Pennsylvania Educational Leadership

Volume 37, Number 1
Spring/Summer 2017

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Pennsylvania Educational Leadership is an official publication of the Pennsylvania Association for Supervision and Curriculum Development. Since 1996 the journal has received numerous awards from the international Association for Supervision and Curriculum Development. These awards include "best affiliate journal," "outstanding affiliate article" (multiple times), and "outstanding affiliate journal."

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Pennsylvania Educational Leadership

Volume 37, Number 1 – Summer/Spring 2017

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Acknowledgments

PEL would like to thank the following reviewers for the Spring/Summer 2017 issue.

Laurel Byrne
Kurt Eisle
Allen Grant
Helen Hamlet
Anju B. Jolly
Brooke Lylo
Janet Sloand
Sarah Ulrich

Recruitment and Retention of Beginning Special Educators

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The purpose of this study was to determine the career goals of special education teachers prior to their entrance into the field as well as the school variables that influence their decision to accept and/or remain in a teaching position. Eighty-eight student teachers responded to an online survey. Results were analyzed descriptively. Most respondents had a lifetime career goal to teach in special or general education; however, 19% planned to change fields or positions. The top five variables that influenced their decision to accept a position are: a principal who understands special education, tuition reimbursement to advance education, classroom materials and technology, valuable in-service training, and lastly, a yearly stipend. The top five variables that influence their decision to remain in a teaching position are: a manageable caseload, a principal who understands special education, a mentor program, a yearly stipend, and additional planning periods.

The U.S. Department of Education Report on Teacher Shortages stated that since 1990, special education has been a critical shortage area in many states (Williams & Dikes, 2014). This long-term problem will continue as teacher attrition and low supply of new teachers continue. According to the U.S. Department of Education, Office of Post -Secondary Education, students selecting teaching as a career have declined. Enrollment in teacher preparation programs has decreased 31% between AY 2009-10 and AY 2012-13 (2015). How can we better understand the dynamics contributing to the decline of teacher candidates?

Some factors that contribute to low enrollment in teacher preparation programs include the perceptions that the position is high-stress due to poor working conditions and significant paperwork, low salaries, and low social status (Barmby, 2006; McLeskey, Tyler, & Saunders, 2004; Rice & Goessling, 2005). According to Plash and Piotrowski (2006), the attrition rate among special educators is 13% annually. The average career lifetime of a special education teacher is a mere eight years with five-year post-certification retention at an all- time low (Blake & Monahan, 2007, Kindzierski, C. M., O'Dell, R., Marable, M. A., & Raimondi, S. L., 2013, p. 180). Beginning teachers and younger teachers are especially at risk of attrition (Billingsley, 2004b).

According to Smith and Ingersoll (2004), beginning special educators were 2.5 times more likely to leave the classroom when compared to beginning general educators. Many beginning special educators left within the first three years. If they make it past the first three years, their length of employment was typically shorter than any other teaching professional. Data from the 2012-2013 National Center for Education Statistics (NCES) *Schools and Teacher Follow-Up Survey* (TFS), reported that 10.6% of beginning special education teachers migrated

from their current school to another school and 6.6% left the field of education. A statement by Emery & Vandenberg (2010) sums up this dilemma well, "Ironically, those who are professionally committed to help high risk children are themselves a high-risk group" (p. 206). This exodus of beginning teachers can have a significant impact on school function, student achievement, and can also take a financial toll (Ronfeldt, Loeb, and Wyckoff, 2013; Guarino, Santibanez, and Daley, 2006; Harris and Adams, 2007; Johnson, Berg and Donaldson, 2005).

One major concern was the effect of teacher migration on student achievement. A study of 850,000 fourth and fifth grade students in New York City found that students who were in grades with higher teacher turnover scored lower in English language arts and math (Ronfeldt, Loeb, & Wyckoff, 2013). Guin (2004) studied 66 elementary schools in a large urban district and found a negative correlation between school-level turnover and the proportion of students meeting standards on statewide assessments in reading and math. In addition to student achievement, there can be financial ramifications of teacher migration and attrition.

According to the U.S Department of Labor and the Alliance of Excellent Education, when teachers left the field of teaching or migrated to another school, there was an estimated turnover and replacement cost of about $4.9 billion annually (Johnson et al., 2005). Precious resources were being used in an attempt to hire and retain qualified educators. In order to determine a solution, consideration needs to be given to the variables that may result in a teacher's decision to leave. A consideration was that the very reason that beginning teachers chose the field is confounded by the teaching environment. Selecting special education can often be motivated by a desire to make a difference. Stephens & Fish (2010) found that special educators pursued a career in special education due to empathy towards students and families as well as opportunities for employment. Many of these educators had a family member or friend that had a disability or had volunteered in a special education setting. If a teacher enters the field to make a difference, the reasons they leave can be multi-factored.

There are multiple studies on the reasons that teachers leave or migrate to other schools, leave to teach in a general education classroom, or leave the field of teaching entirely (Gehrke & McCoy, 2007; Kaff, 2004; Boe, Cook, & Sunderland, 2008). One variable is the comparably low income level of teachers. Allegretto & Mishel (2016) evaluated the income of public school teachers compared to other professional fields with a comparable education. A wage analysis was conducted using the Bureau of Labor Current Population Survey (CPS) and the Employer Cost for Compensation Survey from 1979-2015. Their findings showed that in 2015 weekly wages for a public-school teacher were 17% lower than for workers with comparable education, and average weekly wages (inflation adjusted) of public sector teachers decreased $30 per week from 1996-2015, from $1,122 to $1,092, while the weekly wages of all college graduates rose from $1,292 to $1,496 over this same period. Another study found that percentage of beginning teachers that remained at a school for 5 years was less (68%) if their base salary was below $40,000 when compared to teachers who were in schools that made $40,000 or more (85%)" (Raue & Gray, 2008, p. 6).

Even though salary is important, there are other factors that influence the decision to leave. One study found that monetary incentives were not enough to keep teachers in the

classroom if they felt ineffective or overwhelmed by the workload. The Massachusetts Signing Bonus Program (MSBP) provided financial incentives to promising candidates who entered the career of teaching (Liu, Johnson, & Peske, 2004). The program offered a $20,000 incentive over four years and an accelerated route to certification. Between 1999 and 2002, the Project of the Next Generation of Teachers followed 13 out of the 59 incentive recipients. Teachers reported that the signing bonus did not strongly influence their decision to remain in teaching. Instead, the teachers reported that the working conditions at their school site and their ability to gain intrinsic rewards from their work influenced their decision the most (Liu, Johnson & Peske, 2004). Of the fifty-nine recipients, 46% (n=27) had left teaching.

Several studies have found that student caseload and the various disabilities within a caseload as contributing factors in their decision to leave the field (Kaff, 2004; Griffin et al., 2009; Emery & Vandenberg, 2010). Teachers also have reported struggling to keep up with Individualized Education Plans (IEP), lesson planning, and needing to complete this work outside of school hours (Billingsley & Tomchin, 1992; Kilgore & Griffin, 1998). In a review of literature from 1992-2004, Billingsley (2010) found that research on new teachers is limited but the findings are consistent. New teachers tend to struggle with: problems of inclusion, collaboration, and interaction with adults; pedagogical concerns; and difficulty managing their roles in the school environment. Job stress was magnified by confusion about their job design, but the support from other teachers and the principal could help to alleviate this stress (Gersten, Keating, Yavonoff, & Harness, 2001). In a Teacher Follow-up Survey (2000-2001), teachers stated the two most important reasons for their decision to change schools were an opportunity for a better teaching assignment (subject or grade area) and/or dissatisfaction with the administrative support (Luekens, Lyter, & Fox, 2004). The need for support was also reported in another study that followed 50 new teachers over 4 years and found that the decision to stay at a school were based on the extent of the support they received in their schools and the success that they experienced teaching their students (Johnson, S. M., Berg, J. H., & Donaldson, M. L., 2005).

Johnson and Birkeland (2003) interviewed 50 first-year and second-year teachers on their decision to stay in their school, move to another school, or leave teaching. The teachers expressed that their main priority in teaching was "whether they believed that they were achieving success with their students" (p. 19). Teachers who decided to stay in their current school also stressed the importance of a professional culture where both the teachers and the principal took responsibility for developing a cohesive staff. Emphasis was on a collegial environment with schedules set up to facilitate "structured explicit opportunities for collegial interaction" (p. 38). Effort was made to organize teachers of all experience levels in various collaborative projects. This resulted in 83% of those teachers remaining at the same school for their second year. "School-site conditions were absolutely crucial in order for new teachers to achieve a sense of success" (p. 44).

Gehrke and McCoy (2007) found that beginning special educators who remained in their position regardless of the size and location of their schools had a more easily accessible network of supportive persons and resources in each of their teaching environments. This was also reported in various studies on the value of an induction program for beginning educators. The

process of induction enhances the frequently used practice of mentoring to further support the beginning teacher. Teachers were assigned a mentor to assist them; they were observed teaching; and they were given feedback. According to the *Beginning Teacher Longitudinal Study* (Gray & Taie, 2015), among all beginning teachers including special education, 80% of those who participated in an induction program or mentoring program during their first year of teaching taught all five years. Jerald and Boser (2000) reported that beginning teachers who participated in induction programs were twice as likely to continue in teaching as those who had not. Almost 80% remained in the field after the initial years of being in the classroom. One factor that could enhance an induction program is quality in-service training. Valuable in-service training to improve pedagogy, assessment, behavior management, and the use of curriculum can be important to the beginning teacher and can facilitate student success. This can have an impact on a special educator's commitment to the profession and an indirect effect to reduce their intention to leave (Billingsley, Griffin, Smith, Kamman, & Israel, 2009, p. 374). Improved training and support can influence teacher retention (Brownell et al., 1994-1995; Gersten et al., 2001; Morvant et al., 1995). However, according to Billingsley (2010), "the best induction programs cannot compensate for difficult work situations with unwelcoming school cultures, unreasonable jobs, and insufficient resources" (p. 45).

Johnson and Birkeland (2003) hypothesized that beginning teachers may be a new generation of teachers who see teaching as a "short-term job where serial careers are the norm. If this is the case, then improving a frequently challenging work situation becomes extremely important to hiring and retaining new teachers" (p. 7). The majority of current research focuses on teachers who were in their first year and beyond. There is limited research on pre-service teachers. The purpose of this research study was to answer the following questions: 1. Do student teachers initially plan to remain in the field of special education or are they planning to have multiple careers? 2. What variables might influence their decision to accept a position in special education? 3. What variables might influence their decision to remain in a special education position? It was hypothesized that a large percentage of beginning teachers leave special education because they use this initial position as a stepping stone to another position, be it in general education, another school, or in another career.

Method

This research was conducted using a descriptive design. Following approval by the university Institutional Review Board, a request for research participation was sent in an email to the student teaching directors at fourteen universities in a northeastern state system of higher education. Student teaching directors were asked to forward an email with a survey link to their current student teachers to protect student identity. A reminder email was sent to students after a week. Seven schools agreed to send the survey out to their pre-service teachers. The participating universities are located across the state in rural, suburban and urban areas.

Student teaching program directors sent emails with the survey link to 293 student teachers completing their special education placement. The group consisted of students with the major of special education along with: early childhood, middle level or secondary level education. The email also included an introduction to the purpose of the survey, the survey link, and an enticement to participate in a drawing upon completion of the survey. Student teachers

had an opportunity to enter a drawing for gift cards at a popular online shopping website. Completion and return of the survey were considered as each respondent's consent to participate. Each respondent had the option to quit the survey at any time without consequence. At the end of the survey, the drawing link opened in a separate window that could not be tied to the survey responses. Student teaching directors received these entries and a drawing was conducted by the student teaching office on campus. The researcher was not aware of the identities of students who responded to the survey or entered the drawing. One week after an initial email was sent to students, a second follow-up email was sent out as a reminder to take the survey. At the end of a three-week period, the survey link was closed due to the end of the semester.

Ninety-seven (97) student teachers submitted the survey, nine of whom were submitted without completing the questions. Those surveys were discarded. Thirty percent (n=88) of the student teachers completed the survey in its entirety. Respondents were mostly female (94.3%, n=83). The most common age range was 20-25 (96.5%, n=85). Early childhood/special education was the most common major, with 89.8% (n=79) of respondents, while 9.1% (n=8) majored in secondary education/special education and 1.1% (n=1) majored in middle/special education. The respondents completed their placement in a variety of settings including various exceptionalities with various levels of inclusion. The majority (99%, n= 87) reported their student teaching experience was either excellent or good.

An online survey was developed by the author based in part on the extant literature on the retention and attrition of special educators. The survey consisted of five sections entitled: demographics, student teaching experience, career goals, job interest, and decision to stay. The first section was the *Student Teaching Experience* section which asked students to rate their general education and special education student teaching experience using a Likert scale (i.e. 1=poor, 2=neutral, 3=good, and 4=excellent).

The *Career Goal* section asked students to choose a statement that best described their career goal: teach in special education; teach in general education, start out in special education and transfer to general education, start out in education but seek a job outside of education, start out in special education but then move up to school administration; start out in teaching but leave to meet family needs, and start out in a school to get experience and then move closer to my home.

The *Job Interest* section asked students if they had to choose between two teaching positions in special education, rate fifteen variables that would influence their decision. They rated each variable on a Likert Scale (1=would not influence, 2=would influence, 3=would definitely influence, and 4=would greatly influence). The fifteen variables were cited in the research as important to teachers who were leaving teaching or transferring to a different school. Other variables were practices currently used as part of the induction process in the schools. The final section, *Decision to Stay at Your Current Position* asked students to consider the same list of fifteen variables and rank the top five variables that would influence their decision to remain in a special education teaching position.

Results

Participation in online surveys is thought to be easy for frequent computer users (Israel, 2011). However, one major concern is that online surveys typically have a low response rate (Archer, 2008; Wiseman, 2003). On average, online survey response rates are 11% below mail and phone surveys, and rates as low as 2% have been reported (Petchenik & Watermolen, 2011). The response rate for this online survey was 30% (n=88).

Frequency distributions were used to describe the sample and descriptive statistics were used to answer the research questions. The respondents were asked to evaluate what their career goal was and given seven choices. Figure 1 and Table 1 show the frequencies of each answer. Wanting to teach in special education as a lifelong career was the most common career goal at 35.2% (n= 31), followed by the goal of teaching in general education as a lifelong career, at 29% (n=26). To a lesser degree, 10.2% (n=9) of respondents agreed with the statement that they plan to take a position as a teacher and then eventually move on to administration. As far as new teachers looking forward to multiple careers, 9% (n=8) chose the statement that they will start out in teaching but eventually seek a job outside of education.

