Applicants at the Doorstep: Improving Hiring Practices through a Better Understanding of the Link Between Applicant Information and Teacher Quality

## PROJECT NARRATIVE

## A. SIGNIFICANCE OF THE RESEARCHER-PRACTITIONER PARTNERSHIP

### a. Strength of the partnership

Under the proposed project, the partnership of the Center for Education Data and Research (CEDR) and Spokane Public Schools (Spokane) will study how well the information collected during the teacher hiring process predicts future teacher performance, and whether alternative means of assessing teacher applicants to the district might lead to better hiring decisions. The partners share a common interest in assessing policies and practices that have the potential to affect student outcomes, and view district hiring as an important policy lever that has potential to significantly influence the quality of the teacher workforce. As described below, CEDR and Spokane propose to strengthen an existing relationship by engaging in research important to the district, with each partner bringing a complement of experience, skills, and resources to bear on the topic.

*Background - The Center for Education Data and Research*

CEDR is housed at the University of Washington Bothell and is directed by Dr. Dan Goldhaber. Its mission is to conduct high quality, independent education research that provides policymakers and practitioners the hard evidence necessary to make decisions that improve education outcomes. Ultimately, CEDR strives to help move the education enterprise toward being a continuously evolving system where learning from policy variation, and adjusting policies based on what is learned, is the norm not the exception.

CEDR's research work generally addresses the following areas of education policy with the intent to facilitate evidence-based policy and practice: school and teacher effectiveness, education accountability and governance, and teacher labor markets. Empirical work at CEDR focuses on the analysis of longitudinal data that associates teachers with individual students.

Several aspects of this work are worth highlighting because they demonstrate CEDR's capacity to successfully partner with districts and complete the proposed research. First, CEDR has extensive experience using Washington State's education databases and merging them in ways that allow new issues to be addressed.[1] These state-level data sets are readily available for addressing the proposed research in Spokane. Second, numerous ongoing and completed projects by CEDR personnel connect teacher credentials and characteristics to student achievement, which is central to the proposed empirical strategy.[2] Third, CEDR has experience with hands-on work that involves policy makers and practitioners. This is important in the context of this

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[1] CEDR's recent studies highlight the center's approach to Washington State data. For example, CEDR examined the implications of seniority-based layoffs by linking teachers who received layoff notices to Washington State data on students and schools (see Goldhaber & Theobald, forthcoming). Another recent study explores the relationship between specific provisions in collective bargaining agreements (CBAs) and the quality and distribution of teachers, using a unique state dataset and augmenting it by collecting and coding district collective bargaining agreements from each school district in the state (see Goldhaber et al., 2012).

[2] See, for instance, Goldhaber's study of pre-service credentials (Goldhaber & Brewer, 2000), his work on teacher licensure (Goldhaber & Hansen, forthcoming; Goldhaber 2007), and his recent study of teacher-training institutions' impact on teacher effectiveness (Goldhaber et al., 2012).

partnership as the work entails the explanation of technical methods and reasons behind modeling decisions.[3]

In addition to its experience working in collaboration with school districts, CEDR has established a framework to utilize data and build research capacity at the district level in Washington State. When it was established in 2010, one of the center's first actions was the formation of the Strategic District Partnership Initiative (SDPI). School districts are collecting unprecedented amounts of data, but it is not always clear how to use this data to improve policy and practice to enhance student outcomes. SDPI was created to support the productive use of this data at the district level and to assist districts in building their own capacity to conduct research and implement evidence-based practice.

CEDR has currently partnered with eleven Washington State school districts through SDPI, including Spokane Public Schools. By sharing data with CEDR, these districts contribute information and knowledge that is vital to understanding the impact of current policies on students.  For example, over the last two years CEDR has worked with Anacortes to assess the extent to which value-added measures based on district assessments align with value-added measures based on the state assessment, and how principal teacher assessments correspond with value-added measures of performance.[4]

*Background – Spokane Public Schools*

Spokane Public Schools is the largest school district in eastern Washington, and the second largest in the state. The district consists of 34 elementary, 6 middle, and 5 high schools. The district employs 1,758 teachers who instruct 28,768 students. During the past five years, Spokane has hired 988 new teachers from a pool of 5,840 applicants.

The proposed project will primarily involve the Employment Services department of Spokane Human Resources. A top priority of Human Resources is to hire high-quality educators who can provide the very best educational environment to the students of Spokane. Employment Services, directed by Angela Jones, oversees the recruitment, screening, and hiring processes of Spokane, including the assessment of protocols used during the hiring process, and the training of administrators responsible for hiring. The project will contribute to the district's understanding of the effectiveness of its current practices in hiring the highest quality teachers, and build its capacity to use this understanding to adapt its practices in the future. Currently, Spokane does not have established partnerships with other research institutions.

*The Development of the Partnership between CEDR and Spokane*

In late 2010, Dr. Goldhaber began discussing a research partnership with Dr. Staci Vesneske, Assistant Superintendent of Human Resources at Spokane. Dr. Vesneske and Dr. Goldhaber were interested in developing value-added models for Spokane's teachers that could

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[3] CEDR, for example, he has worked closely with Denver Public Schools on an analysis of their alternative teacher compensation system (see Goldhaber & Walch, forthcoming), and also partnered with the Washington State Professional Education Standards Board (PESB) for an ongoing assessment of the relationship between teacher performance on the new state assessment of in-service teachers and student achievement.

[4] This work is not funded by a dedicated source (CEDR uses discretionary funds), and it will not be published in an academic outlet (Anacortes is a small district so the findings do not meet conventional levels of statistical significance).

be used to identify teachers in need of supplemental assistance (e.g. mentoring) and to find better ways to assess the potential of teacher applicants to the district. In the wake of those initial discussions, a formal data sharing agreement was signed in March 2011 and CEDR received a series of teacher, teacher applicant, and student-level data from Spokane in July 2011.

In November 2011, CEDR hosted a Strategic District Partnership Initiative (SDPI) meeting bringing together current and potential District Partners, including Spokane, to discuss specific questions and issues that were common to SDPI districts.[5] CEDR and the Strategic District Partners developed several research initiatives that all parties were interested in exploring.[6] Brent Perdue, Director of Evaluation and Certificated Staff Support at Spokane, attended the meeting and reiterated Spokane's interest in studying whether his district could develop a better way to judge teacher applicants. While Spokane had intended to explore this question independently, it has lacked the research capacity required for a rigorous analysis of the issue. CEDR agreed to assist Spokane and pledged to seek funding to support this work.

IES's Researcher-Practitioner Grant Program provides an excellent opportunity to strengthen the existing partnership and address an issue that is important to both the school district and a broader audience of practitioners and academic researchers. The proposed project would be the first formal research project carried out under the partnership.

