In 2006, the New York City Department of Education formed the Partnership for Teacher Excellence with New York University and City University of New York. The partnership is dedicated to developing and implementing a new model for teacher education that addresses the city's need for highly qualified, well-trained teachers in high-need areas such as mathematics, science, and special education.

Resource 8: *Ahead of the Class*

Clewell, B. C., & Villegas, A. M. (2001). *Ahead of the class: A handbook for preparing new teachers from new sources.* Washington, DC: The Urban Institute. Retrieved January 21, 2011, from http://www.urban.org/UploadedPDF/ahead_of_the_class.pdf

This handbook describes the steps necessary to create a successful institutional partnership.

Resource 9: Education Renewal Zones

Website: http://files.ruraledu.org/misc/erz.htm

According to The Rural School and Community Trust, an education renewal zone (ERZ) is a collaborative effort by schools and institutions of higher education to connect schools in high-need communities with resources that can help improve and sustain them. According to The Rural School and Community Trust website, higher education plays the following role as part of the ERZ initiative:

> Each ERZ centers on a teacher education institution that assumes the lead in identifying 10 to 15 rural school or district partners; selecting and forming an ERZ Advisory Committee with school, community, and higher education representation; developing and implementing an ERZ needs analysis pertaining to teacher quality, recruitment, and retention; and designing a specific focus and plan of work to meet the needs of partnership schools and communities.

Resource 10: Capital Educators Collaborative

Website: http://gsehd.gwu.edu/index.php?c=55&kat=Special+Projects#anchor23

The George Washington University has developed a number of partnership programs with local school systems. This Special Projects page of the graduate school's website presents the reasoning behind these partnerships, many of which provide alternative routes to certification. Overviews and contact information for district-university partnerships also are provided.

Resource 11: High Tech High

Website: http://gse.hightechhigh.org/

High Tech High is a leading innovative charter school. Based in San Diego, California, High Tech High combines its 11 K–12 schools with a graduate school of education that trains teachers to create rigorous project-based, collaborative learning environments. High Tech High was the first charter school to be authorized by the state of California to fully credential teachers.

STRATEGY 3:
Develop Differentiated Pay Systems, and Create Financial Incentives to Attract Prospective Mathematics and Science Teachers

It is well-known that the earnings differential between teaching and other professions is greatest for individuals with expertise in mathematics and science. In charter schools, where teacher salaries on the whole are lower than traditional public schools, this differential is even greater, exacerbating recruitment challenges in these subject areas. In addition, one of the primary reasons teachers leave their schools and the profession at large relates to salary and compensation (Smith & Ingersoll, 2004). Given equal pay across teaching assignments, most teachers choose to work in better resourced systems in high-amenity communities with higher performing students (Hanushek, Kain, & Rivkin, 2004). Teacher pay should be structured to encourage the natural distribution of highly qualified teachers across districts, schools, and content areas. Currently, about one-third of charter schools have merit pay policies, and those who do offer such policies when their local school districts do not, report being more content with their applicant pool (Gross & DeArmond, 2010). Charter schools, particularly those that are not required to abide by local collective bargaining agreements, must provide incentives and policy supports that encourage and support the recruitment of teachers who have many opportunities to earn higher salaries outside of teaching.

Resource 12: *Out of the Debate and Into the Schools*

Therriault, S. B., Gandhi, A. G., Casasanto, J., & Carney, S. (2010). *Out of the debate and into the schools: Comparing practices and strategies in traditional, pilot and charter schools in the City of Boston.* Boston: The Boston Foundation. Retrieved January 21, 2011, from http://www.tbf. org/uploadedFiles/tbforg/Utility_Navigation/Multimedia_Library/Reports/OutofDebate_ Evidence.pdf

This study was conducted by researchers at American Institutes for Research for the Boston Foundation. Eighty-four principals were surveyed from throughout Boston's public schools, including all charter schools. There was a striking difference between charter and noncharter principals' views toward the role of salaries and benefits. When asked whether the level of salary and benefits offered in their schools helped them to attract qualified teacher candidates, 100 percent of traditional school principals agreed, compared with only 28 percent of charter school principals. Charter school principals were more likely to see their school's reputation as their recruitment advantage, with nearly 90 percent agreeing that their reputation helps them attract qualified candidates. It is not entirely clear, however, whether the principals were suggesting that the salary levels offered in their charter schools were too low and therefore did not help attract qualified teacher candidates or that they believed qualified teacher candidates did not care what salary they received.