Figure 1
Career Goals

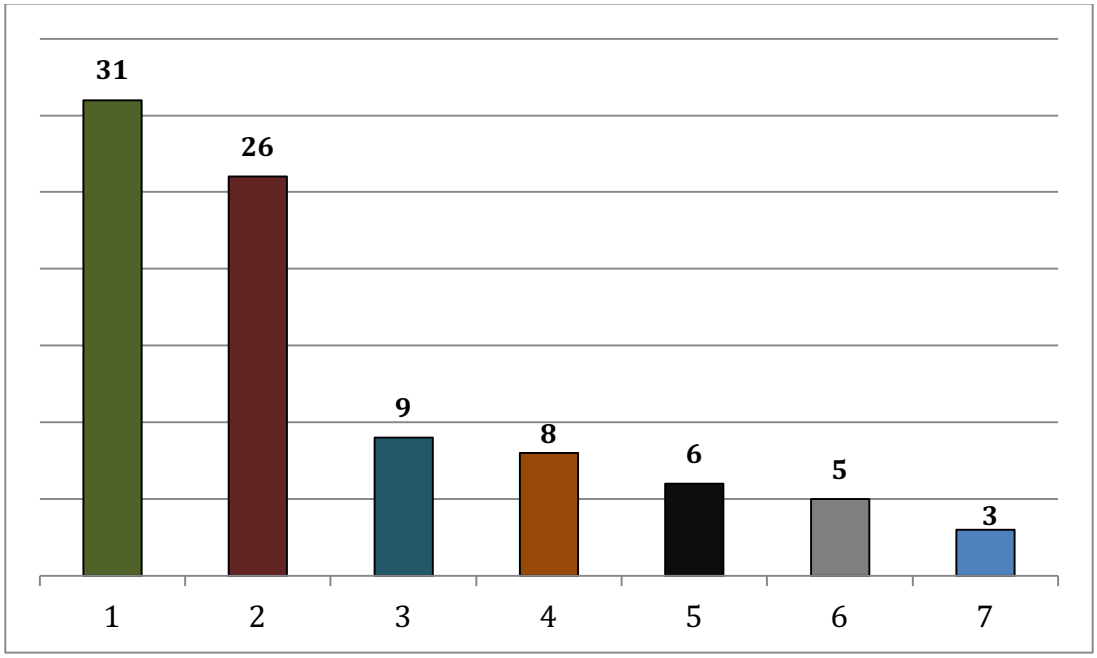

Table 1
Career Goals

	n	(%)
1. Teach in special education as a lifelong career.	31	35.2
2. Teach in general education as a lifelong career.	26	29.5
3. Start out as a classroom teacher in special or general education then eventually seek a position in educational administration or higher education.	9	10.2
4. Start out as a classroom teacher in either special or general education then eventually seek another career outside of education.	8	9.1
5. Obtain a job in special education and then eventually transfer to general education.	6	6.8
6. Start out teaching in special education where there are position openings and eventually seek a teaching position closer to my hometown.	5	5.7
7. Start out as a classroom teacher in special or general education and quit at some point to meet family needs.	3	3.4
Total	88	100

When asked about the decision to accept a position in special education, respondents were asked to rate fifteen variables on a four point Likert scale. The answers ranged from "greatly influence" to "not influence." In order to determine the level of importance of each variable, the frequencies for each answer were calculated. The variables with the highest score in "greatly influenced" were believed to be the most important in influencing student teachers to accept a position in special education.

First, Cronbach's Alpha measure of reliability was calculated in order to ensure that the data collected were consistent. The results of this calculation are with the N=15, a= .902. According to Tavakol and Dennick (2011), "Cronbach's Alpha is a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. Internal consistency describes the extent to which all the items in a test measure the same concept or construct and hence it is connected to the inter-relatedness of the items within the test. As the estimate of reliability increases, the fraction of a test score that is attributable to error will decrease "(p. 54).

It is important to note that the mean score of each variable was not calculated as the measure of central tendency because this would only work for normally distributed data. For these variables, frequency was the best statistical measure as it is nonparametric. The top five variables listed in order of importance were: a principal who understands special education and needs, tuition reimbursement to advance education, classroom that has materials and technology, valuable in-service training to develop teaching skills, and a stipend of 5, 000-10,000 dollars per year to teach special education.

The respondents were then asked to rank (from 1-5) the factors that they consider most important to remain in a special education position. To analyze the most important variables regarded by student teachers, the frequency was calculated. For this section, however, a weighted average was attempted. Nevertheless, the different sample sizes for each variable made it hard to give a definite weighted average for each variable. Therefore, in order to evaluate which were regarded as more important, a weighted sum was calculated instead.

The weighted sum used the frequencies as well as the weight of each rank. Number one ranks were weighted by multiplying them by five, number two by four; number three by three, number four by two and number five by one. For example, if a variable had 14 respondents ranking it as the number one factor to remain as a special education teacher, that variable received a total of 70 points (14*5). The sums provided after these calculations showed the perceived importance of the variable to respondents. The significance of a principal who understands special education and the needs of the classroom was one of the most relevant variables for student teachers. The top five ranking was: a manageable caseload, a principal who understands special education, a mentor program where you are closely matched with a colleague in your field, a yearly stipend, and two planning periods per day (Table 2).

Table 2
Variables That Would Influence the Decision to Accept a Position (Rank Order)

1	A principal who understands special education and the needs of the classroom
2	A classroom that includes materials and technologies
3	Tuition reimbursement to advance my education
4	Valuable in-service training to contribute to develop teaching skills
5	A stipend of an additional $5,000 - $10,000 per year to teach special education
6	A manageable caseload with a limited number of students according to the needs of the students
7	A behavior specialist as a resource person available to the special education classrooms at your school
8	Beginning teacher mentor program where you are closely matched with a colleague in your field
9	Common preparation time with your mentor and teachers that you are collaborating or pushing in
10	Two planning periods per day: one for special education paperwork and the other for lesson planning
11	A $500 signing bonus to work in the district
12	A Monday to Thursday schedule with Fridays designed for paperwork, IEPs, and student evaluations if needed
13	Assignment of a part-time assistant that would schedule IEP meetings and assist with paperwork
14	Teacher teams of five that meet biweekly after school to brainstorm solutions to classroom issues
15	Reduction of committee assignment to meet paperwork needs in the classroom

Discussion

The respondents in this study were student teachers completing the final weeks of their internship experience. The survey data was self-report only. The identity of the participants was not disclosed to the researcher so there was no opportunity to follow-up their survey submission that may have added to the knowledge base concerning their responses. Additional efforts to

contact participants may have increased the response rate for this survey, but time was limited due to pending graduation and availability of the student teachers. The low response rate of this study limits the generalizability of these findings.

The first research question in this study was whether student teachers initially plan to remain in the field of special education. Over 35% responded that they did intend to remain in the field of special education. If beginning teachers are selecting teaching as a lifelong career but leaving the field in considerable numbers, it is important to examine the variables that influence their decision to remain in the field. Gersten et al. (2001) proposed that the way to address the problem of special education teacher shortages should not be to "simply increase recruitment or even to focus solely on retention, but to address the job design and working conditions of special education teachers" (p. 551)

According to Guarino, Santibanez, and Daley (2006), teachers value the significance of their position more than many other professionals. This can be said to be true about special educators who often choose this career to serve those in need (Fish & Stephens, 2010). The participants in this survey followed suit. They selected variables in their potential work environment that would contribute to the quality of their teaching. The most important variable selected by respondents that would greatly influence their decision to remain in a position is a manageable caseload. Teacher caseloads can be directly related to funding and are difficult to adjust. According to Billingsley (2010), assigning a manageable caseload would take resources and administrative planning. However, there are other variables that could benefit teachers that are less costly such as "hiring practices that consider matching the teacher to the position, securing materials for new teachers in a timely manner and helping teachers clarify their role in the school" (p 45).

Having a good match between the teacher and their mentor was another important factor for respondents. A principal could match these professional pairs and could arrange teacher schedules with common planning periods to provide time for consultation and paperwork. To further enhance teacher effectiveness, respondents selected quality in-services as a variable that would "greatly influence" their decision to accept a position. The availability of materials and technology was one of the priorities of the pre-service teachers. Billingsley et al. (2009) reported that in a nationwide survey of beginning special educators, one third reported that they did not have the necessary materials to teach. Fifty percent of 228 teachers in the state of Texas responded "strongly agree" to the statement that they lacked sufficient school supplies, materials and resources in order to do their job properly (Kaufhold, Alverez & Arnold, 2003, p. 160). Access to materials and technology can enhance the work environment. An enriched environment and a skilled educator both have the potential to result in student learning. These are variables that can prevent the beginning teacher from being overwhelmed by job demands as well as improve their ability to meet the needs of their students.

Within the career of teaching, there is the reality that there are financial obligations that professionals need to meet which affect their quality of life. For both research questions on accepting and remaining in a teaching position, a yearly stipend was selected as one of the top five variables that would greatly influence the group's decision. This was of interest because it

was not the number one choice as hypothesized. For question one on the influence of a yearly stipend on their decision to accept a job, it was their fifth choice. In question two on the variables that would influence their decision to stay in a position, the importance of a yearly stipend ranked fourth. Income and the ability to meet one's financial responsibilities can be an important consideration for young professionals. This group also selected the availability of tuition reimbursement to advance their education as an influential variable. Even though salary and tuition were important in their decision-making process and need consideration, the other environmental variables related to teacher effectiveness were ranked higher.

Pre-service special educators typically have had diverse experiences in a variety of classrooms. They have a sense of what is important to them in order to be effective in the classroom. Educational leadership in the schools becomes the foundation for the success of beginning special educators. The most significant variable selected by the respondents in this study was a skilled principal who understands special education. The principal's ability to assist beginning special educators can be multi-faceted and could have an impact on their decision to continue in their chosen field. The responses of pre-service special educators mirror similar variables that echo throughout the research of experienced teachers. In this study the selected factor that resonates as "greatly influencing" a beginning teacher's decision to accept and remain in a teaching position is "a principal who understands the needs of special education."

A supportive principal can establish a positive collegial environment; ensure that teachers have the support that they need; provide a mentor and classroom materials; quality in-services; facilitate communication in the school; match teachers to the class; clarify their position in the school; assist with teacher scheduling to provide time for collaboration and paperwork; as well as provide emotional support (Littrell, Billingsley, & Cross, 1994; Gold 1996; Whitaker, 2000). Littrell et al. (1994) found that emotional support and instrumental support can affect teacher job satisfaction and school commitment resulting in higher teacher retention. A skilled administrator could have a direct impact on the position of special educator. In time, improvement in the position could entice students to select special education as a career. The results of this study suggest that a supportive environment where teachers can be effective in their position could result in an increase in teacher retention, improve the school climate, reduce the expenditures related to teacher replacement and most importantly improve student achievement.

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Comparisons and Indicators of Success on the Pennsylvania School Performance Profile

Robert S. Legutko
North Schuylkill School District

This study investigated relationships of data elements provided by the Pennsylvania Department of Education with its statewide accountability system, the School Performance Profile (SPP). OLS regression analysis determined that high Asian population significantly predicted higher school SPP scores; high African American, Hispanic, and Multi-Racial populations significantly predicted lower school SPP scores; and the combination of economically disadvantaged and African American populations significantly predicted lower school SPP scores. One-way ANOVA tests revealed significant differences in SPP group mean scores among five school types. The Tukey HSD post-hoc test revealed K-12 school SPP group mean scores were significantly lower than all other school types, and scores for comprehensive career and technical center were significantly lower than secondary level schools.

The Every Student Succeeds Act of 2015 (ESSA), is the national education law of the United States that authorizes state-run programs for eligible schools and school districts to raise student academic achievement, and addresses challenges for students with disabilities, who live in poverty, and/or who need to learn English (Elementary and Secondary Education Act, 1965; State of Washington, 2017). The Commonwealth of Pennsylvania fulfills its obligations to the federal accountability system established by the ESSA by administering the School Performance Profile (SPP) – a measure for assessing school effectiveness and communicating the judgments about schools to educators, policymakers, and the public (Fuller, 2014). The SPP provides a school building-level academic score on a 100-point scale based on multiple indicators of academic achievement that include student performance on the Pennsylvania System of School Assessment and Keystone Exams; closing the achievement gap; graduation rate; promotion rate; and attendance rate (Pennsylvania Department of Education, 2015; Pennsylvania Department of Education, 2016a). The SPP also provides a summary of student academic performance in each Pennsylvania public school building (regular public schools, charter schools, cyber charter schools, and career and technology centers), and delivers a common measure of Pennsylvania school performance to students, families, school districts, and to the public (Pennsylvania Pressroom, 2015; Pennsylvania Department of Education, 2016b).

Because of the importance of school SPP scores for public education constituents in Pennsylvania, determining the extent to which the school SPP score is related to school profile and student performance variables that either directly or indirectly comprise its calculation are invaluable. This study considers the following research questions:

1. What is the relationship between school SPP score and the school profile and student performance variables (known as data elements) provided by the Pennsylvania Department of Education?
2. Which variables significantly predict school SPP score from among the data elements that indicate a very strong relationship?
3. Is there a significant difference in SPP group mean scores between and within the five school types (regular public schools, charter schools, cyber charter schools, and career and technology centers)?

School Performance Profile and High-Stakes Testing

Pennsylvania uses two forms of standardized testing that carry high-stakes consequences: the Pennsylvania State System of Assessment (PSSA) and the Keystone Exams (Pennsylvania State Education Association, n.d.). Ninety percent (90%) of a school's SPP score is affected by its students' performance on the PSSA and Keystone Exams in four specific categories:

- Indicators of Academic Achievement (40%), which includes percent of students considered Proficient or Advanced in each of the assessed content areas of the PSSA/Keystone Exam;
- Indicators of Academic Growth (40%), which includes a statistic known as PVAAS Growth Index, representing the school's impact on the change in academic achievement levels of groups of students from year-to-year in each of the assessed content areas of the PSSA/Keystone Exam;
- Indicators of Closing the Achievement Gap for All Students (5%), which includes percent of students who close a distance (known as gap closure) based on a formula that calculates difference between current achievement levels and full proficiency on each of the assessed content areas of the PSSA/Keystone Exam; and
- Indicators of Closing the Achievement Gap for Historically Underprepared Students (5%), which includes percent of required gap closure met for economically disadvantaged, English Language Learners, and students with disabilities in each of the assessed content areas of the PSSA/Keystone Exam (Pennsylvania Department of Education, 2015).

The remaining 10% of the SPP score is based on Other Academic Indicators, which include cohort graduation rate; promotion rate; attendance rate; preliminary college entrance examination participation; and Advanced Placement (AP), International Baccalaureate (IB), or college credit (Pennsylvania Department of Education, 2015). These percentages comprising SPP score calculation also have some variability depending upon school type. One example includes Indicators of Closing the Achievement Gap for All Students, which has a 3% value for Comprehensive Career and Technical Centers and a 5% value for all other schools (Pennsylvania Department of Education, 2015).

