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Urban School District-University Research Collaboration: Challenges and Strategies for Success

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Urban School District-University Research Collaboration: Challenges and Strategies for Success

School district-university research collaborations represent one strategy to increase educators' ability to use current, research-based information in program decision-making and efforts to improve student achievement. However, differences in organizational structures, goals, values, and prior collaborative experiences, have made successful school-university research partnerships challenging. This project intentionally structured and examined a mutually beneficial, research collaboration between one small urban university with a significant percentage of first-generation college going students and two local school districts (P-12) to examine high school math achievement and subsequent college math success. One partnership successfully conducted the study and identified actions to increase student success. The other was successful only to the point of partial data collection. This article describes the structures, mechanisms, and conditions that led to the successful partnership and compares them to the unsuccessful one. It contributes to our understanding of developing effective, mutually beneficial school-university research collaborations to improve student outcomes.

Key words: urban education, educational policy, school improvement

Urban School District-University Research Collaboration: Challenges and Strategies for Success

In the current environment of accountability, educators are increasingly urged to practice evidence-based decision-making and to incorporate findings from data analyses and research to inform program improvement for increased student achievement (Hamilton, Halverson, Jackson, Mandinach, Suppovitz, & Wayman, 2009; Tseng, 2012). This emphasis is reflected in numerous federal and state programs, such as the U.S. Department of Education initiatives No Child Left Behind (2002) and Race to the Top (2009). In spite of these mandates, connecting research and practice has proven to be a persistent problem. The gap between research evidence available to practitioners and the use of this research to inform practice has been widely documented (Fuchs & Fuchs, 2001; Gersten & Smith-Johnson, 2001; Honig & Coburn, 2007; Levin, 2013; McIntyre, 2005; Penuel, Allen, Coburn, & Farrell, 2015; Rosenquist, Henrick, & Smith, 2015).

Recommending education researchers and practitioners[1] work more closely together to align research efforts to practitioner needs is one logical strategy to attempt to close the gap (Levin, 2013; Tseng, 2012). However, both organizational differences between universities and districts as well as practitioners' prior experiences of working with researchers have impeded successful research collaborations (Levin, 2013). Recently there have been increasing calls for greater clarity and understanding of how researchers and practitioners can work together in long-term research partnerships (Coburn & Penuel, 2016; Penuel et al., 2015). In this study, the researcher examined obstacles to successful partnerships and then intentionally structured a mutually beneficial, collaborative research effort between two urban school districts and one small urban university to address those issues. The research effort itself focused on investigating the relationship between students' high school math achievement and subsequent college math success.

Differences between the cultures, norms, and practices in the academic research environment and the elementary/secondary education (P-12) environment present various challenges to successfully produce research that is relevant to, and can be used by, practitioners to inform their decisions regarding educational programs and policies (Coburn & Penuel, 2016; Barton , Nelsestuen, & Mazzeo, 2014; Tseng, 2012). Researchers focus on contributing new knowledge to the field, and are the primary producers of educational research using rigorous methodologies (Coburn & Penuel, 2016; McIntyre, 2005). They are inclined to value theoretical (impersonal) approaches to problems, and design rigorous methodologies for investigations more likely to demonstrate cause and effect, which frequently includes breaking a problem into very specific and limited aspects of practice (McIntyre, 2005). Meticulously planning and implementing such rigorous studies can take extensive time and effort. Finally, researchers often use definitions of methodologies and scientific terminology related to complex analyses, which may be unfamiliar to practitioners (Levin, 2013; Tseng, 2012).

In contrast, practitioners focus on solving problems of practice to increase student learning. Theoretically, they are primary consumers or users of educational research, but using research to inform practice is not their primary goal. Studies on how practitioners use research to inform decisions indicate that, while they value research, practical demands on their time inhibit reading and consuming research first-hand so they often rely on trusted colleagues for research-based information (Levin, 2013; Tseng, 2012). They tend to focus on the practical use of research as just one of many considerations in complex decision-making. The realities of limited resources, along with political and personal factors related to managing human beings in organizations are often weighed more heavily in practitioners' decisions (Levin, 2013; Tseng, 2012). Research using elegant methodologies regarding limited aspects of practice may result in

findings too narrow and not relevant or useful for practitioners (Coburn, Penuel, & Geil, 2013; McIntyre, 2005). The need for information to make daily decisions about practices and policies often does not accommodate the longer timelines required for developing and implementing rigorous research designs (Coburn et al., 2013; McIntyre, 2005; Penuel et al., 2015). Finally, translating the findings of complex, rigorous studies into information that can be applied in a practice-based setting is not always readily apparent. Some have even proposed the notion of a separate partner to help practitioners make these connections (Levin, 2013; Penuel et al., 2015; Tseng, 2012).