Resource 13: *Mobilizing and Motivating Your Staff to Get Results*

Hassel, B. C., Hassel, E. A., Isaacson, D., Krasnow, J., McNiff, M. G., & Walter, K. (2000). *Mobilizing and motivating your staff to get results: A technical assistance guide for charter school leaders.* St. Paul, MN: Charter Friends National Network. Retrieved January 21, 2011, from http://www.uscharterschools.org/pdf/gb/motivatingstaff.pdf

This guide from the Charter Friends National Network provides charter school leaders with a range of strategies for recruiting, selecting, rewarding, developing, and evaluating teachers. The section on rewarding teachers offers four detailed steps to creating a stronger system for rewarding your teachers, including articulating a philosophy toward compensation, deciding which elements of rewards to change, communicating reward decisions, and creating a consistent and clear rewards process. It also provides examples and resources on performance-related pay.

Resource 14: Center for Educator Compensation Reform

Website: http://cecr.ed.gov/
Contact: cecr@westat.com

The mission of the Center for Educator Compensation Reform (CECR) is to raise awareness of alternative strategies for the reform of educator compensation structures. CECR provides resources for policymakers, states, and districts in the design and development of compensation policies and programs. The CECR website provides a collection of research syntheses on teacher pay and educator compensation, as well as guides, frameworks, and case studies to inform the implementation of reform initiatives.

Resource 15: National Center on Performance Incentives

Website: http://www.performanceincentives.org/
Contact: ncpi@vanderbilt.edu

The National Center on Performance Incentives (NCPI) at the Peabody College of Vanderbilt University conducts rigorous research on the effect of performance incentives on the quality of teaching and learning. NCPI acts as a resource for researchers, policymakers, and state and district education leaders.

Resource 16: *America's Pressing Challenge— Building a Stronger Foundation*

National Science Board. (2006). *America's pressing challenge—Building a stronger foundation* (NSB-06-02). Arlington, VA: National Science Foundation. Retrieved January 21, 2011, from http://www.nsf.gov/statistics/nsb0602/nsb0602.pdf

This report is a companion to *Science and Engineering Indicators—2006*, also published by the National Science Foundation. The report sounds an alarm regarding the low level of effective mathematics and science education in the country and calls on policymakers to implement policies for improving the quality of mathematics and science teachers through competitive compensation.

Resource 17: Study of Personnel Needs in Special Education

Westat. (2002). *SPeNSE summary sheet: Recruiting and retaining high-quality teachers.* Rockville: MD: Author. Retrieved January 21, 2011, from http://spense.education.ufl.edu/ policymaker5.pdf

This summary sheet is one in a series funded by the U.S. Department of Education to analyze personnel issues in special education. Salary is a factor reported by special education teachers as making a difference in their employment decisions.

Resource 18: *Diversifying Teacher Compensation*

Azordegan, J., Byrnett, P., Campbell, K., Greenman, J., & Coulter, T. (2005). *Diversifying teacher compensation* (Issue Paper). Denver, CO: Education Commission of the States. Retrieved January 21, 2011, from http://www.ecs.org/clearinghouse/65/83/6583.pdf

This paper provides a general overview of the issue of diversifying teacher compensation, reviews policy options, and provides examples of actions that states and districts have taken to reform compensation.