High Stakes Testing: For Whom and for What

Gregory Marchant, professor of Educational Psychology at Ball State University, noted that advocates and opponents of standardized testing agree that everything is at stake when high stakes testing: Scores are used for the promotion and retention of children in each grade, evaluating the performance of teachers and administrators, and ranking schools and districts for

educational merit (Marchant, 2004). Scores are also used to justify granting vouchers; increasing or decreasing the number of charter schools; and determining whether public schools are failing, subject to improvement procedures, or to be closed (Levine & Levine, 2013). The American Educational Research Association recognized the polarizing nature of high-stakes testing and school accountability systems in its July 2000 Position Statement, which stated that high scores may bring public praise or rewards, and low scores may bring embarrassment or sactions. (American Educational Research Association, 2000).

Such is the case in Pennsylvania. One superintendent of a large central Pennsylvania school district commented that the majority of the SPP data are based on the PSSA/Keystone Exam, which in essence is one high-stakes test (Miller, 2014). The Pennsylvania deputy secretary for elementary and secondary education, Matt Stem, agreed that SPP scores primarily reflect the results of the PSSA for elementary and middle schools, and reflect the results of the Keystone Exams for high schools (Boccella, 2016). Scores such as the SPP are used to influence educational practices and make decisions about school effectiveness, teacher quality, student graduation, and distribution of funds **(**Pringle & Martin, 2005**)**. Approximately $390 million in federal appropriations was issued to the states for assessment each year from 2002 to 2011, which equates to almost $4 billion total on NCLB testing during that time span (Levine & Levine, 2013).

Administrators. One of the high schools in a study by McNeil, Coppola, Radigan, and Helig (2008) on accountability policy in a major urban Texas school district reported that it was raising its high-stakes test scores neither high enough nor fast enough to meet district goals. This presented its leaders with a perplexing dilemma of priorities: To either satisfy the accountability system, or satisfy their own sense of responsibility to provide a strong curriculum and help students remain in school until graduation (McNeil et al., 2008). The superintendent of a small rural school district in western Pennsylvania whose high school building score ranked in the top 4% statewide, and whose middle school building score ranked in the top 7% statewide, surprisingly noted that "[o]ur scores were not where they needed to be," and "[w]e did not demonstrate the growth that I thought we should" (Mercer & O'Brien, 2016, ¶5). Even though one suburban high school in southeastern Pennsylvania earned a score in the top 4% statewide, and netted an increase from the 2014-2015 SPP scores, its director of curriculum, instruction, and professional development noted the district has little faith in the SPP scores, and that the district fosters an environment of creativity, problem solving, collaboration, critical thinking, community involvement, and social and academic success in harder-to-quantify ways than high-stakes testing (Bennett, 2016). However, at least one high school in northeastern Pennsylvania that reported achieving its highest SPP score to date, placing it in the top 20 highest scoring schools statewide, boasted on its website that it "has proven once again just how amazing its students are... far exceeding their expectations [with] hard work by students and staff" (Imber, 2016, ¶1).

High-Stakes and High Stakeholders

The purpose of school accountability systems such as the SPP is to accurately assess school performance and effectiveness, and to communicate the judgments about schools to educators, policymakers, and the public (Fuller, 2014). These school-level scores are also a

component of teacher and principal evaluations, and are part of the Pennsylvania educator evaluation system which assesses teachers on student achievement, provides schools with comprehensive resources to improve instruction, and offers professional development to teachers, principals and superintendents (Fuller, 2014; Pennsylvania Department of Education, 2016a).

For superintendents, coordinators, and principals – education administrators with no tenure and no collectively bargained contract – scores that figure into school accountability systems can result in their personal job loss or retention (McNeil et al., 2008). For principals, whose performance contracts may only be annual, there is even greater pressure to show score increases in a very brief period. Such was the case of one principal whose entire evaluation was dependent upon raising the school's standardized test scores. The single line typed into the Consequences if Goals Not Met line on the performance evaluation for that year was one word: *Termination* (McNeil et al., 2008).

Teachers are forced change their way of teaching to focus on preparing children for the tests as a result of the high-stakes standardized tests and school accountability systems (Pringle & Martin, 2005). Adding to the pressure that the SPP places on teachers, a proposed 2015 bill introduced in the Pennsylvania House of Representatives that attempted to link teacher furloughs to teacher evaluations – which are dependent upon a school's SPP score – initially passed by a narrow margin (Thompson, 2015). Governor Tom Wolf, however, vetoed the bill in 2016, noting that the bill "relies heavily on a single score from the teacher evaluation system, as opposed to using the entire method of evaluation" (Sheppard, 2016, ¶3).

Another consequence of high-stakes testing inevitably becomes testing fraud, which is a likely result of the anxiety brought about those high stakes. A 2009 investigation of 48 schools and districts that showed irregular PSSA test score gains from the previous year revealed that 140 educators were either suspected or convicted of tampering with and/or changing student answers on the PSSA (Daniels, 2012; Mezzacappa & Socolar, 2015). The PDE mandates that its PSSA/Keystone Exam administrators and proctors undergo Pennsylvania State Test Administration Training (Pennsylvania Department of Education, n.d.) in part to ensure that the integrity of the exams is maintained, and that temptations for cheating in order to increase school SPP scores are kept in check.

There are multiple consequences of high-stakes testing for students. The test results may determine whether they are eligible for certain special programs, to which college they might be admitted, and/or whether they graduate from high school or matriculate to the next grade level (Marchant, 2004). One of the earliest effects of NCLB legislation with direct impact on students occurred when approximately 20,000 Baltimore City Public School System students in grades 1-8 were scheduled to repeat a grade after they failed to meet the standards based upon their results on a national standardized test (Bowie, 2002).

The Pennsylvania Department of Education also reasons that "recognizing academic achievement and holding public schools accountable [is] essential to ensuring that taxpayer dollars are being invested in education programs that benefit students" (Pennsylvania

Department of Education, 2016a, ¶5), and further emphasizes that its citizens will be able to ascertain student performance and the quality of school educational programs based upon several determinants of academic achievement provided by the SPP (Pennsylvania Department of Education, 2016a). Ensuring that taxpayer money is wisely invested may be enough cause in and of itself to gain knowledge of which data elements are leading indicators of high (and/or low) school SPP scores in Pennsylvania schools.

Data sources

There were 2,864 Pennsylvania schools in this study, which consisted of regular public schools and charter schools. Public schools were defined in the U.S. Code as any elementary or secondary educational institution operated by a state, subdivision of a state, or governmental agency within a state, or operated either completely or mostly with governmental funds or property (Legal Information Institute, 2012). Charter schools, authorized under Title X Part C of the Elementary and Secondary Education Act (U.S. Department of Education, 2004) were defined as publicly funded, tuition-free, non-sectarian, public schools of choice open to all students (Tell, 2015). All regular public schools and charter schools in Pennsylvania during the 2015-2016 academic year, ranging from pre-kindergarten through 12th grade, were considered in this study. Neither overall school district data nor individual student data were used in the study. (Individual schools within districts, not the school districts themselves, earn their own SPP scores. Individual students also do not earn SPP scores.)

Two data files provided by the Pennsylvania Department of Education on the Pennsylvania School Performance Profile portion of its website were used. The *Academic Performance Data for the 2015-16 School Year* data file included 53 categories and provided academic performance data elements for each district and school (Pennsylvania Department of Education, 2017a). The School and District Fast Fact Data for the 2015-16 School Year data file included 58 categories and provided data elements for each district and school (Pennsylvania Department of Education, 2017d).

Instrumentation and Variables Studied

School profile and student performance variables are referred to as *data elements* by PDE (Pennsylvania Department of Education, 2017c), and several are considered in the quantitative analyses for this study. The list of data elements included in the Academic Performance Data for the 2015-16 School Year file is found in Table 1, and the list of data elements included in the School and District Fast Fact Data for the 2015-16 School Year is found in Table 2.

All data were accurate to the extent that the information (1) was accurately reported to PDE by the schools utilized in this study; and (2) provided in the files available on the PDE website. There were several checks on the reliability of the data, most notably when each of the data elements were analyzed. In instances where questions arose or an outlier was found, the data for the category and school in question were reviewed and either corrected or eliminated from this study, as previously mentioned.

Table 1

Academic Performance Data for the 2015-16 School Year Data Elements

County	ELA/Literature- Percent Proficient or Advanced on PSSA/Keystone	Number of Grade 12 Students with Record of Taking the Plan
Institution Type	Final Academic Score	Number of Grade 12 Students with Record of Taking the PSAT
LEA Name	Grade 11 Enrollment	Percent 3 or Higher on any AP Exam or 4 or Higher on any IB Exam
School Name	Grade 12 Enrollment	Percent Industry Standards-Based Competency Assessments Advanced
AUN	Grade 3 ELA - Percent Proficient or Advanced on PSSA	Percent PSSA/Keystone Advanced – ELA/Literature
School Number	Industry Standards-Based Competency Assessments – Percent Competent or Advanced	Percent PSSA/Keystone Advanced – Science/Biology
2015-16 SPP Score	Lit - Percent of Required Gap Closure Met (ALL)	Percent PSSA/Keystone Exam Advanced – Mathematics/Algebra I
Lit - Percent of Required Gap Closure Met (HUS)	Mathematics - Percent of Required Gap Closure Met (ALL)	Promotion Rate - All Students
Advanced Placement, International Baccalaureate, or College Credit	Mathematics - Percent of Required Gap Closure Met (HUS)	PSAT/Plan Participation
Algebra I - Percent of Required Gap Closure Met (ALL)	Mathematics/Algebra I – Meeting Annual Academic Growth Expectations	SAT/ACT College Ready Benchmark
Algebra I - Percent of Required Gap Closure Met (HUS)	Mathematics/Algebra I - Percent of Required Gap Closure Met (ALL)	Science - Percent of Required Gap Closure Met (ALL)
Attendance Rate	Mathematics/Algebra I - Percent of Required Gap Closure Met (HUS)	Science - Percent of Required Gap Closure Met (HUS)
Biology - Percent of Required Gap Closure Met (ALL)	Mathematics/Algebra I – Percent Proficient or Advanced on PSSA/Keystone Exam	Science/Biology - Meeting Annual Academic Growth Expectations
Biology - Percent of Required Gap Closure Met (HUS)	Number of Grade 12 Students with Record of Scoring 1550 or Higher on the SAT	Science/Biology - Percent of Required Gap Closure Met (ALL)
Calculated Score	Number of Grade 12 Students with Record of Scoring 22 or Higher on the ACT	Science/Biology - Percent of Required Gap Closure Met (HUS)
Cohort Graduation Rate	Number of Grade 12 Students with Record of Scoring 3 or Higher on any AP Exam or 4 or Higher on any IB Exam	Science/Biology - Percent Proficient or Advanced on PSSA/Keystone
ELA - Percent of Required Gap Closure Met (ALL)		
ELA - Percent of Required Gap Closure Met (HUS)		
ELA/Lit - Percent of Required Gap Closure Met (ALL)		
ELA/Lit - Percent of Required Gap Closure Met (HUS)		
ELA/Literature - Meeting Annual Academic Growth Expectations		

Note. Information provided by Pennsylvania Department of Education. (2017a). Academic performance data for SY 2015-2016. [Data files]. Retrieved from http://www.paschoolperformance.org/Downloads

Table 2
School and District Fast Fact Data for the 2015-16 School Year File Data Elements

LEA Name	English Language Learner	Percent of Classes Taught by Highly Qualified Teachers
School Name	Female	Percent of Gifted Students
AUN	Grades Offered	Reading (ACT)
School Number	Hispanic (any race)	Reading (SAT)
American Indian/Alaskan Native (not Hispanic)	Intermediate Unit Name	School Address (City)
Asian (not Hispanic)	Intermediate Unit Website	School Address (State)
Average Years of Educational Experience (In LEA)	Life and Physical Sciences – AP Offered	School Address (Street)
Average Years of Educational Experience (Total)	Life and Physical Sciences – IB Offered	School Enrollment
Black or African American (not Hispanic)	Life and Physical Sciences – Other Offered	School Name
Career and Technical Center Name	Male	School Year
Career and Technical Center Website	Math (ACT)	School Zip Code
Career and Technical Programs	Life and Physical Sciences – Other Offered	Science (ACT)
Dropout Rate (Percent)	Male	Social Sciences and History – AP Offered
Economically Disadvantaged	Math (ACT)	Social Sciences and History – IB Offered
English (ACT)	Math (SAT)	Social Sciences and History – Other Offered
English Language and Literature - AP Offered	Mathematics - AP Offered	Special Education
English Language and Literature - IB Offered	Mathematics - IB Offered	Students Eligible for Opportunity Scholarship Tax Credit Program
English Language and Literature - Other Offered	Mathematics - Other Offered	Telephone Number
	Multi-Racial (not Hispanic)	Title I School
	Native Hawaiian or other Pacific Islander (not Hispanic)	Website
	Number of Advanced Placement Courses Offered	White (not Hispanic)
		Writing (SAT)

Note. Information provided by Pennsylvania Department of Education. (2017d). School and district fast fact data for SY 2015-2016. [Data Files]. Retrieved from http://www.paschoolperformance.org/Downloads

Missing data

Schools that did not supply SPP scores were eliminated from the study (n=147). All school district data were then eliminated because school districts do not have SPP scores. According to PDE, the reasons for not providing an SPP score included:

1. A SPP building-level academic score is not available for this school. This is due to the school not having enough possible points to be assigned a SPP building-level academic score.
2. A building-level academic score is currently not available for this school. The Department anticipates releasing a SPP building-level academic score for this school after working with the school to quickly address student-level attribution complications.
3. A SPP building-level academic score is not available for this school. Part time Career and Technical Centers only display Fast Facts because the majority of the academic instruction in the core content areas occurs in the students' home schools. (Pennsylvania Department of Education, 2017d).

The files were then combined for the analyses necessary in this study.

Methods

A correlational analysis of school SPP score and data elements were performed using Pearson's product-moment correlation coefficient, or Pearson's r, to determine the relationship between school SPP score and each of the data elements. The correlation coefficient can assume any value from -1.00 to +1.00 inclusive, and describes the strength of the relationship between two sets of interval-scaled or ratio-scaled variables (Lind, Marchal, & Wathen, 2012).