In addition to organizational differences, the unique work environments of the researcher and the practitioner also contribute to the challenge of building effective collaborative efforts. For the researcher, it may be difficult to align the collaboration work with academic norms and requirements (Rosenquist et al., 2015). Many of the activities needed to maintain collaborative relationships are not valued in academic accountability systems. For example, for many universities, tenure is closely tied to the number of publications, not necessarily the amount of time and effort expended to conduct studies. Activities such as multiple meetings and interim steps required to develop and maintain the trusting relationships needed for collaboration are not valued or weighted in the tenure system.

Challenges specific to school district environments include practical and political pressures of educating children. Schools are dynamic organizations that can be dramatically affected by constantly changing forces such as federal and state legislative initiatives, local school board elections and members, local political pressures, changing student demographics, and frequent personnel turnover. Rigorous research studies planned over long periods of time

are vulnerable to the impact these changing dynamics can have on school resources and priorities (Rosenquist et al., 2015).

Over time, the nature of university/district research partnerships has contributed to a sense of power inequity between the partners (Dallmer, 2004; Lefever-Davis, Johnson, & Pearman, 2007; Wagner, 1997). Traditional university education research has frequently focused on theoretical solutions to educational problems. Often practitioners have not had a voice in defining the research focus, questions, or outcomes (Coburn et al., 2013; Osajima, 1989). The long history of perceived power inequity in school-university partnerships has created mistrust and hesitation in practitioners' willingness to engage (Coburn, Bae, & Turner, 2008; Osajima, 1989). Addressing the perceived power differential of the partners is an important consideration when planning a collaborative research effort.

In spite of these challenges, the pursuit of effective researcher/practitioner research collaborations has continued because of their recognized potential to close the gap in relevant research production and use in practice. Partnerships to conduct mutually beneficial research are intended to: a) increase the relevance of research conducted to current problems of practice (Easton, 2014; McIntyre, 2005; Tseng, 2012;); and, b) increase practitioners application of research findings and evidence-based information to problems of practice (Honig & Coburn, 2007; McIntyre, 2005; Tseng, 2012).

The federal government has validated the importance of developing researcher/practitioner collaborations or communities of practice by including them in major programs such as the Institute of Education Sciences Regional Education Laboratories (RELs) (Easton, 2010). The RELs began developing Research Alliances around 2008 as one type of education researcher/practitioner partnership in which stakeholders who have common concerns

collaborate to leverage complementary knowledge and skills to examine a problem of practice and to identify potential solutions to improve student outcomes (Barton et al., 2014; Penuel et al., 2015). In early 2016, across the ten RELs, there were 79 Research Alliances with federal funding supporting their collaborative efforts (U.S. DOE, 2016).

Two notable established efforts of universities partnering with P-12 school districts to provide rigorous evidence to inform education policy and practice are the Consortium on Chicago School Research (University of Chicago and Chicago Public Schools) and the Research Alliance for New York City Schools (New York University and New York City Schools). Both of these research collaborations have resulted in numerous published research studies designed by researchers and practitioners together, to answer specific, relevant questions and inform public school policies and practices (Roderick, Easton, & Sebring, 2009; Villavicencio, Bhuttacharya, & Guidry, 2013). These collaborations include very large urban school districts, teams of both senior and junior researchers, relatively mature organizations, and ongoing funding from various sources.

As researchers and practitioners have attempted to develop partnerships to produce more relevant and usable education research, new studies examining collaboration and the necessary conditions and practices for successful partnerships have emerged (Coburn & Penuel, 2016; Coburn, Bae, & Turner, 2008; Coburn et al., 2013). They describe the importance of identifying mutually beneficial goals and activities, co-designing the work, building trust, and identifying mechanisms for translating information so it is meaningful for both organizations. Penuel et al. (2015) proposed the notion of boundary-crossing as intentionally structuring researcher/practitioner interactions to enable successful collaborations of individuals from very different organizational cultures.

The research collaboration described in this article was modeled on the Chicago consortium and the New York alliance in that it represents an urban P-12 school district/university partnership to conduct relevant research. However, it was developed on a much smaller scale (two districts, one small university, one researcher), had little formal organizational structure other than what the researcher established, and almost no funding resources other than the researcher's time. Implementing a small-scale collaboration using strategies intentionally designed to address specific challenges created a unique opportunity to describe the dynamics of developing a successful research partnership.

Research Questions

The research questions for this study were:

1. Can a small, urban district-university partnership with limited resources be structured to address potential organization barriers and produce relevant, mutually beneficial research, to improve policies and practice and increase student success?
2. What are the characteristics, structures, and mechanisms that contribute to, or impede a successful district-university research collaboration?