Resource 19: *Better Pay for Better Teaching*

Hassel, B. C. (2002). *Better pay for better teaching: Making teacher compensation pay off in the age of accountability.* Washington, DC: Progressive Policy Institute. Retrieved January 21, 2011, from http://www.ppionline.org/documents/Hassel_May02.pdf

The 21st Century Schools Project at the Progressive Policy Institute argues the need for differential pay for teachers in hard-to-hire areas and offers policy options and considerations for reforming teacher compensation.

Resource 20: Pay Levels Needed to Attract Skilled Mathematics and Science Teachers

Milanowski, A. (2003). An exploration of the pay levels needed to attract students with mathematics, science and technology skills to a career in K–12 teaching. *Education Policy Analysis Archives, 11*(50). Retrieved January 21, 2011, from http://epaa.asu.edu/epaa/ v11n50

This study explores the role of salary levels and other factors in motivating potential mathematics, science, and technology teachers. Results suggest that low pay was a factor in undergraduates' not considering teaching as a career; however, job demands, individual abilities, and interests also contributed to undergraduates' career decisions.

Resource 21: *Regulation Versus Markets*

Podgursky, M. (2001). Regulation versus markets: The case for greater flexibility in the market for public school teachers. In M. C. Wang & H. J. Walberg (Eds.), *Tomorrow's teachers* (pp. 117–148). Richmond, CA: McCutchan.

Economist Michael Podgursky argues that the single-salary pay scale, even with higher pay, does not allow for adjustments to compensate for differing working conditions. Given equal pay, teachers will use their seniority to transfer to preferred schools, and new teachers will seek better conditions in which to begin. Consequently, troubled schools—including hard-to-staff rural schools—end up with the least experienced teachers. Podgursky concludes that "if schools differ in terms of nonpecuniary conditions (e.g., safety, student rowdiness [and rural-ness]), then equalizing teacher pay will disequalize teacher quality. On the other hand, if districts wish to equalize quality, they will need to disequalize pay" (pp. 137–138).

Resource 22: Rural Districts Meeting Teacher Quality Requirements

Schwartzbeck, T. D., & Prince, C. D. (with Redfield, D., Morris, H., & Hammer, P. C.). (2003). *How are rural districts meeting the teacher quality requirements of No Child Left Behind?* Charleston, WV: Appalachia Educational Laboratory. Retrieved January 21, 2011, from http://www.edvantia.org/products/pdf/AASA-AELReport.pdf

Researchers surveyed rural teachers and superintendents to determine the challenges related to meeting No Child Left Behind Act teacher requirements, the obstacles they face in recruiting and retaining teachers, and the strategies they use to get highly qualified teachers in their classrooms. The smaller the school, the more difficulty superintendents reported in attracting and retaining teachers. The most frequently cited challenge to recruitment was social isolation, and the most frequently cited challenge to retention was low salaries.

Resource 23: The Costs of Getting and Keeping Rural Teachers

Prince, C. D. (2002). *Higher pay in hard-to-staff schools:* The case for financial incentives (ERIC Document Reproduction Service No. ED467667). Arlington, VA: American Association of School Administrators. Retrieved January 21, 2011, from http://www.eric.ed.gov/PDFS/ED467667.pdf

The author notes that rural areas are generally viewed as having a lower cost of living than other areas and thus requiring lower teacher pay. Policymakers need to consider the hidden costs of living in rural places, where the lack of public transportation, suitable housing, and necessary services require expenditures for home ownership and automobile operation. For these reasons, more money will be needed to attract teachers to rural areas.

Resource 24: Virginia Middle School Teacher Corps

Website: http://www.doe.virginia.gov/teaching/career_resources/middle_teacher_corps/index.shtml

In Virginia, some low-performing middle schools are eligible to hire qualified mathematics teachers from the Virginia Middle School Teacher Corps. Teachers apply to enter the state-approved pool and receive extra pay in an amount up to $10,000 per year for each of three years. Corps members must meet six criteria for eligibility, including being highly qualified and exhibiting certain competencies of effective teachers. The teachers are trained in a coaching model that also is used in the state's Mathematics Specialist program. It is expected that the effects of these highly qualified teachers will be felt throughout the school through professional development activities and other leadership roles that they might assume.