Two multiple regression analyses were conducted to explore whether certain data elements in one common category significantly predicted school SPP score. Multiple regression uses additional independent variables that better explain or predict the dependent variable (Lind, Marchal, & Wathen, 2012). The first multiple regression analysis explored the relationship between school SPP score and data elements as defined by Pennsylvania in the School Overview Fast Facts - Percent Enrollment by Race/Ethnicity (Pennsylvania Department of Education, 2017c). These data elements included *American Indian/Alaskan Native (not Hispanic)*, *Asian (not Hispanic)*, *Black or African American (not Hispanic)*, *Hispanic (any race)*, *Multi-Racial (not Hispanic)*, *Native Hawaiian or other Pacific Islander (not Hispanic)* and *White (not Hispanic)*. The second multiple regression analysis explored the relationship between school SPP score and a combination of two data elements that prompted additional examination based upon results from the initial correlational analysis: *Economically Disadvantaged* and *Black or African American (not Hispanic)*. The data elements and their definitions from both multiple regression analyses are provided in Table 3.

A one-way analysis of variance (ANOVA) was performed to determine whether there was a significant difference in SPP group mean scores among five school types. The groups included *Kindergarten to Grade 12* (low range of K-6 and high range of 9-12); *Secondary Level Schools* (low range of 7-10 and high range of 7-12); *Comprehensive Career and Technical Centers* (range of 9-12); *Kindergarten to Grade 8 including Grade 3* (low range of PK-3 and high range of K-8); and *Kindergarten to Grade 8 without Grade 3* (low range of K-6 and high range of K-8) (PA School Performance Profile, n.d.). The Tukey Honest Significant Difference (HSD) post-hoc test *p*-values were provided in the ANOVA to determine which pairs of SPP group mean scores among the five school types differed significantly from each other. As noted by Gall, Gall, and Borg (2005), the significant value finding can also be followed by a post-hoc statistical test to determine which pairs of means differ significantly from each other when three or more mean scores are compared.

Table 3
Definitions of Data Elements Used in the Multiple Regression Analyses

Data Element	Definition
American Indian/Alaskan Native (not Hispanic)	This data element indicates the percent of American Indian or Alaskan (not Hispanic) native students in the school based on October Student Snapshot enrollment. It equals the number of American Indian or Alaskan (not Hispanic) native students in the school divided by total school enrollment. AMERICAN INDIAN/ALASKAN NATIVE – A person having origins in any of the original peoples of North and South America (including Central America), and who maintains tribal affiliation or community attachment.
Asian (not Hispanic)	This data element indicates the percent of Asian native students (not Hispanic) in the school based on October Student Snapshot enrollment. It equals the number of Asian native students in the school divided by total school enrollment. ASIAN - A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
Black or African American (not Hispanic)	This data element indicates the percent of Black or African American (not Hispanic) students in the school based on October Student Snapshot enrollment. It equals the number of Black or African American (not Hispanic) native students in the school divided by total school enrollment. BLACK/AFRICAN AMERICAN – A person having origins in any of the black racial groups of Africa (except those of Hispanic origin).
Economically Disadvantaged	This data element indicates the percent of students who are considered economically disadvantaged in the school based on October Student Snapshot enrollment. It equals the number of students identified as economically disadvantaged in the school divided by total school enrollment. It is at the discretion of the District to determine if a student is economically disadvantaged. Poverty data sources such as Temporary Assistance for Needy Families cases, census poor, Medicaid, children living in institutions that are neglected or delinquent, those supported in foster homes or free/reduced price lunch eligibility may be used.
Hispanic (any race)	This data element indicates the percent of Hispanic students in the school based on October Student Snapshot enrollment. It equals the number of Hispanic native students in the school divided by total school enrollment. HISPANIC – A person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race.
Multi-Racial (not Hispanic)	This data element indicates the percent of multi-racial (not Hispanic) students in the school based on October Student Snapshot enrollment. It equals the number of multi-racial (not Hispanic) native students in the school divided by total school enrollment. Multi-racial (not Hispanic) - A person who is identified as 2 or more races.
Native Hawaiian or other Pacific Islander (not Hispanic)	This data element indicates the percent of Native Hawaiian or Other Pacific Islander (not Hispanic) students in the school based on October Student Snapshot enrollment. It equals the number of Native Hawaiian or Other Pacific Islander (not Hispanic) native students in the school divided by total school enrollment. NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER - A person having origins in any of the original peoples of Hawaii, Guam, Samoa or other Pacific Islands.
White (not Hispanic)	This data element indicates the percent of white (not Hispanic) students in the school based on October Student Snapshot enrollment. It equals the number of white (not Hispanic) native students in the school divided by total school enrollment. WHITE (NON-HISPANIC) – A person having origins in any of the original peoples of Europe, North Africa, or the Middle East (except those of Hispanic origin).

Note. Information provided by "Glossary of terms, Pennsylvania School Performance Profile," from the Pennsylvania Department of Education, 2017c. Retrieved from http://www.paschoolperformance.org/Glossary

The data analysis tools in Microsoft Excel and statistical software available at *VassarStats.com* were used to analyze the quantitative data. Since the significance level of at least $p < .05$ is traditionally used as a marker of significance (Lind, Marchal, & Wathen, 2012), it was also used throughout this study for the correlational analyses, multiple regression analyses, ANOVA, and Tukey HSD test.

Results

The *r*-values reported for the correlation calculations in this study were categorized as having a very strong positive relationship between 0.70 and 0.99, a strong positive relationship between 0.40 and 0.69, and a strong negative relationship between -0.40 and -0.69 (Hinkle, Wiersma, & Jurs, 2003).

The correlational results showed a very strong positive relationship between school SPP score and 14 data elements, a very strong negative relationship between school SPP score and two data elements, and a strong positive relationship between school SPP score and 18 data elements. The results are listed in Table 4. All data in the table are at least $p < 0.001$, determined by choosing the smallest number of participants in any category (n = 461 in *Life and Physical Sciences – AP Offered*) and calculating the *p*-value based upon the lowest reported correlation found in the table ($r = 0.42$) with the significance value set at 0.05.

Table 4

Significant Findings: Correlations between School SPP Score and Data Elements

Data Element	*r**
Very Strong Positive Relationship	
ELA/Literature- Percent Proficient or Advanced on PSSA/Keystone (9.5%-20%)	0.86
Mathematics/Algebra I - Percent Proficient or Advanced on PSSA/Keystone Exam (4.75%-10%)	0.84
Grade 3 ELA - Percent Proficient or Advanced on PSSA (2.5%, 10%, or n/a)	0.81
Science/Biology - Percent Proficient or Advanced on PSSA/Keystone (4.75-10%)	0.80
Math (SAT)	0.79
SAT/ACT College Ready Benchmark (5% or n/a)	0.78
Writing (SAT)	0.78
Reading (SAT)	0.77
English (ACT)	0.72
Percent PSSA/Keystone Advanced - Science/Biology	0.72
Percent PSSA/Keystone Exam Advanced - Mathematics/Algebra I	0.71
Math (ACT)	0.70
Reading (ACT)	0.70
Science (ACT)	0.70
Strong Positive Relationship	
Percent ≥ 3 on any AP Exam or ≥ 4 on any IB Exam	0.65
Percent PSSA/Keystone Advanced - ELA/Literature	0.64
Cohort Graduation Rate (2.5%-5%)	0.63
White (not Hispanic)	0.61
Science/Biology - Meeting Annual Academic Growth Expectations (10%)	0.60
Mathematics/Algebra I - Percent of Required Gap Closure Met (ALL) (0.75%-1.25%)	0.56
Advanced Placement, International Baccalaureate, or College Credit (2.5% or n/a)	0.55
ELA/Literature - Meeting Annual Academic Growth Expectations (20%)	0.54
Number of Advanced Placement Courses Offered	0.51
Number of Grade 12 Students Scoring ≥ 3 on any AP Exam or ≥ 4 on any IB Exam	0.51
Mathematics/Algebra I - Meeting Annual Academic Growth Expectations (10%)	0.50
Attendance Rate (2.5%-5%)	0.49
Life and Physical Sciences - AP Offered	0.49
Mathematics/Algebra I - Percent of Required Gap Closure Met (HUS) (0.75%-1.25%)	0.47
ELA/Lit - Percent of Required Gap Closure Met (ALL) (1.5%-2.5%)	0.46
Mathematics - AP Offered	0.46
Social Sciences and History - AP Offered	0.44
ELA/Lit - Percent of Required Gap Closure Met (HUS) (1.5%-2.5%)	0.42
Strong Negative Relationship	
Economically Disadvantaged	-0.69
Black or African American (not Hispanic)	-0.57

Note. Numbers listed in parenthesis indicate the percent or range that the data element is figured into the SPP score calculation. Differences in percentages and ranges listed are determined by school type: K-12, Secondary, Comprehensive CTC, K-8 Schools with Grade 3, and K-8 Schools without Grade 3 (PA School Performance Profile, n.d.).

**p*<.001 for all values in table

Multiple regression analysis was used to determine whether the data elements as defined by Pennsylvania in the School Overview Fast Facts - Percent Enrollment by Race/Ethnicity (Pennsylvania State Department of Education, 2017c) significantly predicted school SPP score. The results of the regression [$F(7,2855) = 336.28$, $p < 0.001$, $R^2 = .45$, $R^2_{Adjusted} = .45$] indicated that percent *Asian (not Hispanic)* ($\beta = .38$, $p < 0.001$) population significantly predicted a positive/direct relationship with school SPP score, while the percent *Black or African American (not Hispanic)* population ($\beta = -.35$, $p < 0.001$), percent *Hispanic (any race)* population ($\beta = -.32$, $p < 0.001$), and percent *Multi-Racial (not Hispanic)* population ($\beta = -.35$, $p < 0.001$) significantly predicted a negative/inverse relationship with school SPP score. Basic descriptive statistics and standardized regression coefficients that predicted school SPP score considering race/ethnicity are shown in Table 5.

Table 5
Descriptive Statistics and Standardized Regression Coefficients Predicting School SPP Score Considering Race/Ethnicity

	M	*SD*	β		SE
American Indian/Alaskan Native (not Hispanic)	0.16	0.39	-0.19		0.48
Asian (not Hispanic)	3.07	5.31	0.38*	0.08	
Black or African American (not Hispanic)	14.41	24.69	-0.35*	0.07	
Hispanic (any race)	9.03	15.71	-0.32*	0.07	
Native Hawaiian or other Pacific Islander (not Hispanic)	0.08	0.19	0.16	0.97	
White (not Hispanic)	69.71	31.51	-0.06	0.07	
Multi-Racial (not Hispanic)	3.48	3.50	-0.35*	0.09	

*p<.001

OLS regression was also used to determine whether the data elements that indicated a strong negative relationship with school SPP score [percent *Economically Disadvantaged* population and percent *Black or African American (not Hispanic)* population] significantly predicted school SPP score. The results of the regression [$F(2,2862) = 1548.93$, $p < .05$, $R^2 = .52$, $R^2_{Adjusted} = .52$] indicated that a combination of both percent *Economically Disadvantaged* population ($\beta = -.31$, $p < .001$) and percent *Black or African American (not Hispanic)* population ($\beta = -.13$, $p < .001$) significantly predicted a negative/inverse relationship with school SPP score. Basic descriptive statistics and standardized regression coefficients that predicted school SPP score considering percent *Economically Disadvantaged* population and percent *Black or African American (not Hispanic)* population are shown in Table 6.

Table 6
Descriptive Statistics and Standardized Regression Coefficients Predicting School SPP Score Considering Black or African American (not Hispanic) and Economically Disadvantaged

	M	*SD*	β	SE
Economically Disadvantaged	46.43	23.77	-0.31*	0.09
Black or African American (not Hispanic)	14.41	24.69	-0.13*	0.09

*p<.001

A one-way ANOVA was performed to determine whether there was a significant difference in SPP group mean scores among five school types as categorized by PDE: *Kindergarten to Grade 12*; *Secondary Level Schools*; *Comprehensive Career and Technical Centers*; *Kindergarten to Grade 8 Schools including Grade 3*; and *Kindergarten to Grade 8 Schools without Grade 3*. Relevant Basic Descriptive Statistics of school SPP group mean scores by school type are found in Table 7.

Table 7
Basic Descriptive Statistics of School SPP Group Mean Scores by School Type

School Type	*n*	M	SD	s^2	SE
Kindergarten to Grade 12	91	59.00	14.70	215.96	1.54
Secondary Level Schools	692	72.84	14.23	202.57	0.54
Comprehensive Career and Technical Centers	16	65.64	12.89	166.25	3.22
Kindergarten to Grade 8 schools including Grade 3	1580	69.41	12.80	163.82	0.32
Kindergarten to Grade 8 schools without Grade 3	484	67.51	11.96	143.13	0.54

The results showed a significant difference in school SPP group mean scores between the five school types [$F(4, 2858) = 29.06$, $p < 0.0001$]. Relevant data for the one-way ANOVA of school SPP group mean scores by school type is found in Table 8.

Table 8
One-Way Analysis of Variance of School SPP Group Mean Scores by School Type

Source	*df*	SS	MS	F	*p*
Between groups	4	19920.53	4980.13	29.06	<.0001
Within groups	2858	489709.02	171.35		
Total	2862	509629.55			

Additional post hoc comparisons utilizing the Tukey HSD post-hoc test revealed that school SPP group mean score for *Kindergarten to Grade 12* schools (M = 59.00; SD = 14.70) was significantly lower when compared to each of the other four school types: *Comprehensive Career and Technical Centers* (M = 65.64; SD = 12.89; $p < .05$); *Secondary Level Schools* (M = 72.84; SD = 14.23; $p < .01$); *Kindergarten to Grade 8 including Grade 3* (M = 69.41; SD = 12.80; $p < .01$); and *Kindergarten to Grade 8 without Grade 3* (M = 67.51; SD = 11.96; $p < .01$). The Tukey HSD test also revealed that school SPP group mean score for *Comprehensive Career and Technical Centers* was significantly lower than *Secondary Level Schools* at the $p < .05$ level.

Discussion

There are significant findings in this study that would assist any of the constituents who might benefit from having a knowledge of which data elements correlate with high (and/or low) Pennsylvania School Performance Profile (SPP) scores. According to the Pennsylvania Department of Education (PDE), the SPP is designed to

- Offer a resource for LEAs [Local Education Agencies] to communicate and compare performance, analyze performance indicators as related to achievement, and encourage best practice
- Employ as an analysis tool to inform goal setting, planning, and allocating resources to improve student achievement
- Compare performance to local schools
- Compare performance to schools with similar demographics
- Communicate performance to various constituencies (Pennsylvania Department of Education, 2015, p. 1).

Some of the correlations in this study should be interpreted cautiously. There are 14 data elements which indicate either a strong or very strong relationship with school SPP score that are also directly included in the SPP calculation by PDE. These data elements are indicated in Table 4 by having a number in parenthesis after the data element. For example, the data element *ELA/Literature - Percent Proficient or Advanced on PSSA/Keystone* resulted in $r = 0.86$, which is a very strong relationship with school SPP score. *ELA/Literature - Percent Proficient or Advanced on PSSA/Keystone* also constitutes between 9.5% and 20% of the overall SPP calculation (PA School Performance Profile, n.d.). Logically, the result of an outcome that can exert a numerical influence on a rating/score will effectively skew at least a portion of the results. This influence may be akin to a student being given credit for a portion of an exam

before even taking it. However, results provided by the correlation of these data elements nonetheless indicated significant relationships.