Methodology

A participant observer methodology was used for this qualitative study (Jorgensen, 2015). This method was selected as the most appropriate because the researcher sought to establish a collaborative research effort in a setting where this type of work had not previously been done. There were three primary participants in the study (researcher, two district administrators) and the researcher designing the partnership activities was the logical person to evaluate the various aspects of the effort.

Description of researcher/practitioner research collaboration in this study

The overall purpose of this project was to establish a researcher/practitioner collaborative relationship between a small, urban 4-year university with a significant percentage of first-generation college going students (University) in the northeast part of the U.S., and two local feeder school districts, District 1 (approximately 9500 students) and District 2 (approximately 35,000 students), to collect and analyze data focused on various problems of practice. This article describes and compares both collaborative endeavors. The collaboration with District 1 was successful in completing the data collection, analyses and reporting, whereas the collaboration with District 2 was successful only to the point of District data collection.

The intent was to identify a specific problem of practice to serve as the initial effort to build the partnerships which would provide a foundation for subsequently conducting additional data collection and analyses to improve student outcomes. Considering the challenges in conducting collaborative research described earlier, this article discusses several of the issues/barriers to developing partnerships in this urban context, specific actions implemented to address the issues, and the successes and failures of these school district/university research partnerships.

The collaborative effort was initiated by the University professor and proposed as an opportunity to examine preparing and successfully transitioning high school students for math success at the university level. The two public school districts selected for participation were in close proximity to the University campus and enabled frequent face-to-face meetings to establish the partnerships during the 2014-2015 school year.

Specific challenges and strategies to develop the collaborative work

When proposing a research collaboration between the organizations, it was critical to acknowledge organizational differences and anticipate how to respond to issues that might arise as a result. Key challenges initially perceived for this study were: a) developing and maintaining a trusting relationship; b) identifying and pursuing a mutually beneficial, relevant research topic; c) sharing confidential student data across organizations; and, d) completing the data collection, analyses, and disseminating the results. Both the development of the research/practitioner partnership in relation to these challenges and the specific data collection and analyses conducted to inform related policies and practices in each organization. The successful (District 1), and the ultimately unsuccessful (District 2), collaborations are discussed along with factors potentially related to the different outcomes.

Proposed collaboration activities/project plan

Four primary steps were taken to address the perceived challenges to develop the researcher/practitioner partnership and conduct the study. The first was to develop the framework for the P-16 collaborative research relationship with a focus on building trust between the partners. The framework had several specific components. The roles and responsibilities of each partner (University, District) were clearly defined. A key component of the framework was to establish clear, consistent and transparent communication as the standard for the entire project. A legal counsel-approved Data Sharing Agreement (DSA) was developed to ensure student data confidentiality and approved by both partners. The problem of practice and related outcome data analyses were mutually agreed upon. A detailed project plan that specified activities and timelines (including how results would be shared with the District and others) was developed as a final step of this initial stage to be as transparent as possible about the partnership commitment. Throughout the year the sequence of activities closely followed the

plan. The timeline, however, had to be adjusted to accommodate legal counsel availability and District data collection resources.

<**See Table 1**>

The second critical step was to identify the sources of required data elements from each organization (databases and fields) required to conduct the data analyses. The study database was developed and the fields for the data elements to populate were specified. The method of matching/tracking students, while maintaining confidentiality and anonymity, was discussed and agreed upon.

The third step was to conduct analyses of the data, examining relationships between P-12 mathematics performance and first semester college mathematics course enrollment and performance. The primary analysis was a Pearson correlation with P-12 student math achievement as the independent variable and first-semester University mathematics course enrollment and grades as the dependent variables. The intent was for the results to inform both the Districts and the University about students' math preparation and achievement across P-12 and postsecondary schools.

Finally, the last step was to synthesize the results and identify how they could inform action to improve student outcomes. The researcher and District administrators (DAs) planned to examine the relationship between high school achievement and college success to assess programs the high schools had implemented to improve students' college readiness. The University planned to use the results in their ongoing discussions regarding how to improve postsecondary students' participation and success in credit-bearing math courses.

Key collaborative research efforts

Establishing and developing a trusting relationship. The original intent of the research project was to leverage existing University relationships with local Districts, and to use a defined framework to develop a trusting researcher/practitioner partnership with a focus on a relevant current problem of practice. The University president, as well as the dean of the College of Education, maintained ongoing, positive relationships with both school districts. Each introduced the researcher to District leaders and encouraged the partnerships throughout the project.

Given the history of perceived power inequality in university/practitioner partnerships and the challenges of overcoming major organizational differences with respect to research endeavors, the researcher used specific strategies to address the goals of developing trust between the collaborating organizations and producing a mutually beneficial outcome. The first strategy was to develop a professional relationship between the researcher and each DA by demonstrating task focus, consistency and organization over time. For most of the meetings the researcher traveled to the DAs' offices to meet after students were dismissed from school. An agenda was sent prior to each meeting, as well as follow-up minutes after each meeting summarizing the conversation, agreements made, follow-on activities and a timeline for the next contact. The researcher's goal was to communicate and/or meet with each DA at least once a month to maintain project momentum. The close proximity of the Districts to the University campus was a key factor to enable the frequent meetings. The intent was to demonstrate a clear focus on the work, and to provide consistent follow-through with activities, commitments, and communication to build confidence in a reliable relationship.

