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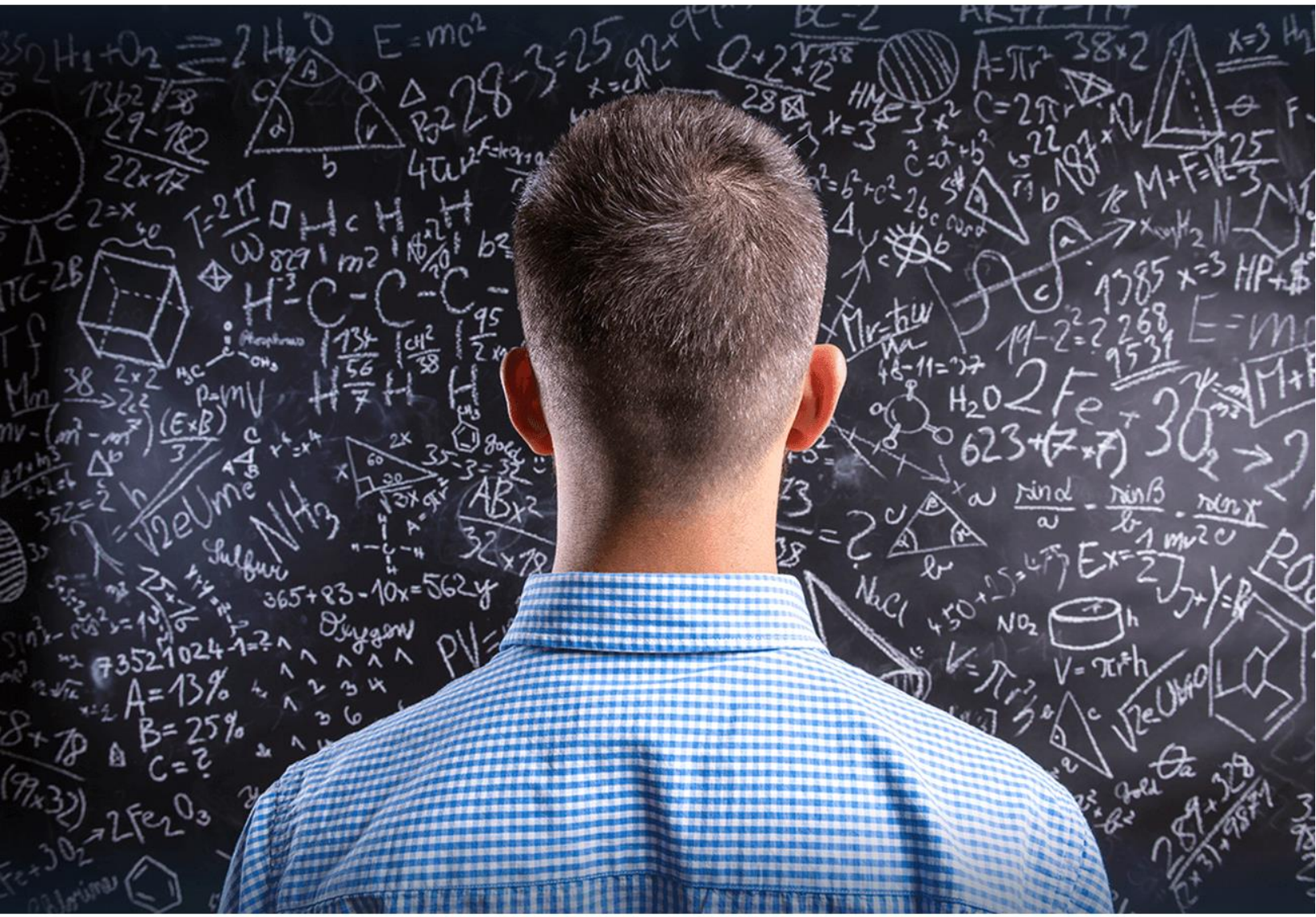