We expect the proposed project to enhance Spokane's ability to collect and utilize teacher applicant information that is demonstrably predictive of future success in the classroom. The point person for Spokane on this project is Angela Jones. As director of Employment Services, she is in a position to translate research findings into policy action by adjusting hiring procedures in Spokane. Equally important, we expect an expansion in the district's research capacity by understanding its understanding of available data, methods of analysis, and interpretation of results.

While this project would represent the first significant research carried out under the CEDR-Spokane partnership, the collaboration has excellent long term potential. In particular, both partners are interested in studying teacher quality, as demonstrated by the fact that the project proposed here was developed out of a series of meetings that pre-dated the IES RFP, and the project idea has survived key leadership changes in Spokane.[7] In addition, Washington, like many states, is in the midst of significant changes in teacher policy that will warrant collaborative research of the type we propose here. For instance, the state is currently developing and pilot testing a new four-tiered principal and teacher evaluation system in accordance with legislation adopted in 2010 and 2012,[8] and Spokane and CEDR have already discussed the possibility of other studies related to this and other reforms mandated by the state. Finally, Washington State was one of the recipients of an IES Statewide Longitudinal Data System grant,

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[5] For more information about the Strategic District Partnership Initiative, see http://cedr.us/WAState_SPDI.html.

[6] The research initiatives included the following questions: How does value-added information affects principal evaluations? Do different tests give different estimates of teacher performance? What do teachers think of cost-equivalent working condition trade-offs? Can a new model of professional development lead to increased teacher effectiveness and student learning?

[7] Staci Vesneske, the assistant superintendent of human resources, left the district in 2011, and Spokane hired a new superintendant in the spring of 2012.

[8] Washington State Senate Bill 6696, Laws of 2010; Washington State Senate Bill 5895, Laws of 2012.

which means that CEDR and Spokane can pursue research linking policies and practices in the district to various measures of students' postsecondary success, another area of mutual interest.


### b. Research aims of the partnership
*Teacher Quality and the Importance of Selection*

It is well documented that teachers can have profound effects on student outcomes. A large body of empirical research on the influence of teachers on student outcomes indicates that teacher quality is the most important *school-based* factor in regards to improving student achievement.[9] The differences among teachers' effectiveness, as measured by raising student achievement, swamp the effects of other educational interventions such as reducing class sizes. For example, estimates suggest that a one standard deviation increase in teacher quality raises student achievement by 10 to 25 percent of a standard deviation. [10]

Two additional findings about teacher quality, however, suggest the particular importance of making the most of the *teacher selection process*.  First, despite its clear importance, teacher quality remains a somewhat elusive concept. In many ways, what makes a teacher effective (or ineffective) remains an empirical mystery: teacher quality does not appear to be strongly or consistently associated with teacher credentials (Aaronson et al., 2007; Goldhaber and Hansen, forthcoming; Harris and Sass, 2011).[11]

Second, even when credentials are found to be statistically significant, it is almost always the case that the difference between the average teacher who holds one credential versus another is swamped by the difference between a more effective and a less effective teacher with a common credential (or path into the workforce). The issue of overlapping distributions of effectiveness, i.e. the finding that there is far more quality variation *within* categories of teachers than there is *between* categories of teachers is important for thinking about teacher selection. Kane et al. (2008), for example, examine the effectiveness of teachers who entered teaching in different licensure categories, and find that the gap in teacher effectiveness (measured by value-added) within each certification category *is about ten times larger* than the average gap between certification categories. Goldhaber (2007) finds similar results for teacher performance on licensure tests.

An example of overlapping distributions is illustrated in Figure 1 of Appendix A, which compares the estimated distributions of teacher effectiveness for those who passed the licensure exams required for full certification in North Carolina (the solid line) and those who failed them

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[9] See, for example, Chetty et al. (2011) who link value-added measures of teacher effectiveness to improved long-term student outcomes such as college attendance and salaries, and conclude that high quality teachers create substantial economic value.

[10] See, for instance, Aaronson et al. (2007), Goldhaber and Hansen (forthcoming), Hanushek and Rivkin (2010) for estimates of the effect size associated with changes in teacher quality. For perspective on what this means in terms of other educational investments, Rivken et al. (2005) find that a one standard deviation change in teacher effectiveness is roughly equivalent to lowering class size by 10 to 13 students. Other estimates (Hanushek, 1992) show that the difference between having a very effective versus very ineffective teacher can be as much as a full year's learning growth.

[11] An exception is early career experience, which has been found to be predictive of teacher quality (Boyd et al., Forthcoming; Clotfelter et al., 2007; Rivkin et al., 2005; Rockoff, 2004).

(the dotted line). As we might expect, on average, teachers who passed the licensure tests are more effective than those who did not (the difference in means is about 4 percent of a standard deviation, or the horizontal distance between F and P in Figure 1). However, we see a considerable overlap (more than 90%) of these two distributions. For example, all the teachers shown in area **A** passed the required licensure tests but were *less* effective than the average teacher who failed to achieve the standard; teachers shown in area **B** failed the standard, but were *more* effective than the average teacher who passed. What the above findings indicate is that there is the potential to vastly improve teacher hiring, but this requires that local hiring officials have the knowledge of how to select more teachers from the upper end of the test-failing distribution of applicants (the dotted line) and fewer from the bottom end of the test-passing distribution of applicants (the solid line).

It is conceivable that local school districts already do, or could, collect the information to allow them to make better hiring decisions. As we go on to describe below, there is far more information about teacher applicants collected and recorded by some school systems (including Spokane) than makes its way into the state longitudinal databases that are used by researchers to assess the relationship between teacher credentials and student achievement. Moreover, local hiring officials may be able to observe characteristics, and or combinations of characteristics, of prospective teachers that cannot easily be quantified, but are nevertheless important predictors of teacher effectiveness in the future (Goldhaber, 2004). We discuss these issues below.

*Background: Teacher Applicant Information and Student Achievement*

There is relatively little research on the selection of teacher applicants by school systems. This is surprising, for contrary to conventional wisdom, many schools and districts have a large degree of choice when it comes to hiring teachers (including Spokane, as discussed below). Using data from the Schools and Staffing Survey conducted by NCES, Ingersoll and Perda (2010) report that in 2000 (when the teacher labor market was relatively tight), the ratio of all teachers in the supply pipeline to the number of teachers leaving through retirement and attrition was over 2 to 1.[12] Similarly, Strauss et al. (2000) find excess supply in their analysis of district hiring practices in Pennsylvania, where 75 percent of districts hiring for various subject areas had at least 3 applicants per position, and in elementary education, mathematics, English, and social studies, there were at least 10 applicants per position.