Developing a relevant topic of mutual benefit. Since one of the main objectives of the effort was to develop a research agenda/topic of mutual interest and benefit, discussing current

problems of practice, potential areas of investigation, and extant data that could be analyzed in a meaningful way, was essential. One of the first meetings was spent discussing current concerns/issues of interest to the DA and relevant student achievement data collected by the District over the previous several years. No decisions were made in the first meeting but additional information needed for further consideration was identified. The researcher provided to each DA an initial search of relevant extant research and potentially relevant researchable topics within the area of mathematics achievement, as well as other requested information.

At the second meeting, potential research questions and related student achievement data elements needed to conduct meaningful analyses were identified. Several different aspects of math achievement were discussed. However, it was clear that only certain ones could be examined with extant data[2] and the potentially viable topics narrowed considerably. This iterative process of discussing problems of practice, topics of interest, and available data was critical to build the shared knowledge and understanding of both organizations' conditions, needs, and expectations for a mutually beneficial research partnership. These discussions also led to in-depth consideration of the Data Sharing Agreement elements required to enable the collaborative work to move forward with explicit shared understandings of specific commitments to protect confidential student information.

Mathematics preparation and achievement across the P-12 and University settings was the mutually agreed upon focus for the research. The national emphasis on college and career-readiness has heightened the focus on how school districts do or do not prepare students for success after high school graduation (Wilkins, Hartman, Howland, & Sharma, 2010). Numerous research studies have been conducted to examine high school students' mathematics performance as it relates to their subsequent performance at the postsecondary level (Adelman, 1999, 2004,

2006; Adelman, Danie, & Berkovits, 2003; Lee, 2012; Norman, Medhanie, Harwell, Anderson, & Post, 2011). While some of the studies show mixed results, in general, four-year university students who enrolled in developmental math courses (non-credit bearing) have had poorer college achievement outcomes (persistence, subsequent success in credit accumulation, and on-time graduation than students who do not take developmental courses, even when taking into consideration background characteristics such as socioeconomic status and high school achievement (Attewell, Lavin, Domina, & Levey, 2006; Calgano & Long, 2008, Chen, 2016). A number of studies also suggest that even if students do not experience negative effects, they experienced little benefit, particularly for better-prepared students (Chen, 2016; Martorell & McFarlin, 2011; Scott-Clayton & Rodriguez, 2015, Scott-Clayton, Crosta, & Belfield, 2014). In addition, they incur costs for courses that do not accrue credit for graduation (Scott-Clayton, 2012; Scott-Clayton & Rodriguez, 2015) The potential negative impacts of placing students in developmental courses heightens the need to accurately identify only those students who truly need remediation and avoid over-placing students in non-credit bearing courses, particularly for first-generation college going students. To that end, this research collaborative effort focused on examining the links between mastery of specific math concepts and courses (P-12 achievement), postsecondary enrollment in developmental or credit-bearing math courses, and subsequent success (passing grades) in those math courses.

The collaborative research question was: Does mastery of specific mathematics courses and content (such as Algebra II) in high school lead to first-year placement and success in credit-bearing post-secondary mathematics courses? The goal for the District was to better understand how to prepare students for success in college, and for the University, it was to decrease the number of students enrolled in developmental math courses and increase the number of students

who would enroll in, and pass, credit-bearing courses. To understand the problem and identify potential actions, the study examined extant data on first-year University students who had attended and graduated from the local Districts. For each student the following data were collected:

1. high school standardized test scores and mathematics courses taken with corresponding grades earned from the District; and,
2. SAT scores, University math placement test scores, first semester math course placement, and related first semester math course grades from the University.

Developing the Data Sharing Agreement (DSA). A key challenge to conducting this study was the need for each institution to share confidential student achievement data with the other organization. This type of data sharing is limited by Federal Education Right to Privacy Act regulations and a formal DSA agreement regarding assurance of confidentiality, the uses of the student data, and the findings was required. The specific DSA was developed by the University legal counsel (in conjunction with the state DOE legal counsel), and ultimately reviewed and approved by each District's legal counsel.

The DSA was designed to address specific concerns, and developing it was a critical component in the success of the collaborative work for several reasons. First, it outlined the roles and responsibilities of each organization to provide clarity and transparency of partner expectations. Second, it described the specific data elements required of each organization for the analyses. Third, it addressed logistics and protocols for ensuring student confidentiality. Finally, it clarified the conditions and processes for any reporting or publishing of the results of the work. In summary, it served to establish and document a common understanding of all

aspects of the research effort and built trust in the collaborative relationship as each component was closely adhered to.