Lance M. Kruse, Ph.D.*
North Carolina State University
lmkruse2@ncsu.edu

Toni A. Sondergeld, Ph.D.
Drexel University
tas365@drexel.edu

Jonathan D. Bostic, Ph.D.
Bowling Green State University
bosticj@bgsu.edu

Edward A. Waddell, Ph.D.
University of Pennsylvania
edward.waddell@pennmedicine.upenn.edu

Guillermo D. Ibarrola Recalde, Ph.D.
Stevens Institute of Technology
gibarrol@stevens.edu

Gregory E. Stone, Ph.D.
University of Toledo
Gregory.Stone@utoledo.edu

*** Corresponding author**

ABSTRACT

Many classroom teachers have questions and concerns regarding the Common Core Standards for Mathematics (CCSSM). This longitudinal, quasi-experimental group-comparison study evaluates a professional development (PD) program centered around the CCSSM by identifying the growth in content and pedagogical knowledge of participating teachers as well as growth in problem-solving ability of students of participating teachers, both over time and as compared to a comparison group. Results indicate a significant increase in both teacher and student knowledge, but not across all mathematical domains or years of the PD program. Implications from the study support the use of PD to contribute to both teacher and student performance.

INTRODUCTION

Nearly five years after the adoption of the Common Core State Standards for Mathematics (CCSSM), many U.S. teachers remain confused about their meaning and concerned about their implications (Kruse, Schlosser, & Bostic, 2017). Existing research indicates that teachers often lack basic understanding relative to the content within the standards (Bostic & Matney, 2013; Murphy & Marshall, 2015; Nadelson, Pluska, Moorcroft, Jeffrey, & Woodard, 2014), fail to correctly interpret the standards (Long, Hutchinson, & Neiderhiser, 2011), and are apprehensive over a reduction in teacher autonomy (Bridges-Rhoads & Van Cleave, 2016). However, studies have demonstrated that professional development (PD) has the ability to improve teacher's mathematical and pedagogical knowledge (Ferrini-Mundy, Burrill, & Schmidt, 2007; Jacobs, Franke, Carpenter, Levi, & Battey, 2007; Wilson, Sztajn, Edgington, & Myers, 2015). Further, the use of student thinking frameworks that summarize what is known about how students learn mathematics (e.g., learning progressions, learning trajectories) in PD have been shown to improve teacher's ability to build upon students' ideas during instruction (Clements, Sarama, Spitler, Lange, & Wolfe, 2011), utilize appropriate instructional practices during discussions (Wilson et al., 2015), evaluate student mathematical reasoning (Norton & McCloskey, 2008), and further develop teacher conceptualization and knowledge of mathematics (Wilson, Sztajn, Edgington, & Confrey, 2014). Additionally, PD centered specifically around mathematical tasks has resulted in an increase in teachers' mathematical and pedagogical knowledge (Ferrini-Mundy et al., 2007; Jacobs et al., 2007; Kabasakalian, 2007). Although a few studies have explored the causal evidence vis-a-vis improving student performance via teacher PD (e.g., Clements, Sarama, Spitler, Lange, & Wolfe, 2011; Hill, Rowan, & Ball, 2005; Jacobs et al., 2007), the few causal studies that exist involved only elementary

students (PreK-5), evaluated only the immediate pre-post PD change, and involved only lower cognitive-level routine tasks.

While classroom teachers express a desire to learn more about the CCSSM (Bostic & Matney, 2013; Kruse et al., 2017), many teachers view existing PD to be insufficient in meeting the rigorous goals of the standards (Ajayi, 2016). As a result, there is a perceived need for more robust, integrative, and impactful PD, in order to improve the knowledge and instruction of classroom teachers and the performance of their students in domains related to the CCSSM. The present study provides an empirical evaluation of one such professional development program aimed at improving teacher knowledge about the CCSSM with the related goal investigating the impact of this PD on student performance.