How do schools select applicants to fill teaching positions? Older survey work suggests that public schools primarily rely on teacher licensure and graduation from a state-approved teacher education institution as a secondary screen for applicants (U.S. Department of Education, 1997), even though there is little evidence that doing so is a good proxy for quality (Glazerman et al., 2006; Goldhaber and Brewer, 2000). Regarding the interview process, Harris et al. (2010) extensively interview school principals and find that a mix of teacher characteristics is desired including experience, enthusiasm, pedagogical skills, and content knowledge, as well as "organizational fit" in terms of achieving a school-level balance of experience, race and gender; indicators of academic proficiency appeared to be given little weight in hiring decisions. In addition to credentials, some districts use survey instruments to assess applicants' values and beliefs thought to be indicative of future success. The Haberman Star Teacher Evaluation

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[12] Not surprisingly, however, the ratios for some difficult to fill fields were much smaller (1.03 and 1.02 to 1 for science and math respectively).

PreScreener and the Gallup Teacher Insight Assessment are two instruments that are currently commercially available and widely used (Rockoff et al., 2011).

Some research suggests that schools do not select amongst the most able applicants, at least relative to those hired in other occupations. Ballou (1996), for instance, finds that unlike in fields outside of education, graduating from a top college does little to improve one's job prospects in teaching.[13] By contrast, in a more recent study of the teacher labor market in New York State, Boyd et al. (Forthcoming) find that when geographic and school characteristics are accounted for, employers do in fact demonstrate preferences for teachers with stronger academic achievement and higher scores on certification exams.

A few studies look at whether schools identify the best applicants in terms of a direct measure of teacher effectiveness: value-added. Hanushek et al. (2005) analyze whether schools that offer higher levels of compensation (in the form of both salary and work environment) tend to hire more effective teachers. They find that these schools (generally suburban schools) are more likely to hire teachers with advanced degrees, but no relationship between hiring and value-added measures of effectiveness. Staiger and Rockoff (2010) also argue that school leaders do not focus on effectiveness during the hiring process. They draw on a natural experiment that occurred in the Los Angeles Unified School District (LAUSD) in 1997, when the state provided a financial incentive to keep K-3 class sizes under 20 children. LAUSD more than doubled its annual hiring of new elementary school teachers during the next five years. During this time, teacher pay did not increase and the proportion of new hires without teaching credentials increased from 59 to 72 percent. If the district was able to identify the best teachers during the hiring process and had been selecting teachers from the upper end of the applicants' future performance distribution – that is selecting those applicants who are likely in the future to be more effective teachers than the non-selected applicants – then one would expect a decrease in the average effectiveness of the cohort of teachers hired in the years after 1997 because the district would need to dip further into the applicant pool to hire enough teachers. Yet, value-added modeling of elementary teacher effectiveness showed no evidence of such a decrease. The results actually suggest that teacher hiring is tantamount to random in terms of future effectiveness.

Several studies also suggest whether additional information about teacher applicants might aid school systems in making good hiring decisions. In an analysis of novice math teachers in New York City, Rockoff et al. (2011) show the extent to which traditional and non-traditional information about teacher applicants might be used to improve the effectiveness of the teacher workforce. The authors examine how traditional information collected by NYC (degree and major, passage of license exam on first attempt, college ranking, SAT scores) and non-traditional information (cognitive ability, Math Knowledge for Teaching, conscientiousness, extraversion, and self-perceptions of general and personal efficacy) corresponds with student and teacher outcomes (including value-added scores, subjective teacher ratings, teacher absences, and teacher retention).[14] Consistent with previous research, the authors find that few *individual*

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[13] Given the evidence of a relationship between measures of academic proficiency (e.g., tests of a teacher's verbal ability, performance on licensure examinations, and the selectivity of his or her college) and teacher quality, this finding suggests that school districts do *not* successfully select for quality (Ehrenberg & Brewer, 1994, 1995; Ferguson, 1991; Ferguson & Ladd, 1996; Strauss & Sawyer, 1986; Strauss & Vogt, 2001).

[14] The information collected by the authors includes performance on a commercially available

metrics are significant predictors of teacher effectiveness. However, distilled measures of cognitive and non-cognitive skills derived using factor analysis methods are found to be significantly predictive of student achievement. The variation of predicted value-added using both traditional and non-traditional information explains about 12 percent of the variance in expected variance in teacher effectiveness, compared to about 4 percent using only traditional information. Thus, the Rockoff et al. findings suggest the quality of the workforce could be improved by expanding the set of information collected during the hiring process.[15]

Finally, a new paper by Dobbie (2011) finds that information used to select Teach for America (TFA) members is predictive of the future impact that TFA teachers have on student achievement (in the 1st year of teaching). This is interesting both because of the research on TFA corps members' success in the classroom compared to those who enter teaching through other routes (e.g. Boyd et al., 2006; Glazerman et al., 2006; Xu et al., 2011), and the fact that TFA collects a wide array of information about their applicants through both an online application and a formal interview (for those who make it through the online screen). Each TFA applicant invited for an interview is required to provide transcripts and conduct a teaching lesson, and is scored along eight dimensions thought to be associated with student achievement.[16] These subjective assessments of TFA candidates are in fact associated with later student success: Dobbie finds that a one standard deviation change in an index that includes all eight TFA measures is predicted to increase student achievement by 0.15 standard deviations in math (the findings for reading achievement were smaller and not statistically significant). The magnitude of the math finding is quite large (several times larger) relative to estimates of the return to early career teacher experience or lowering class size. Again, this suggests there is potential to improve the quality of the teacher workforce through the development of better ways to assess teacher applicants.

*Building on the Potential: Arguing the Need to Study Teacher Selection*

Local school systems have control over one of the most important policy levers affecting the quality of the teacher workforce: the selection of teachers from the pool of applicants. But when districts make hiring decisions, they have few if any research-based tools to help inform the selection process. Collectively, the studies discussed in the prior sub-section suggest two important points: 1) There is likely significant room for improvement in teacher hiring practices, through both the effective use of objective applicant data and the nuanced judgments made by practitioners about subjective data (e.g. letters of recommendation); and, 2) On the whole, there is limited quantitative evidence about the relationship between teacher hiring practices and teacher quality.[17] We see a strong potential for teacher hiring practices to be improved.

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applicant evaluation tool used by a number of large urban school districts: the Haberman Star Teacher Evaluation PreScreener. Content specific knowledge was measured using performance on test designed to measure mathematical knowledge among teachers (Hill et al. 2008).

[15] This study is probably the most comprehensive to date in terms of assessing what might be learned about teacher applicants, but it is also limited, as acknowledged by the authors, in that information is collected only from teachers who had been hired and not the full set of applicants.

[16] Achievement, leadership experience, perseverance, critical thinking, organizational ability, motivational ability, respect for others, and commitment to the TFA mission.