Over the course of a couple of months and several draft iterations, the general research collaboration DSA was developed and finalized from the University perspective. It contained specific sections to define the participating parties; the purpose and scope of the project; the limited use of the data collected and shared across organizations (both in terms of analyses and time frame); the use, maintenance, and destruction of confidential student information; and the protocols for any report or publication written as a result of the study. In addition to the general DSA, a project addendum specified the data elements required of each organization and the uses of the data for the initial analysis. Legal counsel drafted the general agreement and the researcher drafted the project addendum. Due to resource constraints, the development of the DSA took longer than originally planned in the project proposal.

Once drafted, the researcher met with each DA separately to review all aspects of the agreement to ensure full communication and understanding of each element. This was another opportunity to build trust between the partner organizations through transparency and interpersonal engagement. Each DA then shared the DSA with her/his District superintendent. Upon District legal counsel approval, the DSA for District 1 was signed by both parties in December, approximately six weeks later than originally planned, and in March for District 2.

In terms of roles and responsibilities, the DSA identified the researcher as the primary contact and communication individual for the University and the DA as the primary contact and communication individual for each District. The researcher's responsibilities were to lead and facilitate the collaborative activities, conduct the search of the literature, initiate and finalize the development of the DSA, collect University student data, analyze the data, and write the findings

report. The DAs' responsibilities were to collaborate with the researcher to identify the research questions and relevant extant District data elements, secure District signatures on the DSA, merge the District and University data sets using a unique student identifier, collect District student data, and participate in review and meaningful analyses of the findings.

Through the University/P-12 collaboration, the University had access to District student achievement data collected over the prior four years by the District (high school standardized test scores and mathematics course grades) for current first-year University students (in both developmental and credit-bearing mathematics courses) who had attended the local Districts' high schools. The Districts had access to SAT scores and postsecondary high school math performance for students who attended the University.

The general DSA contained language about sharing confidential student information across the two organizations that could be maintained for the collaborative research effort overall, and the addendum defined the specific data elements to be collected from each organization for this individual study. The intent was that the general DSA could be used across studies and, to save time, only a separate Addendum identifying specific data collection would need to be developed for each study.

Data analyses and dissemination. The researcher and the DAs discussed at length the protocols for protecting the confidentiality of individual student data, including transmitting and storing data, and specifying individuals (as few as necessary) who would have access to data during the analyses. The logistical details specified where the data would be stored (external memory sticks in secure cabinets), the method of transmitting data (for security purposes, hand-delivered and, specifically, not via the internet), and the destruction of data at the conclusion of the study.

Finally, on multiple occasions the researcher and the DAs discussed how the results of the study would be reported. The DAs were concerned the findings of the study might not present a positive picture of her/his District. Specific potential 'negative' findings were discussed and the ways in which the information could be presented without negative public relations for the Districts. Each time these concerns were expressed, the researcher reiterated how the DSA described the process of developing reports and the District's involvement/approval prior to any publication. In the end, while the findings of the study were not negative for either District 1 or the University, District 1 chose not to disclose its identity and the DA chose not to be named as a co-author on the report.

Collecting student data. Throughout the process of developing the DSA, the researcher met multiple times with the University director of institutional effectiveness and the technical data programmer to identify the required study data elements in the University data system and to create the data query to generate the required student information. While this may appear to be a straightforward task, often different individuals understand different parts of an organization's data system and data elements are not always as readily extracted as expected, and the project schedule should allow sufficient time to accommodate these potential challenges. This proved to be the case in the initial University data run. The researcher met several times with the programmer to refine the query and generate a list of the specified first-year University students who had attended each P-12 school district. The following data elements were extracted for each student: student name, birthdate (for ensuring P-12 record match), SAT scores (if available), University math placement test (MPT) scores[3], first semester math course enrollment, and first semester grade. The query generated a list of 55 students in an Excel spreadsheet for District 1 and 168 students in District 2.

Once the list of University students was confirmed to have accurate and complete information, the researcher saved the Excel file to external memory sticks and, as prescribed in the DSA, hand-delivered to each DA. Data elements to be added by the DAs were High School Proficiency Assessment (HSPA) scores[4]; 8th grade standardized test math scores; and 9th, 10th, 11th and 12th grade math courses taken with grades for each. The researcher and the DAs had discussed the resources potentially needed to collect and enter the District data elements for each student. As it turned out, with only 55 students in the dataset, the District 1 DA (DA1) planned to enter the information her/himself. The District 2 DA (DA2) intended to have the District data team enter student data. The researcher and DAs discussed and agreed upon the projected time required for the data entry. In March, DA1 hand-delivered to the researcher the completed spreadsheet with all data elements available for each of 54 students (one student was dropped due to inactive high school status). District 2 did not complete the data entry for its 168 students and the District 2 analysis ended at that point. The remaining description of data analyses and findings pertains only to the District 1 partnership.