Resource 25: *Partnerships for Success*

American Association of Colleges for Teacher Education. (2005). *Partnerships for success: No Child Left Behind meets the Higher Education Act* (ERIC Document Reproduction Service No. ED493529). Washington, DC: Author. Retrieved January 21, 2011, from http://www.eric.ed.gov/PDFS/ED493529.pdf

This brochure showcases partnerships with universities that facilitate school improvement, teacher preparation, and professional development.

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STRATEGY 4:
Provide Prospective Teachers With Adequate Information About Teaching Opportunities

Research indicates that prospective teachers lack information during the job search process and often experience information-poor hiring interactions (Liu & Johnson, 2006). The lack of adequate information available during teachers' job search processes may lead to teaching assignments that are not the best fit for the teachers, their districts, or their schools. These ill-fitting placements may lead to migration and attrition. Moreover, research suggests that teachers make job search decisions based on feelings of familiarity or comfort, and they rely on student and demographic data to inform their searches (Cannata, 2010). Charter schools should examine their public outreach, marketing, and recruitment efforts and craft new strategies that ensure the distribution of information to prospective mathematics and science teachers. Research has shown that teachers often make decisions based on salary and benefits (e.g., Stinebrickner, 2001), geographic location (e.g., Boyd, Lankford, Loeb, & Wyckoff, 2005), and working conditions (e.g., Johnson, Kardos, Kauffman, Liu, & Donaldson, 2004).

Resource 26: The New Teacher Project

Website: http://www.tntp.org/
Contact: info@tntp.org

The New Teacher Project (TNTP) is a nonprofit organization whose mission is to eliminate achievement gaps by ensuring that all students are taught by qualified teachers. A key component of the organization's work is hiring and staffing reform whereby it works with states and districts to eliminate barriers to effective human capital management. TNTP has published a series of groundbreaking papers on recruitment and hiring practices and their effects on teacher supply and the equitable distribution of teachers.

Resource 27: *New Teachers' Experiences of Hiring*

Liu, E., & Johnson, S. M. (2006). New teachers' experiences of hiring: Late, rushed, and information-poor. *Educational Administration Quarterly, 42*(3), 324–360. Abstract retrieved January 21, 2011, from http://eaq.sagepub.com/cgi/content/abstract/42/3/324

This article examines the processes by which new teachers are hired and the extent to which these processes result in good matches between new teachers and their schools. Guiding this examination is the authors' conception of new teacher hiring, which they identify as a two-way process with both the school and individual teacher as active participants. They contend that a good match between the teacher and school is important for two reasons: (1) a good match can facilitate teacher effectiveness because the knowledge, skills, and dispositions required for a particular position at a particular school are different from those required for a different teaching assignment and (2) good matches can affect both the teacher's job satisfaction and retention.

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The authors also report that new teachers often are hired through a school-based, decentralized hiring process. Even though they hypothesized that decentralized hiring structures would act as a strong prerequisite for information-rich hiring, they found that schools and teacher candidates had limited interactions during the hiring process, which led to the process being information poor. Further complicating this picture of hiring is the fact that many teachers (more than one third in California and Florida) are not hired until the school year has begun. In sum, teacher hiring was found to be information poor and rushed, despite the prevalence of decentralized hiring structures.

Resource 28: DSST Public Schools

Website: http://dsstpublicschools.org/jobs/teaching-at-dsst/

The DSST Public Schools in Denver has been recognized as a top STEM model in the nation. Of the school's graduates, 100 percent are accepted to attend four-year colleges. It is a free and open-enrollment charter school and attracts a top-rate teaching force by focusing on the school's mission and values and seeking out candidates with a similar focus on student achievement. Its website highlights statements from teachers about what made DSST, with its laser-like focus on achievement, a place of employment for which they were willing to move cross-country.