[17] As we go on to discuss in Section B, the literature provides evidence on the power of teacher applicant information to predict future success for only a small subset of the applicant

This conclusion is buttressed by research on the importance of selection tools and rubrics in other sectors of the economy (Heneman and Judge, 2003). Hundreds of studies involving a wide variety of employers and employee groups, have analyzed the validity of screening and selection processes. In a multi-occupation, multi-agency study of federal employees, for example, Gandy, Dye, and MacLane (1994) report average correlations of 0.29 to 0.31 between a job candidate's assessment score on a biographical screening instrument and his or her job performance. McDaniel, Schmidt, and Hunter's meta-analysis (1988) of assessments of education and experience finds an average correlation of 0.45 between such screens and job performance; Bliesener (1996) finds an average correlation of 0.53 between assessment scores based on biographical data and objective measures of performance. These correlations are far stronger than what we observe between service teacher credentials and student achievement, suggesting that public schools have room for improvement. Consistent with this conclusion is a recent assessment of school district human resource management that compares public school practices to what is typical in the private sector (DeArmond et al., 2009). Regarding teacher selection, the authors argue that "two important lessons from selection in the private sector point the way to more sophisticated practice: the use of systemic assessment instruments and, importantly, the evaluation of how well they work" (p. 62).

Coming back full circle to the findings about the impact of teacher quality on student achievement, better teacher selection not only has the potential to improve the quality of the teacher workforce, *it is likely to be far more cost-effective than other avenues of reform.*[18] Teacher salaries represent roughly 50 percent of expenditures in a typical school district (Guthrie and Rothstein, 1999), but unlike investments in other educational interventions such as class-size, which can be easily adjusted from year to year, teachers become near-permanent investments for the school system once tenured. This means that once-hired and tenured, school systems are, conservatively, making a potential investment of around $2 million (Goldhaber and Anthony, 2003). Given these facts, it makes sense to engage in research leading to a better understanding of where current hiring practices successfully identify effective teachers, where they fail, and how those practices can be improved. Such research is likely to be far richer, and more useful to practitioners, if it is the product of collaboration between researchers and educational agencies.

The research aim of the proposed CEDR-Spokane partnership is threefold:
1. To better understand the relationship between objective and subjective pre-Spokane service measures of teacher applicants and student achievement, teacher performance evaluations, teacher absences, and teacher attrition.[19]
2. To use what is learned in the first research aim to inform a rigorous statistical analysis of where Spokane's applicant selection process succeeds and fails in identifying applicants who will be successful in the classroom.

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information collected by many school systems.

[18] Dobbie (2011), for instance, makes a strong case that the magnitude of the effects found on the TFA instrument are far larger than those typically found for class size reduction, the returns to early career teacher experience, or the benefits of attending a highly effective charter school.

[19] "Pre-service" refers to the period of time before an applicant obtained K-12 teaching experience. Roughly half of those applicants to Spokane in recent years have existing K-12 teaching experience.

3. To apply for funding to develop and pilot test new applicant evaluation tools that address aspects of the hiring process where opportunities for improvement are identified by the school district and our initial analyses of administrative data.

To address the first issue, we plan to draw on a rich (and underutilized) applicant dataset that has been maintained by Spokane in digital form since 2007. The district collects detailed data about teacher applicants, including information on credentials, academic background, and student teaching experience.[20] In addition to the objective measures above, Spokane uses teacher selection instruments at two stages of the selection process to score applicants. CEDR will supplement this district data with a statewide dataset that includes value-added estimates of teacher effectiveness, based on student achievement on state standardized tests. As described below, initial descriptive analyses of these administrative datasets will provide a better understanding of the relationship between applicant characteristics, assessments by Spokane hiring officials, and student and teacher outcomes.

The second aim of the project is to identify how to improve teacher selection in Spokane. The understanding that is gained through the joint analysis of the factors predicting student achievement, teacher absences, attrition, and performance evaluation scores will not only facilitate the development of capacity in the district to analyze the data that are already being collected by the district, but will also allow Spokane to weigh the consequences of tighter or looser screens, or alternations to the screening process. For example, the analysis might find that applicant information not thought to be associated with the outcomes of interest (and thus not currently given much weight in the hiring process) are in fact predictive. This could lead to changes to the training processes around hiring that are currently in place in the district. As noted under the description of Key Personnel, supervisors, principals, and assistant principals are currently trained by Angela Jones, Brent Perdue, and LaRee Hanson on how to use the 54-point screening rubric.

Finally, our expectation is that new teacher selection tools may lead to better teacher selection procedures. We plan to jointly develop a proposal to test of the effect of providing new information about applicants to school-based hiring committees. As we describe below in Section B.c,, the specific shape of the proposal is contingent on the findings of our initial analyses. One possibility is that available data is sufficient to identify the teachers most likely to succeed in the future, and that new tools can help school districts use this data more effectively. Another possibility is that available data is insufficient to consistently identify the best teachers, and that a new assessment tool would focus on obtaining novel information about applicants. We anticipate the new research study proposal to be the focus of an application for further IES grant funding under the topic, Improving Education Systems: Policies, Organization, Management, and Leadership, and under the Development and Innovation goal.

*Importance of Issue to Spokane Public Schools*

In recent years, Spokane has annually hired for approximately 250 teaching positions, for which there are typically around 1,500 applicants. The extent to which Spokane is able to select the highest quality applicants from this pool potentially has significant implications for the future quality of its teacher workforce and by extension, student outcomes. While the process used to hire teachers at Spokane is certainly intended to select teachers who most positively contribute to

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[20] A more comprehensive list of these variables is available in Appendix A.

student outcomes, Spokane believes that not enough is currently known about the process to identify where it is failing and succeeding in this aim. And in spite of the priority the district places on teacher quality, to date, the district has not performed any systematic analysis linking hiring criteria to student outcomes.

The analysis and improvement of hiring practices at Spokane has been on the agenda of the Human Resources (HR) department since 2008, and in 2010 and 2011 the topic was included as a priority for HR to address in the annual District Work Plan. In spite of maintained interest, the reality of a declining budget and a decrease in HR staffing has required the district to shelve the issue. As increasing amounts of applicant, teacher, and student data are collected by school districts, access to data becomes less and less of a restriction on the ability to explore this issue.

While data has become increasingly available, access to the resources needed to utilize it have not. Spokane lacks the expertise to fully exploit its data and translate it into actionable information. To date, no systematic analysis of the effectiveness of Spokane's teacher selection processes exists and we are unable to describe here where it appears to be succeeding or failing. What *does* exist at Spokane is the desire to rigorously describe the strengths and weaknesses of current hiring practices, and to use that information to improve those practices. For these reasons, the proposed partnership presents a tremendous opportunity for Spokane to 1) gain a better understanding of the relationship between the applicant information it collects and student outcomes, 2) develop tools that use applicant information more effectively, and 3) increase its capacity to continually monitor and improve hiring practices.