Analyzing student data. First, a unique student identifier was created and District and University identifying information were removed to protect student confidentiality. The researcher initially sorted the completed data by different variables: by SAT score, by MPT scores, and by first semester University course placement. While it was assumed that the University math department used multiple criteria for placing students in first-semester math courses, in fact, for almost all students placed in developmental or credit-bearing courses, MPT scores were the criteria used. As a result, the original statistical correlation analysis planned (examining high school courses taken in relationship to first-semester college math placement and success) was modified.

While the purpose of this article is not to describe in detail the findings of the specific math study, a brief overview of the key observations is relevant to discussing the benefit of the collaboration for both partners. The collected data were analyzed using student SAT scores as a proxy for high school achievement. Summary observations indicate of the 54 students in the data set, 83% were placed in first semester math courses. Of these students, 69% were placed in developmental (non-college credit-bearing) math courses. Approximately 70% of the students placed in developmental math courses had SAT math scores above 400[5], and about 50% had scores of 450 or above.

The data analyses indicated students who took at least Algebra II in 11th grade but no math course in 12th grade were placed in first semester college developmental math courses at twice the rate of students who took a math course higher than Algebra II, most in grade 12.

The findings regarding high school mathematics achievement as measured by the SAT, use of students' MPT score for course placement, and subsequent success in first-semester college math courses provided insight and informed further action/investigation to improve student success. Analyses indicated the University almost exclusively used the MPT scores rather than other previous math achievement to place students. There was no correlation between the SAT and MPT for discriminating the placement of students in the lowest credit-bearing course and the highest developmental course, so the accuracy and validity of using the MPT to differentiate between students placed in credit-bearing and non-credit-bearing courses was questionable. Use of other measures of previous math achievement, for example math SAT scores, to place students in their first year math course, rather than MPT scores, would have resulted in more students taking credit-bearing courses and, given the level of their prior math achievement, who could have likely succeeded.

Sharing and disseminating the study results.

The data examined provided useful, actionable information for each organization. The researcher initially met with the University director of institutional effectiveness to review the complete data set, analysis, and discuss the implications for the University. The researcher subsequently reviewed the findings with additional University administration, and follow-up analyses and action were discussed. For the University, the study data helped make their placement practices more transparent and stimulated discussion regarding other methods for placing and supporting student success in college level math courses, including interventions other than placement in developmental math courses. The University now considers student SAT scores as part of the placement process. The study results also contributed to ongoing discussions between faculty and administration regarding the value, utility, and design of developmental math courses.

Finally, the data and findings were shared with DA1 and the analyses discussed for potential District action. Understanding University placement practices and the impact on student course-taking could aid the District in considering various interventions (such as advisement to help students understand the importance of enrolling in higher level math courses in grade 12, university placement practices, and the potentially negative effects of taking developmental math courses on college success) to assist students in successfully transitioning to college level math. The District was considering increasing their high-level math course offerings for 12th grade students who have completed Algebra II but do not want to enroll in Pre-Calculus or Probability & Statistics. This study confirmed the potential positive effect of this action. Subsequently, the District added Discrete Math to course offerings for students who successfully complete Algebra II, and Advanced Placement Computer Science Principles for

students who successfully complete Foundations to Computer Science. The school-university research collaboration was mutually beneficial for informing both District and University practices.

Discussion of the University/District Collaborative Effort

The primary goal of this collaborative project was to establish a trusting working relationship between two urban P-12 districts and a small university such that confidential student achievement data could be shared to examine a mutually beneficial current problem of practice. The conclusion of the study indicated that the answer to the first research question is yes, a small, urban district/university partnership with limited resources can be structured to address potential organization barriers and produce relevant, mutually beneficial research to improve both organizations' policies and practices to increase student success.

This section addresses research question 2 regarding the characteristics, structures, and mechanisms that contribute to, or impede, the successful research collaboration. Establishing trust was accomplished through regular, ongoing communication and meetings between the organizations; developing and closely adhering to the DSA; and following through with the planned activities to collect, analyze, and share data related to the problem of practice examined.

Identification of the mutually beneficial, relevant problem of practice was accomplished through open discussion of current practices, data collected in the past, and program development over time. Existing relevant published research studies were reviewed as part of the process. These discussions took place over time and included consideration of what would be most beneficial and informative for both partners, what data collection would be required, and what level of effort would be needed for each partner to complete the work. Engaging the Districts in identifying the research topic and research methods was specifically intended to

minimize the power differential between the researcher and practitioners, and to ensure the complexity of the methodology was accessible to the practitioner.