If superintendents, principals, and other educational personnel are interested in factors that are related to the school SPP score for the sole means of boosting school SPP score, they should focus on improving the data elements in their schools centered around Percent Proficient or Advanced on PSSA/Keystone. Simply stated, if a school has a high SPP score, it is likely because the majority of students in that school earned at least a passing grade (i.e., either Proficient or Advanced) on the *PSSA/Keystone in ELA/Literature*, *Mathematics/Algebra I, Science/Biology*, and *Grade 3 ELA* (where applicable). Another factor, the data element *SAT/ACT College Ready Benchmark*, had the sixth-highest relationship with school SPP score, and was also part of the calculation for those schools with secondary level grades that immediately prepare students for postsecondary matriculation. The implication is consistent with the fact that 90% of a school's SPP score is affected by its student performance on the PSSA and Keystone Exams, as previously mentioned (Pennsylvania Department of Education, 2015).

For secondary schools, there were seven data elements that had a very strong positive relationship with school SPP score which did not directly figure into the SPP calculation, and these also contained a central theme: College entrance examinations. The data elements *Math (SAT)*, *Writing (SAT)*, *Reading (SAT)*, *English (ACT)*, *Math (ACT)*, *Reading (ACT)*, and *Science (ACT)*, all had a relationship with school SPP of $r \geq 0.70$. The implication derived from this finding is that if students take the college entrance examination in a (secondary level) school, their performance on the examination might also have a positive/direct correlation with the school SPP score. At the very least, secondary schools that have an elevated population of capable college-bound students are also better schools, according to the SPP.

The first multiple regression analysis offered predictions of school SPP score by comparing it with several data elements related to Percent Enrollment by Race/Ethnicity. One finding was that having a high percentage Asian population significantly predicted that a school would have a high SPP score, and its implication is that having more students who self-identify as Asian in a school means that it would be a better school. Another finding was that having a high percentage Black or African American, a high percentage Hispanic, or a high percentage Multi-Racial population significantly predicted that a school would have a low SPP score, and its implication is that having more students who self-identify with being either Black, Hispanic, or Multi-Racial means that it is a lower-performing school. These findings are consistent with recent outcomes in California. Results from its 2015 Smarter Balanced Assessment Consortium test on student performance revealed that Asian students passed the English test at a 72% rate and passed the math test at 69% rate, while conversely Latino students had pass rates of 32% in English and 21% in math, and African-American students had pass rates of 28% in English and 16% in math (Noguchi, 2016). These findings are also consistent with 2015 National Assessment of Educational Progress (NAEP) reading and math tests, where 61% Asians and only 19% of Hispanics scored proficient or above (Hardy, 2015).

The second multiple regression analysis was performed based on the initial correlations showing that having a high percentage of economically disadvantaged students and a high

percentage of African American students indicated a strong negative relationship with school SPP score, and a resulting curiosity in whether either significantly predicted school SPP score. The results indicated that having either a high percentage of economically disadvantaged students and/or a high percentage African American population do significantly predict a lower school SPP score, thus implying that having more students who were economically disadvantaged or African American means that it is a lower-performing school. These findings are in concert with California's test on student performance from the Smarter Balanced Assessment Consortium, where African-American students had a pass rates of 28% in English and 16% in math (as previously mentioned), and low-income families had pass rates of 31% English and 21% in math (Noguchi, 2016).

The significant difference in school SPP group mean scores between the five school types categorized by PDE (*Kindergarten to Grade 12*; *Secondary Level Schools*; *Comprehensive Career and Technical Centers*; *Kindergarten to Grade 8 Schools including Grade 3*; and *Kindergarten to Grade 8 Schools without Grade 3*) in the one-way ANOVA revealed that there is variability among school types. This finding seems to indicate that using school SPP score as a one-size-fits-all comparative measure is likely neither the most effective nor accurate means of examining school performance. The calculation for determining school SPP score is imbalanced based upon school type and circumstance. One example of this imbalance includes the Indicators of Academic Achievement, which is set at 44% for Career and Technical Centers and 40% for all other schools. Another example is found in the extra credit possibilities of up to seven points in some areas that are not possible to achieve by all schools. Clearly, elementary schools cannot earn bonus points for percentage of students who pass certain Career and Technical Center certification tests, nor can they earn bonus points for having students scoring well on Advanced Placement or International Baccalaureate achievement tests (Pennsylvania Department of Education, 2015). The same argument against using a non-uniform school SPP score calculation can also be applied in the findings that revealed the *Kindergarten to Grade 12* group mean was significantly lower than each of the other school types in the Tukey HSD post-hoc calculations.

The data files from the PDE website also revealed that the *Kindergarten to Grade 12* group included 58 out of 91 schools categorized as Charter Schools, which might have been the reason for its significantly lower mean score when compared to each of the other school types. The finding that revealed the *Comprehensive Career and Technical Centers* school SPP group mean score was significantly lower than *Secondary Level Schools* is notable but likely not a surprise, because the SPP is a more academic measure of achievement instead of a practical hands-on performance measure that would favor students who are preparing for postsecondary careers in programs offered at technical schools.

Limitations

A common refrain in statistics is that correlation does not imply causation. Correlation does not demonstrate cause and effect, but instead provides a quantitative measure of the strength of the relationship between two variables (Lind, Marchal, & Wathen, 2012). The disadvantage of correlation research is that its data analysis is very limited, and specifies only a positive correlation, negative correlation, or no correlation between data sets ("What are the Disadvantages", 2017). Also, results from school correlations in the aggregate do not yield the

same results as correlations on the individual students that they contain. The relationship between two variables, regardless of the degree to which they are correlated, does not imply that the association will be observed in all individuals (Ricker, n.d.). In this study, there is a high likelihood that several students identified in a school as economically disadvantaged and as African American earn high marks and achieve well academically even though they are part of the data elements contributing to making it a lower-performing school. The same reasoning is applicable to the results obtained in the multiple regression analyses. The major limitation of all regression techniques is that only relationships can be ascertained, while the underlying causal mechanisms cannot be assured (StatSoft, 2013).

Conclusion

Future research should be conducted to determine why the data elements that do not figure into the SPP calculation had very strong relationships with school SPP score; why certain data elements associated with percent enrollment by race/ethnicity predicted either high or low school SPP scores; and why schools with high percentages of economically disadvantaged and African American students predicted low school SPP scores. In addition, the fact that PDE is presently examining how school SPP score is calculated, with likely revisions to be enacted soon (Pennsylvania School Boards Association, 2017), is an indication that some of the concerns presented in this research have also been recognized by those constituents charged with school evaluation. It then behooves the constituents vested in the results of Pennsylvania School Performance Profile (or any subsequent evaluative means) to continue examining the relationship between high-stakes testing and school accountability, and seek to improve and determine whether the SPP truly discloses whether any school is of high merit.

The Pennsylvania Department of Education articulated that through the School Performance Profile its citizens should be able to "determine the quality of the educational programs in their schools and how students are performing" (Pennsylvania Department of Education, 2016a, ¶12). Those same citizens likely believe that a system based on high-stakes testing and school accountability produces a data-rich collection of student performance that accurately reflects each child's potential (Dodge, 2009). Yet, the validity of the school SPP scores and the inability of the scores to capture the true effectiveness of schools may come into question (Fuller, 2014), and regardless of whether Pennsylvania's citizens support the SPP or other school accountability measures, having knowledge of the means to achieve a high score remains beneficial to school administrators and to the public.

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Mentoring and Modeling: Providing Support and Promoting Agency in Student Teachers

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Developmentally responsive mentoring is important at all levels of a preparing teacher's journey. This article illuminates a collaborative approach using continued advising and modeling for teacher certification candidates in PK-12 school communities. The complexities of teaching are abundant and the support needed by student teachers is paramount to their success. This work highlights the journey of two practitioners who have sought to create a collaborative model by which preparing teachers are engaged in active goal-setting and action planning to promote a successful student teaching experience, which in turn will ultimately result in highly competent and certified teachers. The process highlighted in this work provides a strong framework for building upon strengths, addressing challenges and setting goals, which ultimately serves the supervisor, cooperating teacher, student teacher and students.

The complexities of teaching are abundant and the support needed by student teachers is paramount to their success. Our work highlights the journey of two practitioners who have sought to create a collaborative model by which preparing teachers are engaged in active goal-setting and action planning to promote a successful student teaching experience, which in turn results in highly competent and certified teachers. This initiative was conducted by a cooperating teacher and university supervisor who responded to the opportunity to communicate and generate a framework of support for the student teaching experience. The decision to collaborate over the course of three semesters emerged organically due to the supportive structural relationship between the cooperating teacher's school district and the university employing the student teaching supervisor.

Developmentally responsive mentoring is important at all levels of a preparing teacher's journey, perhaps especially at the beginning of the field This article illuminates a collaborative approach using continued advising and modeling for teacher certification candidates in PK-12 school communities. Below are four anecdotes that highlight common missteps that occur during the student teaching experience.

1. I remember Christopher. A misspelling on the classroom bulletin board is constructively pointed out to him by his cooperating teacher. It takes him 36 hours and a strong reprimand from his university supervisor before he corrects the mistake.
2. In morning meeting, the student teacher is confidently leading the pledge, singing the school song, when suddenly she's bombarded by random verbalizations and diverse individual needs. She turns to her cooperating teacher and asks, "What do I do?"
3. In an urban setting, a student teacher prepares a science lesson on "sink or float?" She presents a golf ball floating as the premise for the lesson. Her students wonder: What does a golf ball look like? Who had seen one? And, do they float?

4. We've all met the student teacher who knows the read aloud is a good idea. Every good teacher reads to their students. But how does one make it standards based, allow for differentiation and ultimately, assess? This is the real challenge in what we do.

These incidents underscore the importance of continued advice, support and mentoring as students develop pedagogical knowledge and teaching competence while completing their certification programs.

Student teachers are imbued with skills, talents, and ideals that prime them for the teaching act. They are keenly situated in a position where their experiences have been primarily positive and their motivation to succeed, change lives, and take on the world is high. In juxtaposition, mounting evidence has illuminated the multiple stress factors associated with teaching, such as: students' lack of effort, pressure to demonstrate student achievement, and differentiation as core elements to the intense experience in the classroom (Geving 2007; Sorensen 2007). Cakmak (2008) identified the pressing weight of classroom management as the ultimate challenge for the young teacher. By acknowledging the stresses associated with the position, our goal is to equip student teachers with reflective tools that enable them to grasp a realistic version of teaching in which they feel empowered, and can demonstrate self-efficacy and ownership in their classrooms and in their teaching.

Conceptual Framework

Student teachers are taught to use Wehmeyer's Self-Determined Model of Instruction (SDMI) with their students. Wehmeyer et al.'s (2000) SDMI provides direction for promoting agency in students with special needs via goal setting and action planning. Specifically, teachers are trained to lead students through a series of guiding questions that function as a compass for promoting choice making and goal setting. Students are not told what to do, but rather utilize this framework to galvanize autonomy and ownership in decision making that is connected to an awareness of interests, talents, and capabilities. Wehmeyer et al. (2012, p. 136) describe the meaningful purpose and broad based impact of SDMI on learners:

> Students who self-determine learning set educational goals based upon their own interests, abilities, and needs; meaningfully participate in decisions pertaining to the design of interventions to achieve this goal; implement strategies that enable them to modify and regulate their own behavior; and utilize strategies that support them to track their progress toward the goal and to modify either the goal or the action plan, as needed.

This effective tool used in the field of special education (Chambers et al. 2007), provides a fertile framework for student teachers themselves to become more self-actualized teachers. The essential elements of Wehmeyer et al.'s (2000) SDMI include the questions listed in Table 1.

Table 1
HDMI Phases

Phase 1 Problem: What is My Goal?	**Phase 3 Problem: What Have I Learned?**
-What do I want to learn?	-What actions have I taken?
-What do I know about it now?	-What barriers have been removed?
-What must change for me to learn what I don't know?	-What has changed about what I don't know?
-What can I do to make this happen?	-Do I know what I want to know?
Phase 2 Problem: What is My Plan?	
-What can I do to learn what I don't know?	
-What could keep me from taking action?	
-What can I do to remove these barriers?	
-When will I take action?	

The three core phases highlighted in SDMI serve as guideposts for the student teaching experience. The approach requires the creation of programmatic supports by which student teachers can themselves use the steps of SDMI to improve their practice, enhance the experience of student teaching, and become more reflective in the field. Student teaching serves as a defining experience—the capstone and culmination of an expensive and academically rigorous journey. As supporting professionals, we have refined a method to facilitate, nurture, and scaffold a growth-filled student teaching experience. By combining the assets of cognitive and behavioral approaches and using Wehmeyer et al.'s (2000) SDMI, we provide concrete strategies to help preparing teachers capitalize on their own strengths, in turn, enhancing the skills of our future teaching force.

Participants

The students who participated and were supported by this framework were enrolled in a teacher preparation program designed to earn dual certification in PK-4, Early Childhood Education and PK-8, Special Education. Candidates experience a four-stage continuum of field experience prior to student teaching that includes embedded clinical experiences starting in their first year of the program. Field experience locations are diversified to amplify exposure and connections, ranging from private to public and across urban and suburban settings. During their field experiences students are required to engage in Stage 1 and 2 level experiences that focus on observation and exploration. They then move into Stage 3 experiences in tandem with their methodology classes, focusing on more diverse and sophisticated responsibilities connected to planning, delivering, and assessing academic content. In the 4th Stage of field experience, students complete two 7-week experiences; one in early childhood education and one in a special education setting. Some students complete all 14 weeks of their students teaching experience in a classroom designated as inclusive due to the nature of the school community and the needs of the students.

Mentorship: The University Supervisor

The university supervisor offers SDMI as a strategy to facilitate the student teacher's steps to certification. The link between basic education and higher education is highlighted as the primary vehicle for excellence in the formative process of pre-service teachers. Student teachers experience their most applied training when they receive the opportunity to serve in PK-12 educational institutions. In our preparation program we underscore the essential link between theory and practice. In the role of supervisor, the three core phases of SDMI, "my goal, my plan, what have I learned", are addressed with context-building experiences such as books and film, cognitive behavioral modification strategies such as problem-solving, and growth analysis for consistent reflection.