*Usefulness of Research to Broader Audiences*

The proposed study will contribute to the literature by expanding on Rockoff et al.'s (2011) work on the relationship between pre-service teacher applicant information and student and teacher outcomes. Two aspects of our study distinguish it from the existing literature. First, as discussed above, many studies have considered the relationship between teacher credentials and educational background and teacher quality. However, as demonstrated by Harris et al. (2011) in their analysis of principals' hiring process, a great deal of subjective judgment goes into the decision. We will assess the expert judgment of hiring officials at Spokane by utilizing a database of applicant information that includes scores on two applicant-screening instruments used centrally by district administrators and at the school-level by principals. These scores reflect the expert judgment of Spokane hiring officials and expand on the set of applicant information considered in previous studies: the judgment of hiring officials is expressed numerically, and the score incorporates information from sources such as letters of recommendation that are difficult to incorporate into data analyses (see Appendix A for an example of letter reviewed by Spokane hiring officials).

Second, by combining a detailed district-level dataset with statewide student-teacher data, *we will be able to observe measures of teacher quality for applicants who were not hired by Spokane*, but were subsequently hired by other public school districts in the state of Washington. To our knowledge this will be the first research that includes a census of teacher applicants and observes the outcomes for applicants that are not hired. This is an important feature of the study as the findings from the few studies that focus solely on applicants who are hired will tend to show relationships between applicant data and student achievement that are attenuated (Rockoff et al., 2011).

This research is likely to be of great interest to school districts in Washington and across the country. In particular, as we describe, the *data* we plan to use for the analysis is collected as

part of a standard applicant information system that is used by numerous districts around the country.[21] But, as is hopefully clear from the review of literature on applicant selection, the potential *information* about applicants that may be derived from the data has not been systematically explored and documented.

Given the national focus on teacher quality and the existing empirical evidence showing it is difficult to significantly influence the effectiveness of in-service teachers through training (American Institutes for Research, 2010; Cohen and Hill, 2000; Kennedy, 1998) or incentives (Springer et al., 2010), it makes sense to focus on teacher selection as a policy lever. Our findings will both be novel and have the potential to influence the kinds of data collected from applicants and the ways that the data are aggregated to provide useful information about teacher applicants. For instance, should we find that particular pre-service student teaching experiences are associated with the outcomes of interest, the hiring process in Spokane, and school districts in general, could be influenced. Moreover, our findings have the potential to influence research and practices around teacher training since we will be assessing the relationships between a number of pre-service training characteristics (e.g. student teaching experiences) and in-service teacher performance.

Finally, it is clear that the research we describe has a ready audience in the Professional Educator Standards Board (PESB) as evidenced by the letter from Jennifer Wallace (see Appendix C). PESB, which is the key agency responsible for teacher credentialing in Washington State, has advocated exactly the kind of partnership that has evolved between CEDR and Spokane and has a vehicle – the PESB Research Advisory Committee – that can be used to share important research findings across school districts.

Looking forward to the work that could be done under a future proposal to IES, the successful development and testing of new applicant assessment tools would be of interest to any school district looking to improve the quality of its teacher workforce through better hiring practices.

## B. RESEARCH PLAN

### a. Developing the partnership

Under the proposed project, two types partnership activities will be established to move the project forward while strengthening the relationship between Spokane and CEDR. First, key personnel and staff from Spokane and CEDR will hold a two-hour meeting twice a month. The purpose of these meetings will be to regularly assess progress on the project and address any problems or concerns held by either institution. Accompanying these meetings will be briefs prepared by both Spokane and CEDR summarizing project progress and identifying issues to address. Because Spokane and CEDR are a significant distance apart, these regular meetings will typically be conducted by phone or videoconference.

Second, a bi-annual meeting will be held at Spokane with the purpose of building the research capacity of the district. Currently, the Spokane has a limited capacity to conduct in-house analyses of the data it collects, and virtually no capacity in regards to studying the relationship between teacher quality and student outcomes. The bi-annual meetings will focus on

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[21] Spokane uses the WinOcular software system, distributed by Combined Computer Resources, Incorporated, to track applicants.

building an understanding of what data is available, what questions can be addressed using this data, what methods can be used and what are the trade-offs to different approaches, and how to interpret the results of various analyses. These issues will be addressed using data and findings from the proposed project as it progresses, and the meetings will provide a forum to present results to a stakeholders at Spokane in an intuitive and transparent manner.

At a minimum, the capacity-building meetings will involve key personnel and staff from Spokane and CEDR. However, the meetings will be targeted to a broader set of Spokane stakeholders who are interested in the project's work in particular, or in understanding research possibilities in general. Two important outcomes of the interactions at these meetings will be 1) An improved understanding at Spokane of the types of issues CEDR researchers can address, and 2) A better understanding at CEDR of the types of issues Spokane is interested in working on. Both of these outcomes will strengthen the long-term partnership between Spokane and CEDR by enhancing our ability to collaborate and identify important issues that can be addressed through the analysis of data.

In addition to building research capacity, these meetings will provide a forum (in addition to the Advisory Board meetings described below) for Spokane stakeholders to involve themselves in the research process. Researchers will be able to receive input on the direction of the research, feedback on results, and assistance from practitioners in interpreting findings from the analysis of administrative data. These types of interactions will improve off the status quo, where research is conducted in relative isolation and findings are presented to stakeholders ex-post.


### b. Developing the research plan

The initial analyses will utilize a series of datasets including applicant, personnel, and student information from Spokane, and a combination of state-level datasets compiled by CEDR that link individual students to teachers. These datasets are described below, followed by a discussion of the types of analyses that will be carried out. First, we describe the framework that will be established to guide the research process.

*Guiding Framework*

To guide the initial analysis and its development into a more intensive research project, we will assemble an advisory board of stakeholders and experts to serve several purposes. The board will help guide the research by weighing in on the outcomes we plan to assess through the descriptive study discussed below, and, down the line, interpreting the importance and implications of the research findings both for existing practices in Spokane and the state as a whole. The advisory board will also have two additional tasks: reviewing and commenting on research reports and disseminating research findings to education stakeholders, both in Spokane and Washington State as whole. Finally, we envision that the board will play a central role in the development of a more intensive research project on the issue of teacher hiring practices, which will ultimately be submitted for consideration for further IES grant funding.