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Strategy 5: Provide High-Quality Induction and Professional Development Experiences to Attract and Retain Teachers

Formalized new teacher induction programs are a dominant policy response to the challenges regarding recruitment, retention, and educator quality. Induction programs are designed to enhance novices' instructional effectiveness while socializing them to their schools. Induction programs vary in both content and structure; however, most programs involve mentorship, new teacher orientations and workshops, and some form of collaboration with colleagues (Smith & Ingersoll, 2004). Much of the current research in teacher induction focuses on the content of these programs, specifically on the opportunities for teachers to strengthen their content and pedagogical content knowledge (e.g., Luft, Roehrig, & Patterson, 2003). This research suggests that content-focused induction positively affects teachers' knowledge of content and pedagogy, which researchers suggest will lead to greater gains in student achievement. Likewise, professional development has been shown to strengthen teachers' knowledge and instructional practices when particular core and structural features are present (Garet, Porter, Desimone, Birman, & Yoon, 2001).

This research indicates that professional development focused on content, how students learn content, and the most effective instructional strategies facilitates positive outcomes for both teachers and students. This induction and professional development research is of critical importance to charter schools as they design recruitment and induction initiatives for mathematics and science teachers. High-quality induction and professional development not only are attractive organizational features but also may serve to bolster the effectiveness of novices, thereby facilitating their retention decisions.

Resource 29: *Mobilizing and Motivating Your Staff to Get Results*

Hassel, B. C., Hassel, E. A., Isaacson, D., Krasnow, J., McNiff, M. G., & Walter, K. (2000). *Mobilizing and motivating your staff to get results: A technical assistance guide for charter school leaders.* St. Paul, MN: Charter Friends National Network. Retrieved January 21, 2011, from http://www.uscharterschools.org/pdf/gb/motivatingstaff.pdf

This guide from the Charter Friends National Network provides charter school leaders with a range of strategies for recruiting, selecting, rewarding, developing, and evaluating teachers. The section on coaching and developing teachers outlines five criteria for successful professional development programs, lists the different types of professional development and supports available, and provides various resources on the topic.

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Resource 30: *Increasing Teacher Retention to Facilitate the Equitable Distribution of Effective Teachers*

Lasagna, M. (2009). *Increasing teacher retention to facilitate the equitable distribution of effective teachers* (Key Issue). Washington, DC: National Comprehensive Center for Teacher Quality. Retrieved January 21, 2011, from http://www.tqsource.org/publications/KeyIssue_ TeacherRetention.pdf

This publication presents strategies, programs, and resources for improving the retention of teachers and promoting the equitable distribution of teachers. Strategies discussed include enhancing teacher induction and mentoring, improving working conditions, reforming teacher compensation systems, and providing advancement and leadership opportunities to teachers. It also includes four real-life examples of promising initiatives designed to stem teacher turnover.

Resource 31: Content-Focused Teacher Induction

Luft, J. A., Roehrig, G. H., & Patterson, N. C. (2003). Contrasting landscapes: A comparison of the impact of different induction programs on beginning secondary science teachers' practices, beliefs, and experiences. *Journal of Research in Science Teaching, 40*(1), 77–97. Abstract retrieved January 21, 2011, from http://www3.interscience.wiley.com/ journal/102019992/abstract

The researchers examined the impact of three induction programs on novice secondary science teachers. Teachers were assigned to one of three approaches: science-focused induction, general induction, or no formal induction program. The analysis revealed that teachers in the science-focused induction program were more likely to employ student-centered and science inquiry instructional practices and less likely to experience constraints to their teaching. The authors recommend that states and districts work with universities to provide more content-focused induction programs.