"The Goal" is facilitated prior to student teaching. I [Marisa Rauscher] teach all the students at our university in at least one of the two semesters prior to the student teaching experience. Before the start of their student teaching I promote goal-setting in a philosophical way through literature. The focus on goal-setting sets the tone for students to engage at their sites in a positive and hopeful way. Student teachers read a book or articles related to the field of education, such as selections by special educator and psychologist Torey Hayden, work by Jonathan Kozol, or Carol S. Dweck's *Mindset*. This course requirement is designed to be inspirational. We acknowledge that it is removed from direct classroom responsibilities, but takes place as students complete their pre-observational hours in the setting in which they will be student teaching. After reading, discussions between supervisor and candidate occur in an informal format, whereby student teachers can reflect on what they've read and begin to process how the content of the literature could impact their own experiences.

This exercise becomes a jumping off point for goal setting. How will these pre-service teachers set up their own classrooms? How will they address behavioral difficulties? How will they attach meaning to the content they will teach? After reading about personal accounts of life in the classroom, preparing teachers can begin to imagine, dream, and create ideas about what they envision for their own careers. The literature helps them understand more about the realities of the teaching experience and exposes them to different styles of problem solving, methods of instruction, and philosophies of education. The active and reflective discourse about these pieces of literature help preparing teachers as they begin to formulate their own educational philosophies and beliefs. The formation of these ideologies becomes increasingly important as the student teaching experience begins.

"The Plan" and "What Have I Learned" components of the model are developed in post-observational conferencing that occurs after I observe the student teacher in the classroom setting. Often this is perceived as a high stakes situation by the student teacher; they feel the pressure of someone in a position of power observing one data point that only represents a small portion of their greater body of work. To allow for agency in these instances, we meet after the teaching experience to "unpack" the observation. In this instance, I resist the "sage on stage" approach where I tell the student teacher what worked, what didn't and how they may "fix it." Rather, the student teacher engages in the cognitive behavior modification strategies of problem solving and creating alternate responses. They evaluate themselves, and are prompted to identify what is working well and what can be approached in an alternate way.

Embedded in this process is an identification of what is learned, and a growth analysis is used to overtly name what is unfolding in terms of the candidate's learning. The four questions that guide this growth analysis are:

1. What attracts me here and why?
2. What do I resist and why?
3. What questions does this experience raise for me?
4. What questions does this experience answer for me? Not answer for me?

This model is in juxtaposition to the "banking" method in which the student "receives" new knowledge with little critical analysis. Instead, this ownership and engagement allows student teachers to know limits, to evaluate perceptions and to develop agency and self-determination.

Modeling: The Cooperating Teacher

In the role of cooperating teacher, the three core phases of SDMI—"my goal, my plan, what have I learned" —are addressed using skill modeling, standards-based lesson planning, and a reflective journal. The educational setting consists of students who are neuro-diverse and are receiving special education services in a supplemental learning support classroom. My role is to model several skills, including collaborative acumen, curricular knowledge, and differentiation skills as the preparing teacher travels the natural learning curve of a novice.

My elementary-age students are served in a public school where inclusion is prioritized. These students participate in subject areas at various grade levels, receive individualized instruction for academic tasks and attend multiple classes each day with neuro-typical peers. Student teachers are faced with the challenge of providing meaningful learning experiences for each student while managing support staff, collaborating with regular education teachers, maintaining effective classroom management structures and collecting data towards IEP goals. The start of their student teaching experience is unnerving and intimidating. Everything seems overwhelming and impossible to manage at the same time. By using SDMI with the student teacher, the seven- to fourteen-week experience becomes more manageable and becomes a team effort with appropriate support from both the university supervisor and the cooperating teacher. This support provides the student teacher with a greater sense of security as they embark on this first step in their career.

When student teachers enter my classroom, they have had very limited experiences in the special education setting. They have participated in field experience where they first observe various classrooms, and later begin to plan and implement their own lessons on a more regular basis in a specific setting. While these opportunities are necessary and purposeful, they cannot compare to full immersion in a supplemental learning support classroom five days a week for seven weeks. The SDMI method provides a scaffold which allows teacher candidates to assess their own strengths, skills, and ideas to prepare for the daunting task of taking over a real classroom.

I [Becky Konkle] give each of my student teachers a journal on their first day, which is ungraded. Instead, it is a learning tool, which provides a place for reflection, questions, celebrations, and planning for the "next times" after defeat. The journal can also play an

important role in the relationship between the university supervisor, the cooperating teacher and the student teacher. Although not part of an official assignment, the journal provides the student teacher with a concrete narrative that can be shared with the university supervisor. The journal entries paint a picture of what "every day" looks like for the student teacher. Rather than only one lesson being unpacked, the supervisor can see the progression the student teacher has made as the experience unfolds. It also allows the supervisor to see how the cooperating teacher is providing mentorship and modeling throughout the process. When shared, the journal can assist the student teacher and the university supervisor in pinpointing areas for improvement. It also helps uncover patterns that can be tracked and analyzed in a more informal method. The journal provides multiple formats for expressing goals, action plans and the acquisition of knowledge. It is comprised of six main sections, each addressing one or more of the steps in SDMI.

My Educational Philosophy

One way of establishing a student teacher's professional mission is to determine their educational philosophy. On the first day, I ask them to write what they believe about their role as a teacher and how they will demonstrate those beliefs in the classroom. This draft is created by the student teacher who draws from past experiences in schools, the culmination of experiences gleaned through coursework and through the reflective reading analysis that has occurred with the university supervisor. At the completion of the student teaching experience, I ask them to write it all over again. This draft will be written after a strenuous, challenging and very real seven weeks with my students. This practice provides a framework by which the student teacher can see how their original beliefs have been transformed through goal setting, action planning and careful reflection.

I Want to Know! I Need to Know!

Here student teachers engage in real thought about goal setting and action planning. They are given the opportunity to list every question that they have about teaching, about the classroom, about what is expected. What are they unsure about in their lesson planning? How can they manage a classroom and teach at the same time? What skills do they need to be taught? What help needs to be provided? What still needs to be learned or practiced? What remains as a roadblock to their success? We revisit the list together throughout the seven weeks to determine where we are on the path to the goal.

Observations

Student teachers spend the first week observing my teaching. Here, they practice anecdotal record-taking by narrating what they see. This allows them to engage in Phases 1 and 2 by determining more of what they need to know, what they already know, and what they need to do to acquire what is unknown.

I Know! I Know!

This section of the journal requires reflection upon what was unknown and also allows each student teacher to identify victories in what has been learned. As they move through the seven weeks, they write what they learn as they go. What's been surprising? What did you realize you already knew? What will you use in your own classroom? This is Phase 3 in action.

Reflections

Multiple subsections make up this portion of the journal. As time passes, student teachers organize their experiences in a way that will help them through Phases 2 and 3. The subsections are: Aha Moments, That Wasn't the Best, My First Day, My Last Day, IEP Meetings.

Plus/Delta

The "Plus/Delta" concept is a common method of reflection used in professional settings. Pluses indicate what has gone well. Deltas indicate areas that need to be considered. When the student teacher begins to take over the classroom, I observe as they teach. I write in the journal on one page using a T chart. The left side is "+", the right side is "Δ". Throughout the lesson, I list things that went well. I am specific in my praise. I also list considerations to be made. When the lesson is finished, I ask the student teacher to sit and independently complete the same T chart. Then we compare notes. We determine together what is known, yet unknown, and where we both need to improve – me in my modeling or direct instruction of skills – them in the teaching act.

This portion of the journal highlights the true journey of the student teacher. At the completion of seven weeks when the candidate goes back to the journal, concrete movement through the process is apparent. Early lessons are heavy with deltas and questions from the student teacher. As weeks go by, the columns written by cooperating teacher and student teacher begin to match more directly. The student teacher demonstrates the ability to accurately reflect upon what is working and what is not. The university supervisor can also contribute to this growth and that collaboration is apparent here, as well. Plus/Delta is where the inner workings of SDMI are most easily observed. The student teacher has set a goal, made an action plan, and then assessed what has been learned.

The reflective journal has become my tool for using SDMI with student teachers. It spans the phases and provides real, concrete evidence that they are moving through the learning process, and becoming agents in their own teaching. In addition, it creates a concrete connection for the university supervisor and the cooperating teacher by providing a day-to-day narrative of what has occurred in the classroom. This connection provides continuity in the process of SDMI and gives the student teacher the sense that both parties are concerned, involved and working together to create the best experience possible.

Conclusion

In essence, as we support student teachers and acknowledge our own journeys toward best practice, we have collaboratively engaged in goal setting, action planning, and evaluating what we have learned. We have committed to using our own strengths and experiences to assist pre-service teachers in capitalizing upon the gifts they bring to the field. This process provides a strong framework for building upon strengths, addressing challenges and setting goals, which ultimately serves the supervisor, cooperating teacher, student teacher and students.

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Modeling the Intended Change: Using Concepts of Brain-Based Teaching and Learning in Professional Development

Tara L. Parr
Perkiomen Valley School District

This study examined the use of brain-based teaching and learning as an instructional method for professional development, focusing specifically educators' perceptions of how they learn and their intended and realized changes based on the professional development learning experience. This study proposes that pedagogical change begin with effective professional development, which continues to be linked to the success of student growth and achievement in public education (CITE). This study suggests that effective professional development models the change intended for students, thereby beginning to bridge the gap between educational research and practice.

Professional development, considered a cornerstone of teaching and learning, is designed to promote the use of effective pedagogy and advances in pedagogical research. As a stimulant to student learning, professional development can have a profound impact on student growth and achievement (Desimone, 2011; Kuijpers, Houtveen, & Wubbels, 2010; Webster-Wright, 2009). Unfortunately, an estimated 90% of professional development opportunities take place in traditional workshop-style lecture-based settings (DeMonte, 2013), which is a method theorists have argued has little impact on influencing practice (Gulamhussein, 2013; Hughes, 2015). Instead, research advocates that professional development be conducive to the change the learning is designed to bring about (Hull, 2003); in other words, professional development should model the instructional methods it is designed to promote.

Over the years, a list of components necessary for successful professional development has emerged. The list includes meaningful content, active engagement, collaborative opportunities, coherence with school curricula and policies, and sustained, continued efforts (Caine & Caine, 1991; Cohen & Hill, 2001; Cram & Germinario, 2000; Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Desimone, 2011; Penuel, Fishman, Yamaguchi, & Gallagher, 2007; Piaget, 1954; Rushton, Eitelgeorge, & Zickafoose, 2003; Sparks & Hirsh, 1997). These components are closely aligned to research from the learning sciences, an interdisciplinary field combining disciplines such as educational phycology, neuroscience, and cognitive science, to further the consideration of scientific learning in the design of instruction, and brain-based teaching and learning.

Research from the learning sciences offers valuable insights for reform in K-12 public school settings (Weigmann, 2013). For example, advanced studies of brain activity serve in the exploration, classification, and explanation of learning processes and thus concepts such as brain-based learning and brain-targeted learning are becoming more common in instructional

planning. To prepare educators in the use of these concepts for learning and instruction, professional development should model strategies of brain-based learning as a valuable asset to the evolution of classroom pedagogy.

Statement of the Problem

The disconnectedness between brain-based research and pedagogical application presents a major barrier in the evolution of instruction (Stein & Fischer, 2011). Scientists active in the learning sciences are dedicated to not only proliferating the understanding of how learning occurs but also encouraging educational decisions that implement learning innovations for the continued improvement of instructional practice. Stein and Fischer (2011) advise, "the framing of educational problems and the implementation of proposed solutions require the collaboration of educators and students with scientists…the progress of MBE [mind, brain, and education research] is wedded to the progress of educational practices" (p. 59). Though educators play a significant role in student learning they know little of the research from the learning sciences, especially regarding brain-based learning and how brain-targeted teaching can inform instruction (Hardiman, 2012; Willis, 2012). There are several ways to promote the symbiosis required between educators and scientists, one of which is to demonstrate brain-based techniques and strategies during professional development sessions so that educators can experience the strategies as a learner (Lieberman, 1995; Stein & Fischer, 2011; Willis, 2010).

Purpose

This purpose of this study was to examine educator perceptions as learners experiencing brain-based instructional strategies. In addition, this study explored the perceived and realized impact on instruction in the classroom following professional development that modeled concepts of brain-based learning and brain-targeted teaching. There is a plethora of literature that speaks to brain-based concepts as well as innumerable writings regarding professional development. However, this study is unique in that it addresses an existing gap in literature whereas professional development is designed to model brain-based teaching and learning as a means to encourage transference to the classroom.

Conceptual Framework

The researcher maintained the constructivist theory, explained by Piaget (1954) as a process in which learners build knowledge through interaction, reflection, and active response. Modeling, a strategy appropriate for all learners, is a cornerstone in the constructivist approach as it provides a model for observation as well as opportunity for experience of the intended outcome (Cambourne, 2000). In other words, learners learn by doing. Thus, the author of this study echoes a question posed by Tate (2012), "Wouldn't it make sense for those who facilitate professional learning…to model the same strategies and practices during the learning opportunity that they would expect their participants to use with their own students?" (p. xiv).

Limitations

This study relied heavily on the reflective experiences of the participants, which bring intrinsic limitations due to biases in self-perception and one's own change. A second limitation is that educators were asked to report observations of student behavior in relation to changes in pedagogy, which were descriptive rather than quantitative.

Sample

The professional staff in a K-12 public school district was provided the opportunity to participate in a learning session titled "Brain-Targeted Teaching" as part of the district's professional development program. Of the 46 educators that enrolled, 96% (n=44) elected to participate in the study and 50% (n=23) consented to interviews. There were 18 male and 26 female participants. Seventy-five percent (33) of the survey participants indicated their position as regular education classroom teachers, over half of which (57%) represented the elementary level. Over 75% (n=32), indicated 11+ years of teaching experience with equal representation from both the elementary and secondary levels. Participant demographics are outlined in Table 1.

Table 1
Participant Demographics

		Position				**Years Teaching Experience**			
Level Taught		Clrm Tchr – Reg Ed	Clrm Tchr – Spec Ed	Sp Area Tchr	Support Services	Less than 5 years	6-10 years	11-20 years	20+ years
Lower Elementary (K-2)	6.8% (3)	9.0% (3)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	22.2% (2)	4.8% (1)	0.0% (0)
Upper Elementary (3-5)	47.7% (21)	48.4% (16)	0.0% (0)	100% (4)	33.3% (1)	50% (1)	55.6% (5)	42.9% (9)	50.0% (6)
Middle Level (6-8)	25.0% (11)	24.2% (8)	50% (2)	0.0% (0)	33.3% (1)	0% (0)	22.2% (2)	28.6% (6)	25.0% (3)
High School Level (9-12)	20.5% (9)	18.1% (6)	50% (2)	0.0% (0)	33.3% (1)	50% (1)	0.0% (0)	23.8% (5)	25.0% (3)
Total	**44**	75.0% (33)	9.1% (4)	9.1% (4)	6.8% (3)	4.6% (2)	20.5% (8)	47.7% (20)	27.7% (12)

Research Methods

Participants attended a 6-hour professional development session voluntarily as part of a summer professional development series. The session was titled Brain-Targeted Teaching and explored concepts of brain-based teaching and learning (BBL). Participants knew that there were three purposes to the session: (a) provide educators with brain-based research information including implications for teaching and learning, (b) afford an opportunity for educators to experience a BTT model as learners, and (c) model the BTT framework for use in the classroom.