Given the myriad roles we intend the advisory board to play, we sought to include a diverse group of individuals – practitioners with experience with selection practices and policies, researchers with expertise in methodology and the existing literature linking hiring practices and applicant characteristics to later student and teacher outcomes, and stakeholders who are interested in the research and could play a role in the dissemination of findings. Five individuals have already have agreed to serve on such an advisory board should the CEDR-Spokane

partnership be awarded the grant (see the letters of commitment in Appendix C). In addition to those who have already agreed to serve on the Advisory Board, we are committed to adding several practitioners from Spokane who have direct experience with the hiring processes of the district (e.g. principals or teachers) as well as a member of the district's school board.

The research expertise of CEDR will be complemented by the addition to the advisory board of three researchers who are nationally recognized leaders in the study of teachers and student outcomes. Heather Hill is a Professor at Harvard who has focused much of her work on developing and validating the Mathematics Knowledge for Teaching (MKT) instrument that is used in a number of school systems to assess teachers' skills in math instruction (e.g. Hill et al., 2005) and content knowledge. She has plans to develop a variant of the MKT that could be used for hiring purposes.[22] Susanna Loeb is a Professor at Stanford who is one of the leading researchers on the relationship between teacher pre-service and in-service credentials and experiences and student achievement.[23] Jonah Rockoff, has an extensive track record linking pre-service teacher characteristics and credentials to student achievement, is the lead author on one of the key studies on applicant information and student achievement (Rockoff et al., 2011), and has experience designing a randomized control study focused on the provision of information to principals (Rockoff et al., forthcoming), which is likely to be a future focus of the CEDR-Spokane partnership.[24]

Finally, we have received commitments from two representatives interested in education policy at the state level: a representative of the Professional Educator Standards Board (PESB) of Washington State, and Edie Harding, Senior Program Officer at the Gates Foundation charged with overseeing philanthropy in Washington. Both of these representatives will provide valuable outlets through which the findings of this project can be disseminated to other school districts in Washington. As teacher quality is at the heart of PESB's mission, it is very interested in the partnership between Spokane and CEDR, and has offered to support the project with access to relevant state-level data.

We anticipate that the Advisory Board will meet to provide input at three junctures of the proposed project. First, the Washington-based members of the board will meet in person with the Principal Investigators and key personnel in late summer 2013 to discuss Spokane hiring procedures, available data, and approaches to the initial descriptive analyses described below. Second, following the completion of data cleaning and the descriptive of analyses in spring 2014, the full advisory board will be reconvened in summer 2014 to interpret the initial analyses, advise on approaches to the multivariate regression analysis of the data, and outline approaches to developing a proposal to study the development of new tools for teacher selection. The next 6-8 months of the project would be spent revising the analysis based on the input of the advisory board, and on the development of a more rigorous assessment of teacher selection. The advisory board would be convened for the final meeting in the summer of 2015 to critique the new proposal to IES and suggest forums for disseminating existing research findings.

*Administrative Data*

The population of primary interest to the project is that of teacher applicants to teaching positions in the Spokane Public School district. Hence, the set of observations will be determined

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[22] Heather Hill CV: http://www.gse.harvard.edu/faculty_research/profiles/cv/heather_hill.pdf
[23] Susanna Loeb CV: http://cepa.stanford.edu/sites/default/files/susanna-loeb-cv.pdf
[24] Jonah Rockoff CV: http://www0.gsb.columbia.edu/faculty/jrockoff/cv.html

by the Spokane applicant dataset. Other district-wide datasets from Spokane and statewide datasets from CEDR will be merged with the applicant data to connect applicant characteristics with student and teacher outcomes.


Spokane Applicant Data: The department of Employment Services at Spokane maintains a record of each applicant for a teaching position in the district. Since the 2007-2008 school year, these records have been entered into an electronic database using the applicant tracking software WinOcular, from Combined Computer Resources, Incorporated. This dataset consists of the population of all teacher applicants from 2007-2008 to present, including applicants who were not ultimately hired. Total applicants number 8,361 during this time period; 1,265 of these applicants (15%) were hired by Spokane.

The key variables in the Spokane applicant dataset provide information about applicant characteristics known before the hiring decision is made. These variables include: the duration, location, subject, grade-level, and school type at which student teaching and/or teaching experience was obtained; applicant GPA; address at the time of application; qualifications such as degrees obtained (and subject areas) and educational institutions attended, and certifications and endorsements. A more comprehensive list of these variables is available in Appendix A.

In addition to applicant characteristics, screening procedures used by Spokane at two stages of the hiring process provide a quantitative measure of an applicant's desirability. In the first stage, all applicants are pre-screened by the district's central human resources department based on a 21-point rubric (see Appendix A) that judges the quality of teaching experiences and letters of recommendation, and the applicant's depth of skills. The pre-screen score, which is determined for every applicant, reflects the expert judgment of the human resources department distilled into a single score, which is recorded in the WinOcular database. Whether an applicant moves on to the next stage of the hiring process depends in large part on his or her pre-screen score.

Applications that survive the central screening process are forwarded to the principal of the school hiring for the teaching position. The principal, and in some cases other administrative personnel, uses a second screening tool based on a 54-point rubric.[25] It is similar to the central screening rubric, but more detailed and focused on the fit between the applicant and the school (e.g., endorsement areas, types of experience, school culture). These scores are only available for a sub-population of applicants: those who advanced from the central pre-screening. Scores on the 54-point rubric are not currently available in digital form and will require entry into the applicant database.

Ultimately, the applicant dataset from Spokane provide us with three important sets of information: 1) An applicant's pre-employment characteristics and experiences, 2) Scores reflecting the subjective expert evaluation of an applicant, and 3) The hiring decision or point at which an applicant is eliminated from the pool of candidates. In the context of the body of studies on teacher characteristics and teacher quality, this applicant dataset has two clear strengths. Firstly, the screening scores provide a quantitative measure of subjective expert evaluations by hiring officials, whereas other studies have not incorporated information

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[25] Spokane's Human Resources department trains school-level hiring officials in how to score applicants using the 54-point rubric. The personnel responsible for this training include the key personnel from Spokane who are involved in this project: Angela Jones, Brent Perdue, and LaRee Hanson.

Applicants at the Doorstep: Improving Hiring Practices through a Better Understanding of the Link Between Applicant Information and Teacher Quality

reflecting the judgment of hiring officials. Secondly, it identifies applicants who were not hired by Spokane, whereas other studies observe only the variation in characteristics and teacher quality among the population of teachers who is hired.

Spokane Personnel Data: An extensive personnel dataset, encompassing all teachers employed by Spokane, will be available to the project. Since 2007, Spokane has maintained digital personnel records using the Integrated Financial and Administrative Solution (IFAS) software from SunGard. This dataset includes fields describing teacher certification, education, demographics, experience, position, and location. The personnel data include two key variables that will be used as a measure of teacher quality: teacher attrition and teacher absences. The dataset may also provide teacher characteristics to consider, in addition to those provided by the applicant database. However, such data would only be available for the applicants who were hired, but may not accurately describe the status of teachers during the application process.