The general DSA approved by both organization's legal counsel was a major step forward to develop and maintain a trusted collaborative relationship and ensure the confidentiality of student achievement data. The general agreement was designed to be used across various investigations, with individual addenda used to identify the specific data elements collected and analyzed for each investigation. It took longer to develop the general data-sharing agreement than expected. However, the initial time investment was worthwhile because this agreement could be used across investigations, and the time to develop the specific data addendum for each study would be substantially reduced. The DSA was a key component in providing transparency and building trust in the partnership.

The actual data collection occurred in several stages and required confidential data transmission:

1. the University generated the student data set (first year University students who had attended high school in each District) with required University data elements;
2. the DA reviewed and confirmed the student list and entered high school math achievement data for each student; and,
3. the DA and researcher together reviewed all data to ensure shared understanding of coding and data definitions.

Finally, the data were analyzed using a Pearson correlation and the results shared with both the University administrators and the DA in a confidential report. These discussions and communications helped to ensure a shared understanding of the terminology and methodology for the analysis and the utility of findings to inform improved policies and practices.

The outcomes of this particular data collection and analyses represent an important first step in an ongoing cross-organization conversation and collaboration to examine student success from high school to college. The primary accomplishments of this initial study were:

1. Establishing a trusting, collaborative relationship between the researcher and practitioner focused on student achievement and extant data;
2. Developing the legal counsel-approved general data-sharing agreement with protocols and processes that could be readily adapted to investigate other specific questions regarding problems of practice;
3. Providing actionable data to both organizations for potentially increasing student success across high school and college math course taking; and,
4. Providing a case study to examine the development of a small, urban, low-resourced, school district/university collaborative research effort.

Comparison of the collaborative research effort in two districts

If collecting and analyzing a full data set with information from both the District and the University is the metric for assessing the overall success of the project, the collaborative effort was successful in District 1 but not in District 2. Considering the multiple challenges to successful researcher/practitioner collaborations and the necessary conditions to support partnership research, reflection on several differences between the efforts in each District provides useful information to increase the likelihood of future success of collaborative efforts.

Bridging district/university organizational differences. The researcher engaged both DAs in determining the research questions and methodology to ensure a mutually beneficial and relevant study. In both Districts, the researcher and practitioners were able to reach agreement regarding the level of research rigor for the study design and data analyses. The DSA helped the

researcher and the DAs maintain focus on the agreed upon research agenda. At various points when DA1 was anxious about the analyses outcomes, the researcher referred back to the DSA section that specified the protocols for dissemination of the results to reassure her/him. These successes may be partially due to the researcher's experiences as a district administrator and resulting thorough understanding of the P-12 environment regarding: a) the focus on practical issues, b) the types of student achievement data districts collect on a regular basis, c) practitioner language (vocabulary) regarding research, d) work timeframes and decision-making and, e) competing interests. In a sense, the researcher acted as the agent for boundary crossing in this partnership. Including an individual who can serve in this role is an important consideration when planning for successful collaborations.

To address different District/University timelines, in both Districts project schedules were adjusted to accommodate competing priorities and resources. However, in District 1, the DA had direct access to the data needed and the schedule adjustment (approximately 10 weeks) for data collection was within the scope of the project timeline of one year. Because more competing priorities emerged in District 2, and because DA2 relied on the data department to access the data needed, District 2 data collection was not completed. In this case, the smaller District's data collection appeared to be less complex and more readily navigated by the partner. Understanding an organization's data systems and how to access data in larger districts and/or more complex systems are important considerations for successful collaborations.

District differences. There were several important aspects related to challenging District contexts and conditions that affected the outcome. Regarding district leadership, both superintendents were supportive of the collaborative research effort. However, District 1 had a more established district administrative team. The superintendent had been in her/his position

for many years, DA1 had worked in the district a number of years and in her/his leadership position several years, and the DA had a very positive working relationship with the superintendent. In contrast, the District 2 superintendent was relatively new to the district (second year in the district), while DA2 had been in her/his position a number of years. Their relationship was not as established or open as observed in District 1. When it can be assessed, understanding the internal politics and dynamics of a district may inform efforts to establish research collaborations.

Similarly, DA1 was an administrator whose job responsibilities were exclusively in the content area (mathematics) studied, while DA2 was responsible for all district content areas and, as such, her/his focus was more distributed across content areas. The data set for District 1 was smaller than for District 2 (approximately one-third the size). DA1 had direct access to student data and entered the district data elements her/himself. DA2 was dependent upon district data technicians to access and enter the student data. In the end, other district data projects were continually prioritized over the study data entry, and the task was not completed. The size of the districts and the complexity of their organizational structures were factors in the outcome of each partnership. In establishing successful collaborations, it is important to consider whether the contact person has sufficient authority to make decisions, and access critical information. In larger districts these qualities may not reside in one person, and increase the complexity of accomplishing tasks.