The learning activities in the session allowed for both individual and collaborative learning, employed a variety of learning technologies such as interactive tools for formative

assessment and the integration of BTT strategies including opportunities for collaboration, discovery, and reflection. The learning session topics included:

- brain facts (biological and cognitive processes),
- key neurological terms,
- neuro-myths,
- role between science and education, and
- an in-depth look at the six targets of the Brain-Targeted Teaching Model.

Data were collected throughout the session, via pre- and post- surveys as well as anecdotal observations throughout the session. Additional surveys were distributed 4-6 weeks after the session, aligned with the timing of the semi-structured interviews. Using an explanatory sequential design (Creswell & Plano Clark, 2011; Tashakkori & Teddlie, 1998), the data collection occurred in two distinct phases. In phase one there were three collection stages, immediately pre-session and immediately post-session and throughout the session, while in phase two there was one collection stage, approximately 4-6 after the professional learning session (see Table 2).

Table 2
Timeline for Data Collection

Explanatory Sequential Mixed Methods		
Method	**Description**	**Timeline**
Phase One • Primary: Quantitative • Secondary: Qualitative	Administer pre-survey (Immediately prior to PD learning session)	Two PD learning sessions scheduled: • August 18, 2016 • August 23, 2016
	Anecdotal information collected by researcher throughout session	
	Administer post-survey (Immediately after to PD learning session)	
Phase Two • Primary: Qualitative • Secondary: Quantitative	Administer Delayed post-survey	Distributed September 15, 2016 Due by September 24, 2016
	Conduct individual semi-structured interviews	Scheduled September 19, 2016 through September 30, 2016

In the first phase, participants completed an online pre-session survey and an immediate post-session survey indicating their knowledge of brain-based instruction and reflecting upon their experiences in the classroom. The primarily quantitative surveys included close-ended question formats such as matrix ranking and Likert scales with radio buttons representing a range of numeric values. The results of the pre-session survey and immediate post-session survey are outlined in the Table 3 and Table 4. The most significant shifts were demonstrated in relation to knowledge of learning concepts labeled collectively as neuro-myths. These shifts are evidenced by a gain of between 33% and 50% in knowledge, which indicated a change in participant thinking about neuro-myth concepts such as the percentage of brain used and teacher-driven instruction.

Table 3
Pre-Session Survey Results Relating to Educator Knowledge of BBT&L Concepts

Identify the extent to which you agree with the following	**Neither agree nor disagree**	**Strongly disagree**	**Somewhat disagree**	**Somewhat agree**	**Strongly agree**
Learning is based on biological changes.	11.4%	0.0%	2.3%	72.7%	13.6%
Learning best occurs through interaction with information.	0.0%	0.0%	4.5%	36.4%	59.1%
Teacher-driven instruction is very effective.	20.5%	6.8%	31.8%	31.8%	9.1%
Learning activities should provide opportunity for exploration, invention, and creative application.	2.3%	2.3%	0.0%	15.9%	79.5%
Learners are dominantly right-brained or left-brained.	20.5%	2.3%	11.4%	47.7%	18.2%
Humans use only 10% of their brain.	20.5%	15.9%	22.7%	20.5%	20.5%
Differentiation means teaching to the student's learning style.	6.8%	2.3%	9.1%	63.6%	18.2%
When designing instruction, educators benefit from a basic understanding of brain structure and function.	4.5%	0.0%	2.3%	47.7%	45.5%

Table 4
Post Session Survey Results Relating to Educator Knowledge of BBT&L Concepts

Identify the extent to which you agree with the following	Neither agree nor disagree	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
Learning is based on biological changes.	2.3%	2.3%	13.7%	30%	52.3%
Learning best occurs through interaction with information.	0.0%	0.0%	8.8%	13.6%	80%
Teacher-driven instruction is very effective.	25.6%	39.5%	13.9%	16.3%	4.7%
Learning activities should provide opportunity for exploration, invention, and creative application.	0.0%	0.0%	0.0%	9.09%	90.9%
Learners are dominantly right-brained or left-brained.	**45.5%**	34.1%	11.4%	9.09%	0.0%
Humans use only 10% of their brain.	2.3%	90.9%	2.3%	2.3%	2.3%
Differentiation means teaching to the student's learning style.	27.9%	37.1%	9.3%	16.3%	9.3%
When designing instruction, educators benefit from a basic understanding of brain structure and function.	2.3%	0.0%	0.0%	11.4%	86.4%

In the second phase, 4-6 weeks after the completion of the learning session, qualitative open-ended questions via online surveys and individual semi-structured interviews built upon the quantitative data. The delayed post- survey was sent to all study participants and had a 59% (n=26) response rate. For the semi-structured interviews, an interview pool was generated based on those that expressed a willingness to participate. The researcher narrowed the pool based on the educators' roles as regular education content area teachers as that demographic was most represented. Of the seven participants invited to be interviewed, five responded that they would like to proceed; individual interview sessions were conducted with each participant in a private area of the participants' school buildings. An interview protocol was generated that explored relevant information regarding the participant's application of BTT strategies as expressed in their own words.

Results

During the professional development session, participants experienced the concepts of brain-based teaching and learning as learners. In alignment with concepts of brain-based instruction, the learning session was designed to promote a feeling of comfort in a risk-free environment. Learners were encouraged to use movement, interaction, and self-expression to facilitate their learning.

Educators' Reflections on Learning

Commonly, during the session, participants expressed renewed awareness of the impact of the physical environment and the emotional climate on their own process of learning. After the session, participants reflected upon and described their involvement in the session as learners. In an open-ended post-survey response an elementary educator wrote, "The easy flow of the conversations encouraged me to talk and share more." Another educator, at the middle school level, penned, "The room *felt* relaxed. Both getting feedback and giving feedback about ideas occurred freely within the groups and pairs."

Frequent opportunity for discussion is touted in brain-based instruction to promote mastery of content, skills, and concepts. As part of the learning session, participants frequently engaged in discussion activities for brainstorming and questioning through instructional strategies such as think-pair-share, think-alouds, and group discussions. Participants voiced an appreciation for the opportunities to engage in conversation as part of their own learning. One educator wrote, as part of the open-ended post survey, "Discussion was a great way to explore the new and innovative concepts that can enhance the learning experience."

In addition, many participants noted the importance of considering learning through the student lens as opposed to their professional role as an educator. Open-ended comments included one from a high school educator:

> We are not expert neuroscientists. But we have expertise in education. And as an educator, I found it interesting to think about the learning perspective as a student. Not think of them as just sitting there and listening. But thinking about how they think.

Another area of participant interest centered on the relationship between the educator and student. As part of the interviews, two middle school educators commented on the importance of

making connections with their students: "Teachers who become very separated forget what it is like to be a student. I feel I have a good grip on the mind of a student because I try to make personal connections," and, "Connecting with your students and trying to get to know them is so important. It really builds trust. I do that every year, but this year, inspired by the workshop, I felt I had a renewed purpose."

An additional goal of the learning session was to inspire reflection, and engage participants in a variety of strategies to support their learning processes. Several educators expressed satisfaction and a feeling of validation regarding strategies they already employ in their classrooms. Participants expanded on their thoughts as part of the open-ended questions. For example, they offered the following written statements: "This experience allowed me to reflect on what I already do and why I should keep doing it" and, "I realized some of the lessons I viewed as fluff in the past are actually more valuable than I thought for learning."

Participants also commented on the value of physical movement and instructing to a multitude of learning styles. As part of an open-ended immediate post survey question, a third-grade educator offered, "As a learner, I appreciated the ability to move around and talk and experience different ways of learning. I'm trying to think about that for my students." This response was echoed by another third-grade educator on the immediate post survey who wrote:

> Last year I got in the habit of doing brain breaks. I would do one each day in the middle of the day. But now I realize, after participating as a student in a six-hour session, that I may need to do them more often. I need to be more in-tune with my students to notice when they need a break. I recognize that after the break they will most likely be better focused.

The learning session was designed not only to expose participants to concepts of brain-based instruction but also to engage them in brain-based teaching and learning strategies as part of their learning processes. Ultimately, the goal was to model the intended change and thereby inspire the consideration of brain-based instruction in the participants' future instructional design. Therefore, as part of the delayed post four-week survey, participants reflected upon their use of brain-based concepts in instructional design. The concepts align with Hardiman's (2012) six brain-targets and include: the emotional climate, whereas a positive climate can result in higher levels of growth and achievement; the physical environment, focused on gaining student attention and promoting a feeling of security; learning design, encouraging learning experiences based on what is known about how the brain learns; teaching for mastery, advocating for the retention of skills, content, and concepts through mastery of learning; teaching for application, encouraging the active use of skills and concepts mastered; and evaluating learning, which includes a variety of assessment methods and stresses the value of timely feedback.

As shown in Table 5, participants indicated the frequency with which they planned to apply brain-based concepts in their pedagogy, with at least half or more indicating plans to apply some brain-based learning techniques with more frequency. More than half of the participants reported consideration of the emotional climate (56%) and the physical environment (56%) of the room with greater frequency.

Table 5

Application Frequency of Brain-based Concepts, Post Four-Week Survey

	Do Not Plan to Apply	Apply with Same Frequency	**Apply with more frequency**	Plan to Apply
Emotional Climate	0%	44%	**56%**	0%
Physical Environment	0%	40%	**56%**	4%
Learning Design	4%	60%	**36%**	0%
Teaching for Mastery	4%	56%	**36%**	4%
Teaching for Application	0%	72%	**24%**	4%
Evaluating Learning	4%	64%	**24%**	8%

To follow up, participants were asked to indicate the level of occurrence in which they apply or plan to apply brain-based strategies in their classroom. The immediate post and delay post responses are shared respectively in Tables 6 and 7. Overall, the data gathered reflects an increase in the occurrence of applied brain-based teaching and learning strategies in participants' classrooms. Most notable, as per the shaded areas of Tables 6 and 7, was the shift from an indication of *never* in the immediate post survey, in which participants were asked to reflect on past practice, to a more frequent occurrence in the delayed four-week post survey where educators were asked to reflect upon current and projected classroom pedagogy.

Table 6

Immediate Post Session Survey – Reflecting on Classroom Instruction And Strategies Prior To The Learning Session

Identify the extent to which you encouraged your students to…	**Never**	**Sometimes**	**About half the time**	**Most of the time**	**Always**
Set their own learning goals	9.52%	38.1%	35.7%	16.7%	0.0%
Set their own process goals	7.1%	50.0%	26.2%	16.7%	0.0%
Identify strategies for achieving their goals.	0.0%	28.6%	35.7%	31.0%	4.8%
Choice in how they demonstrate learning (assessment)	**14.3%**	**26.2%**	**40.5%**	**14.3%**	**4.8%**
Revise goals when necessary.	4.8%	35.7%	23.8%	28.6%	7.1%
Adjust their actions on their own to achieve goals	0.0%	40.5%	33.3%	23.8%	2.4%
Give constructive feedback to their peers.	2.4%	23.8%	35.7%	23.8%	14.3%
Reflect on their process of achieving their goals.	0.0%	33.3%	28.6%	26.2%	11.9%
Evaluate their own work.	0.0%	23.8%	40.5%	28.6%	7.1%
Identify the extent to which you agree with the following…	**Neither agree nor disagree**	**Strongly disagree**	**Somewhat Disagree**	**Somewhat Agree**	**Strongly Agree**
My students can articulate what is expected of them.	11.9%	0.0%	0.0%	69.0%	19.0%
My students know how they are being evaluated.	7.1%	2.4%	0.0%	71.4%	19.0%
My students work well with their peers	21.4%	2.4%	0.0%	59.5%	16.7%

Table 7

Delayed Post Session Survey – Classroom Instruction and Strategies Four Weeks Post The Learning Session

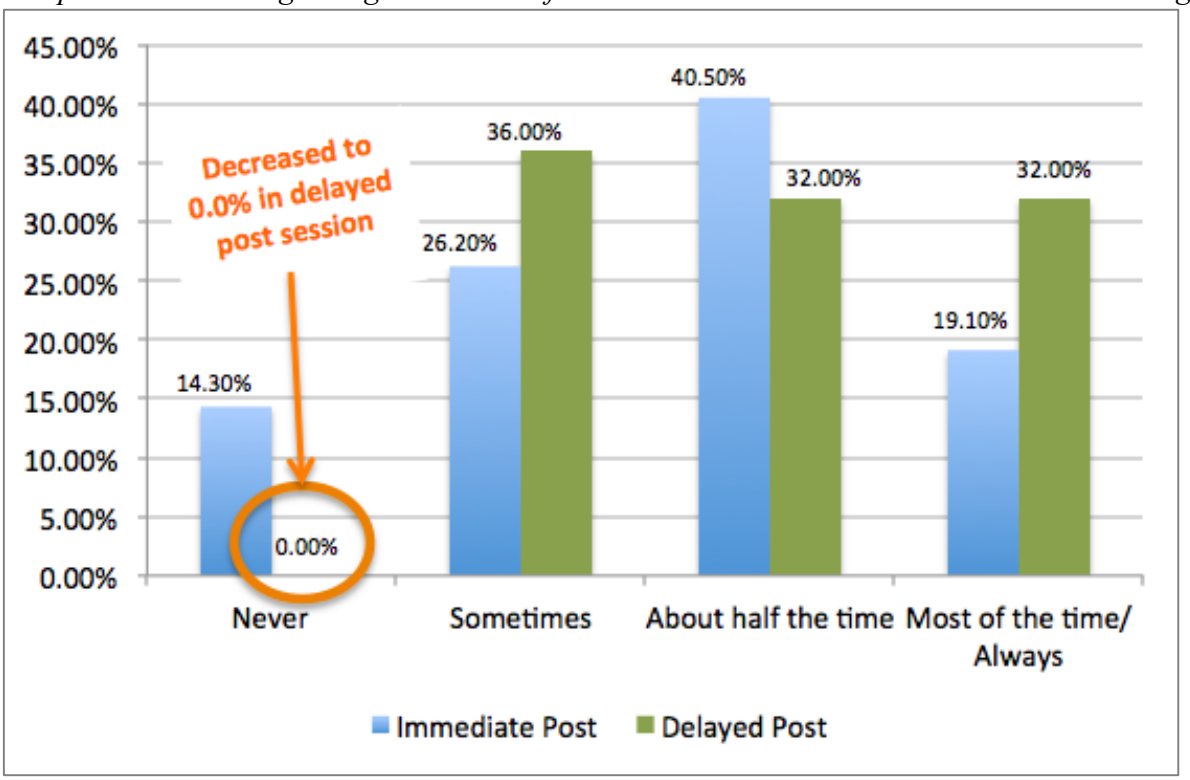
Identify the extent to which you encourage your students to…	**Never**	**Sometimes**	**About half the time**	**Most of the time**	**Always**
Set their own learning goals	4.0%	32.0%	24.0%	28.0%	12.0%
Set their own process goals	0.0%	32.0%	28.0%	32.0%	8.0%
Identify strategies for achieving their goals.	0.0%	12.0%	24.0%	32.0%	32.0%
Choice in how they demonstrate learning (assessment)	**0.0%**	36.0%	32.0%	24.0%	8.0%
Revise goals when necessary.	0.0%	12.0%	32.0%	32.0%	24.0%
Adjust their actions on their own to achieve goals	0.0%	8.0%	28.0%	44.0%	20.0%
Give constructive feedback to their peers.	0.0%	8.0%	36.0%	28.0%	28.0%
Reflect on their process of achieving their goals.	0.0%	8.0%	40.0%	40.0%	12.0%
Evaluate their work.	0.0%	8.0%	24.0%	52.0%	16.0%
Identify the extent to which you agree with the following…	**Neither agree nor disagree**	**Strongly disagree**	**Somewhat Disagree**	**Somewhat Agree**	**Strongly Agree**
My students can articulate what is expected of them.	3.5%	0.0%	0.0%	51.7%	44.8%
My students know how they are being evaluated.	6.9%	0.0%	0.0%	41.4%	51.7%
My students work well with their peers	3.5%	0.0%	0.0%	55.2%	41.4%

It should be noted that a significant gain, extrapolated from Tables 4 and 5, was found in the frequency for encouraging student choice in how to demonstrate learning (see Figure 1). The tables show a 5% gain from immediate post session to delayed post session in allowing student choice in demonstrating learning at least half the time. Further, the results reflect a 13% gain in allowing student choice more than most of the time. Most notable, the percentage of those that indicated they never allow for student choice decreased from 14.3% to 0.0%.