Spokane Student Data: A dataset encompassing all students for the school years 2007-2008 to present will be made available to the project. This dataset includes fields describing student attendance, discipline, location, courses, and test scores, as well as links between students and teachers. The test score data provide a key measure of teacher quality that directly links teachers to student achievement. An additional advantage of test-score based measures of teacher quality is that the same test is administered statewide. A disadvantage is that estimating test-based measures of teacher quality is problematic for some school years, and for teachers of untested subjects in middle and high schools.

State-Wide Teacher- and Student-Level Data from CEDR: CEDR has obtained datasets from the sources described immediately below. Some of the datasets are publicly available, and others have been obtained through agreements with the relevant state agencies.

The **Washington State S-275,** compiled by OSPI, is a personnel report that provides a record of certificated and classified employees of the school districts and educational service districts (ESD) of the state of Washington. All school district and ESD personnel employed as of October 1 of the school year are reported on the S-275 report. The primary use of this dataset will be to identify applicants who were not offered positions by Spokane, and were subsequently hired as teachers in other districts. A second use will be to determine teacher attrition, one of the proposed measures of teacher quality. And a third use will be to complement the applicant and personnel information collected by Spokane. The S-275 data include demographic information, highest degree type (and year obtained), academic and in-service credits, certificated years of experience, contract information, and assignment information.

The **Professional Educators Standards Board (PESB)** database, prepared by OSPI, provides detailed certification and testing records on all education professionals in the state of Washington. Teacher information includes certification information (type, issue and expiration dates, recommending agency, and endorsement type and grade level) and testing information (test name, score, date, standard for passing grade, and whether standard was met). These variables will complement the applicant characteristics recorded by Spokane. CEDR has a working relationship with PESB, which has endorsed a letter of support for the proposed project (see Appendix C**).**

The **Core Student Record System (CSRS)** data are regularly collected as a part of OSPI's testing and school accountability programs, and contain student achievement,

demographic, and assignment information. Variables of interest include race/ethnicity, gender, course-taking patterns, transcripts, and teacher assignments. This dataset is critical for the estimation of valued-added measures of teacher effectiveness.

The **WASL** is a dataset of student achievement information gathered from the Washington State Assessment of Student Learning (WASL)—a regular annual statewide assessment tests for grades 3–8 and grade 10. These tests are similar to those given in most states and are used to assess student performance, determine student promotion eligibility, and to the evaluate schools and teachers in the state. As described below, the student test-score data in this dataset is used in combination with the aforementioned statewide datasets to estimate teacher quality in terms of value-added contributions to student achievement.

Value-Added Estimates

There is a growing body of literature that uses value-added models (VAMs) as a measure of teacher effectiveness (e.g., Aaronson et al., 2007; Goldhaber and Hansen, 2010; McCaffrey et al., 2009). These models estimate a teacher's effect on student achievement as measured by performance on standardized tests, controlling for prior achievement and a vector of student and family-background characteristics. Using the student and teacher-level datasets from Washington State described above, and in particular WASL test scores, CEDR has estimated value-added scores for the population of teachers in grades 4–6 (currently available for the school years 2006/2007 – 2010/2011) and grades 7–8 (currently available for the school years 2009/2010 – 2010/2011).[26] These value-added score data are updated as new data becomes available each school year.

The value-added scores can be matched to Spokane's applicant dataset using teacher certification IDs. Matching the applicants to value-added scores provide a measure of quality for teachers who were hired by Spokane as well as for teachers who were not hired by Spokane, but were hired by a public school system elsewhere in the state. A weakness of this data is that it is currently available for only a subset of teachers (those teaching grades 4–8).

*Initial Data Analyses*

The analyses of the administrative datasets described above will seek to discern the relationship between objective and subjective pre-service measures of teacher applicants (the independent variables) and teacher performance measured by student achievement, teacher performance evaluations, teacher absences, and teacher attrition (the dependent variables). The choice of student achievement as a measure is self-explanatory and consistent with IES' focus, but somewhat limited in that student performance can only be assessed in tested grades and subjects. Currently there is little variation in formal teacher evaluations in Washington State, but this is slated to change as a consequence of recent legislation which mandates a four-tiered evaluation system (Washington State Senate Bill 5895, Laws of 2012; Washington State Senate Bill 6696, Laws of 2010). While the new teacher evaluation ratings will include student test performance as a component, they will encompass other measures such as teacher practices in

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[26] CEDR estimates models using a wide range of specifications because there is no universally accepted method for calculating a teacher's value-added contribution and research shows that methodology and context can influence the measure (Ballou, Sanders, & Wright, 2004; McCaffrey et al., 2004; Rothstein, 2010; Rubin, Stuart, & Zanutto, 2004; Tekwe et al., 2004).

the classroom. Teacher absences are also an important indicator of performance, having been linked to student achievement by recent research (e.g. Clotfelter et al., 2007; Miller et al., 2007; Stoddard and Kuhn, 2008).[27] Finally, teacher attrition is a concern for Spokane given the cost of hiring teachers and the value of the first few years of experience in the district.

We envision a data analysis process consisting of four distinct steps: 1) assessment of variation in applicant data collected; 2) assessment of variation in all variables among applicant subgroups (defined below); 3) assessment of variation in independent variables among teachers of varying performance level; and 4) multivariate regression analysis of the link between applicant data teacher quality (as measured by the dependent variables).

Initially we will seek to provide a descriptive picture of the applicant group as a whole in terms of the full set of data collected by SPS, whether or not it is explicitly used during the hiring process (Step 1). This will illustrate what applicant data is currently available to SPS and which variables exhibit significant variation. Variation in a data field that is collected is necessity for the field to have the potential to distinguish teachers of varying quality. While perhaps seeming obvious, this is often overlooked by practitioners so we believe an assessment of variation is important both to understand which variables have greatest potential for predicting future teacher performance, and to illustrate whether the collection of the information is worthwhile for the district.

Step 2 will look at the distribution of applicant data among subgroups defined by the hiring process. Specifically, we will define subgroups within the entire pool of applicants based on their progression through the screening and hiring decisions of SPS (see Figure 2 in Appendix A):

- Group 1: All applicants
- Group 2: applicants who did not progress beyond pre-screening under 21-point rubric
    - Group 2a: Applicants hired by a different Washington school district
    - Group 2b: Applicants not hired by a district in Washington
- Group 3: applicants who received screening score under the 54-point rubric, but are not hired by Spokane
    - Group 3a: Applicants hired by a different Washington school district
    - Group 3b: Applicants not hired by a district in Washington
- Group 4: applicants hired by SPS

Regarding our dependent variables measuring teacher quality, we are limited to considering groups 2a, 3a, and 4 because we are unable to observe teacher outcomes among applicants who do not ultimately teach in a Washington public school district.