LITERATURE REVIEW

The Need for Professional Development

The CCSSM are divided into two sets of standards: Standards for Mathematical Content (SMCs) and Standards for Mathematical Practice (SMPs) (Common Core State Standards Initiative, 2010). SMCs describe the content that should be addressed, while SMPs describe behaviors and habits that students should demonstrate during mathematics instruction for students in grades K-12 (Koestler, Felton, Bieda, & Otten, 2013). While 42 states, the District of Columbia, four territories, and the Department of Defense Education Activity have adopted the CCSSM, the transition to incorporating the set of standards has been challenging. Many states recognized the rigorous nature of the standards and the need to involve and include stakeholders, aligning curriculum, assessment, and policies with the new standards was complex (Kober & Rentner, 2012). In particular, states realized there was a need to foster teachers' knowledge about the standards in order to effectively align curriculum and practice (Kober & Rentner, 2012).

In order to improve teacher knowledge and curricular alignment, many states have dedicated resources to developing and funding PD "to help teachers master the standards" (Kober & Rentner, 2012, p. 2). Many teachers continue to report feeling both underprepared and less than ideally confident in their interpretation and implementation within the classroom albeit substantial investments have been made by states in terms of assisting teachers with learning CCSSM standards (Murphy & Marshall, 2015; Nadelson et al., 2014; Long et al., 2011). Additionally, teachers have expressed apprehension about the CCSSMs and their impact on teacher instructional independence (Bridges-Rhoads & Van Cleave, 2016). Although they express concern, teachers

have also indicated their interest in learning more about the standards (Bostic & Matney, 2013; Kruse et al., 2017), provided that PD is rigorous enough to help them meet the new demands (Ajayi, 2016).

Existing Professional Development

According to a 2011 survey from the National Center of Education Statistics, approximately 99% of the 3.5 million public school teachers in the United States attend some form of PD each year (Goldring, Gray, & Bitterman, 2013). Borko (2004) provides a 3-phase framework from which research on mathematics PD can be organized and evaluated. Phase 1 research involves the examination of a single-site PD program with the intent to document the impact of the individual program. Phase 2 research involves studying a single PD program that is facilitated by more than one individual and occurs at more than one site with the intent of understanding the requirements of scaling the PD from one site to many. Phase 3 research involves a comparative analysis between various PD models to identify similarities and differences in both structure and outcomes.

The present study focuses on a Phase 1 PD evaluation. Previous Phase 1 studies have utilized a variety of methodological approaches to investigate programs, including single-subject case studies (e.g., Gal, 2011; Muir & Beswick, 2007; Muñoz-Catalán, Carrillo Yáñez, & Climent Rodríguez, 2010; Ross & Bruce, 2007; Witterholt, Goedhart, Suhre, & van Streun, 2012), quasi-experimental (e.g., McMeeking, Orsi, & Cobb, 2012), and experimental designs (e.g., Antoniou & Kyriakides, 2013; Jacobs, Franke, Carpenter, Levi, & Battey, 2007; Stone, Alfeld, & Pearson, 2008). Nevertheless, perhaps because of the nature of single source PD and their associated small sample sizes, qualitative or correlational studies are most common (Sztajn, Borko, & Smith, 2017). A few fundamental suggestions have emerged from the milieu, which may help guide both future PD and research relative to it. First and foremost among them is "grounding the PD in aspects of teachers' practice" (Sztajn et al., 2017, p. 804). More specifically, connecting PD and teacher practice through specific tools (e.g., frameworks of student mathematical thinking, video clips of mathematics instruction, mathematical tasks) (Clements et al., 2011; Jacobs et al., 2007; Wickstrom, Baek, Barrett, Cullen, & Tobias, 2012; Wilson et al., 2014), the use of pedagogical frameworks (Koellner, Jacobs, & Borko, 2011), and modeling appropriate classroom practices (Sherin & van Es, 2009; van Es & Sherin, 2010) is exceptionally helpful. Second, successful PD models tend to place an emphasis on how students learn, and the cognitive demand of rigorous mathematical tasks and/or student-centered instructional designs (Sztajn et al., 2017). Third, the researchers should aim not only a understanding change in teacher knowledge, but also at modifications made in their classroom practices as a result of PD participation (Sztajn et al., 2017). Although

conclusions across studies have been similar, given the consequences of PD, rigorously-developed, quasi-experimental, experimental, and longitudinal studies are needed to better understand the longer-term impacts of mathematics PD design. New research should investigate the change, not only in teacher knowledge, but also in teacher classroom practice and corresponding student outcomes (Sztajn et al., 2017).