Resource 32: Features of High-Quality Professional Development

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915–945. Retrieved January 21, 2011, from http:// aztla.asu.edu/ProfDev1.pdf

The authors used a national probability sample of mathematics and science teachers to compare the effects of features of professional development on teacher learning. The core features shown to have positive effects on teacher learning and practice include a focus on content, opportunities for active learning, and coherence among other learning and professional development experiences. Furthermore, the authors identified the following structural features as contributing to positive outcomes for teachers: collective participation of teachers from the same subject, grade, team, or school; the form of the activity (e.g., workshop); and the duration of the activity. States and districts may use these findings to design high-quality professional development experiences for new teachers as well as promote high-quality professional development opportunities as a recruitment tool.

Resource 33: *Identifying Effective Professional Contexts to Support Highly Effective Teachers*

Hirsch, E. (2008). *Identifying professional contexts to support highly effective teachers* (Key Issue). Washington, DC: National Comprehensive Center for Teacher Quality. Retrieved January 21, 2011, from http://www2.tqsource.org/strategies/het/ProfessionalContexts.pdf

This comprehensive set of resources and strategies helps school and district officials begin to assess the quality of working conditions at their schools and to conceptualize the link between working conditions and teacher job satisfaction. It also offers tips on implementation of reforms.

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REAL-LIFE EXAMPLE: THE STEM CHARTER SCHOOL

In the diverse community of Aurora, Illinois, education leaders are tackling the STEM teacher quality issue head-on by creating a STEM charter school. The charter school is part of a larger initiative called the Mathematics and Science Education Center. Reformers are working with state legislators and local leaders to make this charter school, which is to be operated by Aurora University, a reality. The school's goals include the following:

- Reform teacher training through the development of a clinical immersion site that would allow prospective teachers at the bachelor's, master's, and doctoral levels to build their content knowledge in STEM subjects.

- Leverage the support and expertise of community partners to better engage students in STEM subjects by expanding teachers' repertoire of effective pedagogical strategies and creating a real-world, inquiry-based model.

- Recruit talented faculty and students from nearby districts to inspire a strong community of learning for STEM subjects.

Serving as a laboratory for teacher education, the overriding mission of the STEM charter school is to rectify existing deficiencies in STEM instruction in general. But a secondary goal is to retain more specialists in these areas in the Aurora community. The charter school aims to initially enroll 250 students in Grades 3–8 and eventually increase these numbers to 500, at a total cost of $17 million. Afterschool and summer school STEM programs will be offered, and parent workshops and seminars on the topic will be made available.

The project was initially spurred by the Dunham Fund of Aurora's challenge to community organizations to identify a solution to an existing community problem. In response to the challenge, reformers from Aurora University's Institute for Collaboration proposed the Mathematics and Science Education Center at Aurora University to improve STEM instruction in the community's schools. As the winning proposal, the project received an initial grant of $100,000 in 2009, which was later more than tripled in value to further advance the groundbreaking new model for improving STEM education.

According to the project website, the leaders of this reform believe,

> Few issues are more important today than strengthening STEM learning. For the United States to maintain its competitive advantage, student achievement in these subject areas must improve and teachers must be empowered with content-based degree programs… strengthening local communities and creating replicable examples for others to follow.

In November 2010, the Illinois Elementary and Secondary Education Committee passed legislation to allow the academy to function as a multidistrict charter school with selective admission criteria based on mathematics and science cognitive ability and other factors. The initial vote by the full Illinois House of Representatives failed in December 2010 but will be recast in early 2011. If events go as planned, this new STEM charter school will open in 2012–13.

Resources

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Tips & Tools

ABOUT THE NATIONAL CHARTER SCHOOL RESOURCE CENTER

The U.S. Department of Education is committed to promoting effective practices, providing technical assistance, and disseminating the resources critical to ensuring the success of charter schools across the country. To that end, the U.S. Department of Education, under a contract with Learning Point Associates, an affiliate of American Institutes for Research, has developed the National Charter School Resource Center. The Resource Center provides on-demand resources, information, and technical assistance to support successful planning, authorizing, implementation, and sustainability of high-quality charter schools; to share evaluations on the effects of charter schools; and to disseminate information about successful practices in charter schools.

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