These group-level descriptions will illustrate how the pre-service characteristics and teacher quality vary among applicants who advance through different levels of the hiring process. It will lay a foundation from which we can pursue our research aims more directly in Step 4 by modeling the relationship between applicant data, more generally, and teacher performance. In particular, we will have insight into which applicant data is, and is not used to inform the hiring process, and how effectively current practice selects the highest quality teachers.

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[27] A particularly compelling study from Hermann and Rockoff (2010) estimates that the student achievement effects of teacher absences are comparable to replacing an average teacher with a 10th percentile math teacher or 20th percentile reading teacher for each absent day. And over the course of a school year, the accumulation of 10 absences is associated with a 2–3 percent reduction in student test scores (Clotfelter et al., 2007; Miller et al., 2007).

Step 3 will focus on describing how applicant data and screening scores vary among groups of teachers defined by varying levels of performance. We will work with the Advisory Board to define categories of teacher performance (for example, quantiles of value-added effectiveness or number of absences) and then broaden the descriptive analysis to focus on the variation of applicant data among the different performance based groups. These analyses will illustrate which applicant data are likely to predict teacher performance, which in addition to our Step 2 analyses, will inform our modeling choices in Step 4.

While the descriptive analyses in steps 1-3 are not suitable for making causal inferences, they are important for several reasons. First, as previously mentioned, they will inform the modeling to be undertaken in Step 4. Second, they will provide a comprehensive look at the SPS hiring process, including what applicant data is available, how the screening process sorts applicants, and which variables are likely (or unlikely) to provide useful information to hiring officials. Finally, for practitioners at Spokane, these analyses will establish an intuitive understanding of the applicant data and the potential ways it can be utilized, which is an important step in building the district's capacity for analysis and evidence-based policy formation.

In Step 4 of the process we will use multivariate regression techniques to analyze where Spokane's applicant selection process succeeds and fails in identifying applicants who will be successful in the classroom (Research Aim 2.). The primary goal will be to identify relationships between applicant data and teacher performance, and to determine where predictive data is, and is not, being used by Spokane. This analysis will focus on two features of the dataset that set it apart from those used in previous studies. First, we will be to take advantage of the statewide data available from CEDR, which will enable us to observe the performance of some of the applicants *not* hired by Spokane. Second, we will carefully analyze the screening tools used by Spokane during the hiring process, which reflect the subjective assessment of applicants by hiring officials. Specific modeling specifications will depend on what has been learned in Steps 1-3 and input from the Advisory Board, but one aspect of the analysis that we anticipate estimating ANOVA models so as to obtain an upper bound estimate of the potential for the existing applicant data collected by Spokane to inform selection decisions.

Finally, at each step of the analyses outlined above will be carried out within subgroups defined by grade-level, subject matter, and teaching environment. It is necessary to understand whether certain applicant data is predictive for some types of positions and not others. It is unlikely that one hiring process will fit all situations, and considering these subgroups add an important level of nuance to our proposed analyses.


**c. Developing the application for further Institute funding**

The primary purpose of the research we have outlined above is to assess ways to strengthen teacher selection processes. Central to this goal is building off the analyses we describe above towards the development of an application to IES that will focus on the development and pilot testing of new applicant screening information. We expect to submit this application to the Education Research Grants Program under the Development and Innovation goal.

The development of the future proposal will be guided by our analyses of hiring practices at Spokane and the expert input from researchers and practitioners on the Advisory Board. An approach to the future proposal will be first outlined at the second meeting of the Advisory

Board in Washington in summer 2014. Our approach will be informed by our findings from the descriptive analyses of applicant data and teacher performance that will have been completed in spring 2014. At this point, we will have a thorough understanding of the hiring process in Spokane and any systematic variation in applicant data and teacher performance. During the following year, the application will be refined based on findings from multivariate regression analyses of the hiring process and regular input sought from the Advisory Board and our IES Program Officer. As this second-stage analysis proceeds, we expect to be able to identify where Spokane's hiring processes succeed and fail to identify applicants who are the most likely to succeed in the classroom. Input from the Advisory Board at its summer 2015 convening will finalize the proposal, which will be submitted in September 2015.

The ultimate shape of the future proposal will be contingent on the findings of the proposed project. We anticipate two potential outcomes from our research (or some combination of the two). We may find that currently available applicant data has the potential to successfully identify the best applicants, but that it is not fully utilized by Spokane's hiring processes. On the other hand, we may find that currently available applicant data is insufficient to effectively identify applicants. Depending on the nature of these outcomes, we will propose the development of new applicant assessment tools that a) better exploit currently available applicant data, and/or b) develop new applicant assessment tools that obtain novel information about applicants that is predictive of future success.

Specifically, we anticipate that the decision to use existing data or collect new information from applicants will be contingent on the analysis of variance noted in the prior sub-section. Should we find that existing applicant data has the potential to predict what is deemed to be a significant portion of future teacher performance, we would be unlikely to propose a project that entailed new applicant data collection; rather we would likely propose new selection instruments that utilized data already being collected. However, should Spokane and the advisory board judge the potential explanatory power of the existing data collected to be low, we would be more inclined to propose entirely new forms of applicant assessment. Either way, the proposal will focus on developing new applicant assessment tools and pilot testing their effectiveness when implemented at the district level. Finally, this piloting is likely to include randomization to ensure that we have a rigorous assessment of the extent to which new tools are actually used by school practitioners as part of the hiring process.

The partnership is in a strong position to recruit the research personnel and education agencies needed to carry out this type of research. CEDR and Spokane are committed to pursuing this work. We have recruited an advisory board with the expertise and experience necessary to carry out a high-quality study that develops and assesses the implementation of new applicant assessment tools. In developing the proposal, we will consult with our Advisory Board and Program Officer as to whether the participation of additional school districts is necessary. If additional participants are found to be desirable, CEDR's partnerships with Washington State school districts, as well as PESB's interest in the project, place us in a good position to recruit them.

The future proposal will address the Development and Innovation goals by developing an innovative policy intervention in the form of new teacher applicant assessment tools that can be used to improve hiring practices when implemented at the district level. Furthermore, we will propose piloting the implementation of these tools with the goal of assessing their effectiveness at improving student outcomes through the selection of a higher quality teacher workforce. This pilot will focus not only on the relationship between a new tool and student and teacher

outcomes, but, as noted above, the experimental design will be important to assess whether the new assessment tool is being utilized in authentic setting by hiring officials; the provision of additional applicant information is only beneficial if it is in fact utilized in decision making.