This case study shows that that a successful urban school district and university collaboration was possible. It also describes the characteristics and structures that contribute to or impede the development of a successful research partnership with the intent to be instructive for intentionally building successful future collaborative research efforts.

Limitations

There are two clear limitations to this study. The first is that it occurred in a very limited timeframe (twelve months). Though unanticipated at the beginning of the study, the researcher accepted another faculty position at a different university in another state at the end of the study. Based on the useful initial findings of the study, there were discussions about the researcher continuing to facilitate the collaborative effort on a consultant basis. Ultimately, however, resources to fund this effort were not identified so the potential benefit of the partnership going forward was not realized.

Finally, while the actual findings of the study were shared with District 1 and University administrators, since this article was written about the collaborative effort after it ended, it is limited to representing the researcher's perspective. Additional information from the practitioners' perspectives could have been beneficial, but under the circumstances was not possible.

Footnotes

[1] For the purposes of clarity in this report, academic researchers (primarily at the university level) are referred to as researchers, and elementary/secondary educators (both teachers and policymakers) are referred to as practitioners.

[2] When conducting longitudinal studies using student achievement data, an important consideration is the consistency of assessments used when students were in previous grades. For example, in the current study examining high school achievement for Fall 2013 first-year college students, it was important to consider the math achievement data collected by the district when these students were in 8th grade (2008-2009), 9th grade (2009-10), 10th grade (2010-2011), 11th grade (2011- 12), and 12th grade (2012-13). This can be problematic for cohort comparison purposes when assessments are changed from year to year.

[3] Two math PTs are administered to incoming first-year students: Elementary Algebra (ALGE), and Arithmetic (ARIT). If a student scored =< 67 on the ARIT and/or <77 on ALGE, s/he was placed in a developmental math course and course credits do not accrue towards the required credit hours for graduation. In other words, a student must score >67 on ARIT and =>77 on the ALGE to enroll in a college credit-bearing math course.

[4] The HSPA is a state standardized test designed to assess mastery of 11th grade state standards in Mathematics and Language Arts Literacy. Students take the test in the spring of grade 11 and must score 200 on each section to graduate from high school.

[5] The state DOE had defined a SAT score of =>400 as one indicator of sufficient proficiency for high school graduation (12/2/14).

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Tables

Table 1

Project Plan – Objectives, Activities, Timeframe and Participants

Objective	Activities	Timeframe	Participants
1.a. Define roles and responsibilities of each partner (university, K-12 school district)	1. Meet with District to outline goals of collaboration and clarify expectations 2. Write report reflecting discussion that outlines roles and responsibilities 3. Follow-up communication w/ District to confirm expectations.	1. September 2. September/ October 3. October	University Researcher, DA
1.b. Develop and secure data-sharing agreements	1. Meet with District data leadership to review possible agreement parameters. 2. Reach consensus and secure signed data agreements.	1. September 2. September/ October	University Researcher, DA Superintendent signature required
1.c. Agree upon outcome data analyses and timeline, including how results are shared with the district	1. Meet with District leadership to develop specific timelines for data collection, analyses, discussing findings, refining analyses	1. November	University Researcher, DA
2.a. Define how required data for analyzes will populate research database	1. Specify required data elements for analyses from each organization 2. Meet with District data individuals for clarifying transfer of specific data elements 3. Researchers meet to specify parameters for University database used for analyses.	1. November 2. December	1. University Researcher, DA 2. University Researcher, University Assessment Director
2.b. Define how students will be 'tracked' while maintaining confidentiality and anonymity	1. Meet with District data individuals to identify mechanisms for ensuring data confidentiality. 2. Researchers meet to identify University mechanisms for ensuring data confidentiality.	1. November 2. December	1. University Researcher, DA 2. University Researcher, University Assessment Director
3.a. Conduct initial data analyses	1. Conduct initial data run 2. University review for data integrity 3. Meet with District to review initial analyses for data integrity	January	1. Researcher 2. University Researcher, University Assessment Director 3. University Researcher, DA
3.b. Revise and re-run data analyses as needed	1. Correct any data integrity issues 2. Rerun analyses 3. Review findings internally 4. Meet with District to review findings	February	1. Researcher 2/3. University Researcher, University Assessment Director 4. University Researcher, DA

4.a. Synthesize results and identify how results can inform intervention to improve student outcomes.	1. Identify specific correlations (or lack of) between District student achievement and University course enrollment and success 2. Meet with District to review correlations and discuss implications for intervention. 3. Identify additional data analyses that may further inform District.	1. March 2. March/April 3. April	1. Researcher 2. University Researcher, DA 3. University Researcher, DA