Another notable result pertained to responses regarding students setting their own learning goals. The results indicate there was a small shift from 16.7% allowing the setting of learning goals more than half the time in the immediate post survey to an increased 30% in the delayed post session survey. However, surprisingly, allowing for the setting of learning goals is the only area in which a response of never still existed in the delayed post survey. This is possibly due to educators' interpretation of curricular goals as being static as opposed to dynamic. The participating educators in this study expressed their concern stating that the rigorous timeline imposed by the curriculum allows for very little deviation. For example, during the learning session, a middle school language arts educator explained, "There is so much to get done in a day. It's sad. There is no time to explore creativity or to empower our students in their own learning. We have to stay on target." In other words, educators feel there is little opportunity for individualization of learning goals.

Figure 1

Comparative Data Regarding Allowance of Student Choice in How to Demonstrate Learning



Mean scores were calculated to identify changes or trends in participants' responses by assuming numerical values associated with the Likert scale of responses. Table 6 illustrates the mean scores per question as well as overall. Outlined by the shaded area, the mean scores increased in every instance representing a rise in the use of brain-based strategies in the classroom as part of educator's daily pedagogy. Using SPSS, a paired t-test indicated there was a very small probability of the result occurring by chance as the P-value was less than 0.05 ($t = 4.9$, $p = .000$). Meaning, the evidence collected strongly suggests that the experience of the professional learning session resulted in a statistically significant increase in the integration of brain-based strategies in participant classrooms. Showcased in Table 8, the overall mean average score increased in each individual area and a total of 6.7 points overall.

Table 8

Results of Paired T-Test Comparing Immediate Post Session and Delayed Post Session Survey Means

Identify the extent to which you encouraged your students to…	**Immediate Post Survey Question Mean**	**Delayed Post Survey Question Mean**	**Diff.**
Set their own learning goals	2.6	3.0	+0.4
Set their own process goals	2.5	3.1	+0.6
Identify strategies for achieving their goals.	3.1	3.8	+0.7
Choose in how they demonstrate learning (assessment)	2.7	3.0	+0.3
Revise goals when necessary.	3.0	3.5	+0.5
Adjust their actions on their own to achieve goals	2.9	3.7	+0.8
Give constructive feedback to their peers.	3.2	3.8	+0.6
Reflect on their process of achieving their goals.	3.1	3.6	+0.5
Evaluate their work.	3.1	3.7	+0.6
Identify the extent to which you agree with the following…	**Question Mean**	**Question Mean**	**Diff.**
My students can articulate what is expected of them.	3.8	4.3	+0.5
My students know how they are being evaluated.	3.9	4.3	+0.4
My students work well with their peers	3.5	4.3	+0.8
	37.4	**44.1**	**+6.7**

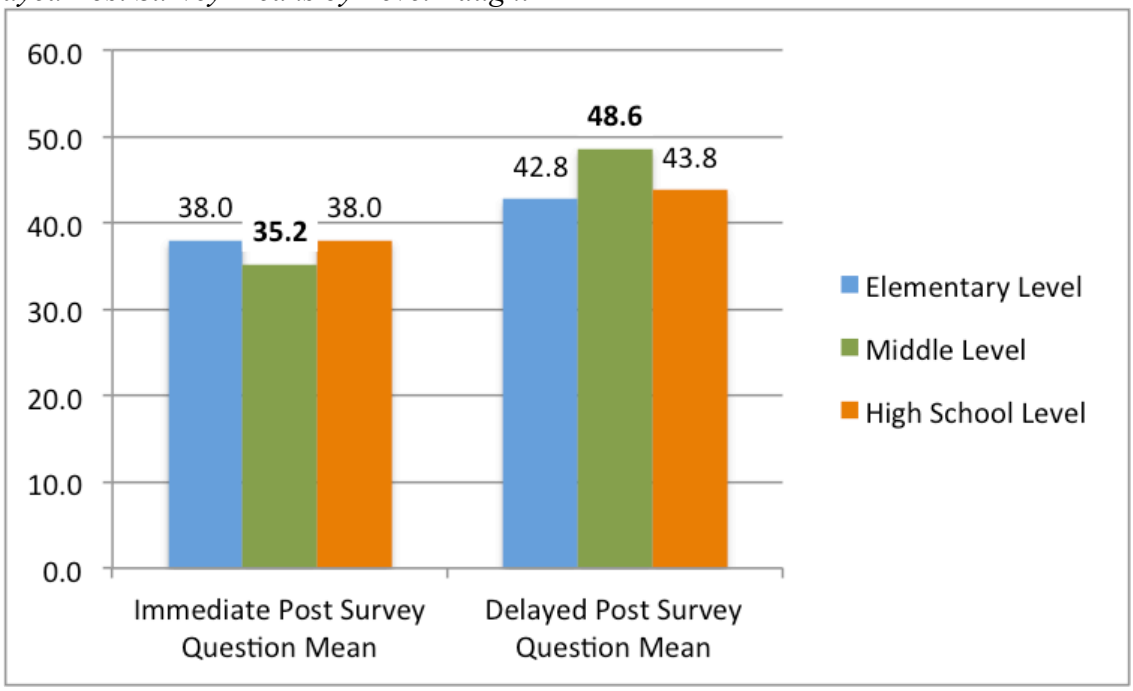
Further analysis of the data outlining the current use of brain-based strategies in the classroom revealed a notable trend in the application of strategies at the middle level in comparison to the elementary and high school levels (see Table 9). While the elementary and high school levels increased 4.8 and 5.8 points respectively, the increase at the middle level was double at 13.4 points (see Figure 2).

Table 9

Comparison of Immediate and Delayed Post Survey Means by Level Taught

Level Taught	Immediate Post Session Mean	Delayed Post Session Mean	Gain
Elementary	38.0 (n=25)	42.8 (n=14)	+4.8
Middle	**35.2 (n=11)**	**48.6 (n=10)**	**+13.4**
High School	38.0 (n=8)	43.8 (n=5)	+5.8

Figure 2
Application of Brain-Based Strategies in Classrooms: Comparing Immediate Post Survey and Delayed Post Survey Means by Level Taught



Discussion

Research from the learning sciences continues to emerge as an important part of the future of instruction. While brain-based teaching and learning concepts can provide a framework for instruction few educators are exposed to the information in a way that transforms their practice (Sikora, 2013). Aligned with the findings of Willis (2012), this study proposes that using brain-based instructional strategies to assist in educating teachers about brain-based teaching and learning can transform their pedagogy. In other words, to understand new concepts, one must first take on the role of learner before effectively assuming the role of teacher (Niederhauser & Wessling, 2011). Educators are in a unique position that often teeters between the role of teacher and the role of learner. The results of this study indicate that when educators are given an opportunity for experiential learning, where the intended change is modeled during the learning, their design of instructional practice is impacted. Consistent with the findings of several researchers (Dubinsky, Roehrig, & Varma, 2013; Hoffman, 2012; Sikora, 2013), this study demonstrated that educators are more likely to implement their newly acquired knowledge within their learning environments following their experience with professional development that models the change intended.

Implications for Future

This study asserts two important implications to the future of instruction. One, professional development designs are effective when they model the change intended. Researchers agree that to promote effective learning experiences, an educator must first

experience knowledge as a learner. Thus, one recommendation emerging from this study is the development of a framework for the design of professional development. The framework would serve as a guide to professional development facilitators and include a checklist of elements necessary to the implementation of effective learning experiences for educators such as modeling the intended change. The guide would also include tips, suggestions, and strategies for leading professional development sessions. The strategies would align with those encouraged for all learners as part of brain-based teaching and learning concepts.

Two, research from the learning sciences is emerging as an integral part of the future of education. A second recommendation includes the creation of a professional development plan dedicated to the exploration of research from the learning sciences. A plan such as this may result in sustained shifts in thinking whereas educators consistently consider concepts of brain-based teaching and learning for instruction. A sustained model would also serve to build capacity throughout education organizations.

Summary

This study explored the impact on instruction following a learning session designed to model strategies of brain-based teaching and learning. The data examined educator perceptions as learners as well as their increased consideration of the strategies when planning instruction. Given these outcomes, it is clear that research from the learning sciences can have a profound impact on elements of teaching and learning and thus, its position is solidified as an important consideration for the future of education.

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An Invitation to Write for Pennsylvania Educational Leadership

Kathleen Provinzano, Editor

Pennsylvania Educational Leadership (PEL) is the professional journal of the Pennsylvania Association for Supervision and Curriculum Development (PASCD). A peer-reviewed journal, PEL is typically published two times per year. Manuscripts are accepted year-round. Topics address the interests and concerns of Pennsylvania educators at all levels. We welcome a wide variety of manuscripts including (but not limited to) single study inquiries, qualitative and quantitative research, theoretical and conceptual pieces, historical analyses, literature reviews, action research, and first-person narratives. Manuscripts may address, among other topics, descriptions of curriculum improvement projects, discussions of trends and issues, views on instructional strategies, statements of theoretical positions, accounts of staff development and supervisory practices, reports of formal research projects and teacher inquiries. In addition, the journal welcomes practitioner's pages—non-research manuscripts written by practitioners for practitioners.

Call for Submissions

Pennsylvania Educational Leadership Special Edition

The underlying premise of this special edition is that educators, at all levels, are committed to providing a high quality, equitable education for all students, therefore, we must find a way to use our voices as a mechanism for advocacy during an intensely political and potentially polarizing time. Dialogue on how issues of race, class, gender, citizenship, immigration, and globalization intersect with access to an equitable education are necessary, as are discussions on how policies, such as ESSA, influence educator practice. Due to the critical nature of this topic, the PASCD Executive Board has commissioned a special edition of *PEL* focusing on ESSA, access, and equity across the PreK-16 spectrum. This edition builds off the research presented at the *PASA Education Conference and Research Symposium* and signifies a cross-organization commitment to advancing research on these topics. Prospective authors are encouraged to explore any number of important issues and perspectives that relate to the broad theme for this special edition (i.e. social justice leadership, Deferred Action for Childhood Arrivals (DACA), undocumented students, ESSA implementation, educational equity, school reform).

Authors interested in submitting to this special edition should consider the following:

We are interested in hearing from public and private educators at all levels, including higher education students, faculty, and professionals. Additionally, individuals working in the nonprofit education policy realm are also encouraged to submit. We welcome a wide variety of manuscripts including (but not limited to) single study inquiries, qualitative and quantitative research, theoretical and conceptual pieces, historical analyses, literature reviews, action research, and first-person narratives. Beginning spring 2014, the journal began including a Practitioners Page highlighting the voices, thoughts, and opinions of educators in the field. Submissions for the Practitioners Page can take a variety of formats including (but not limited to) book reviews, policy reviews, and critical reflections on current educational issues and trends. Individuals choosing to submit to the Practitioners Page should follow the same submission guidelines as those submitting manuscripts, with the exception of the Abstract. Authors must also indicate that the submission is intended for the Practitioners Page on the cover sheet.

Submission Guidelines:

- Authors should email manuscripts to Editor Kathleen Provinzano (Drexel University) at ktp37@drexel.edu. All submissions will be reviewed and evaluated by the Editor and those deemed appropriate will be sent for blind review. Manuscripts should follow the guidelines set forth by the American Psychological Association.
- The submission email should indicate that the submission is intended for the fall 2017 special edition of *PEL*. If submitting to the Practitioner Page please state that in the email.
- Manuscripts should be submitted as a single Word document and include:
    - Cover sheet;
    - Abstract;
    - Body/text, tables, charts, and figures (if applicable);
    - References list.

    - If possible, please include the Digital Object Identifiers (DOI) for all electronic sources. The manuscript must be typed in 12-point font, Times New Roman, with one-inch margins. The text should be double-spaced.
- The cover sheet should include the title and author information, including contact information for the primary author, including mailing address, email address, and phone number. On this page, the author should indicate that the manuscript has not been submitted elsewhere for publication. If the manuscript involves the use of human subjects, the author should indicate whether Institutional Review Board approval has been granted unless deemed exempt.
- The second page of the submitted manuscript is the abstract page. The abstract should be 150 words or fewer. The abstract should include the purpose of the manuscript and essential findings or discussion points.
- The author(s) should remove any references that might be self-identifying from the body of the text to ensure blind review of the manuscript.
- The references page will follow the body of the text and any tables, charts, or figures. Please be sure to check that all in-text citations match references in the list and that the list is properly formatted using the APA guidelines. Please include the DOI for electronic sources.

The deadline for submitting manuscripts for the fall 2017 special edition of PEL is Friday, September 8, 2017. Questions regarding a possible submission, submissions under review, or submissions requiring revision can be directed to the editor, Kathleen Provinzano (Drexel University) at ktp37@drexel.edu.