Improving Mathematics Teacher's Knowledge through PD

According to Hattie (2003), teacher skills account for approximately 30 percent of the variance in student achievement, second only to the 50 percent of variance accounted for by students. As a result, "we need to ensure that this greatest influence is optimised [*sic*] to have powerful and sensationally positive effects on the learner" (Hattie, 2003, p. 3). Over the last three decades, PD models have used a variety of student mathematical thinking frameworks to improve teacher pedagogical and content knowledge (Carpenter, Fennema, Peterson, Chiang, & Loef, 1989). More recently, the use of frameworks of student mathematical thinking has allowed teachers to better build upon student ideas during instruction (Clements et al., 2011), utilize appropriate instructional practices during discussions (Wilson et al., 2015), evaluate student mathematical reasoning (Norton & McCloskey, 2008), and further develop teacher conceptualization and knowledge of mathematics (Wilson et al., 2014). The use of frameworks of student learning in mathematics PD has clearly allowed teachers to improve their own pedagogical and content knowledge.

Another method shown to be effective in improving teachers' mathematical content and pedagogical knowledge is having teachers work through the process of solving typical mathematical tasks their students would be asked to complete in the classroom (Chamberlin, 2009; Chamberlin, Farmer, & Novak, 2008; Thompson, Carlson, & Silverman, 2007; Silver, Clark, Ghousseini, Charalambous, & Sealy, 2007). Some PD developers have asked teachers to also identify multiple solution pathways (Ferrini-Mundy et al., 2007), propose hypothetical student solutions (Kabaskalian, 2007), and to evaluate sample student solutions (Jacobs et al., 2007). While research has shown that asking teachers to investigate typical mathematical tasks in PD sessions is useful for increasing mathematical and pedagogical knowledge (Sztajn et al., 2017), few studies have investigated beyond, to understand the impact well-trained teachers have on their students' performance.

Impacting Student Performance through Teacher PD

The ultimate goal of PD is to improve teacher practice and as a result, student performance. However, limited research exists to support the notion that PD aimed at improving teacher knowledge also successfully elicits positive change in teacher classroom practices, and relatedly, student performance. Of the few studies

that have explored change in teacher practices, research has demonstrated that teachers are able to pose better probing questions (Sherin & van Es, 2009; van Es & Sherin, 2010) and engage in deeper student-teacher dialogue focusing on student reasoning and justification (Borko, 2004; Koellner, Jacobs, & Borko, 2011) after participating in PD than before. However, most research that demonstrates change in teacher practice has utilized small sample and is qualitative in nature (Sztajn et al., 2017). Without the use of more robust research designs, the impact of PD on teacher practice is difficult to generalize.

More rigorously designed evaluations of PD to investigate teacher PD's impact on student outcomes have included the use of clustered randomized trials, (Clements et al., 2011) experimental designs (Jacobs et al., 2007), and linear mixed-methods analysis (Hill, Rowan, & Ball, 2005). These studies have found PD to significantly increase student mathematics achievement (Clements et al., 2011), improve students' relational thinking, (Jacobs et al., 2007), and result in better student performance even when controlling for confounding variables (Hill et al., 2005). The field of mathematics PD research is beginning to produce a body of causal evidence for improving student performance as a result of teacher PD. Because this body of causal evidence has largely focused on elementary students (Pre-K-5), targeted immediate pre-post PD change, and involved lower cognitive-level routine tasks (Clements et al., 2011; Hill et al., 2005; Jacobs et al., 2007) more is needed. In order to evaluate the effectiveness of PD on improving both teacher knowledge and student performance in other grades (e.g., middle school), evaluation studies must take the next step.

Context of this Study

The Common Core for Achievement and Middle Grades Mathematical Proficiency (CAM^{2}P) PD program involved grade 6-8 mathematics teachers. The CAM^{2}P program directly engaged middle-grades teachers in learning the content and practices within the CCSSM for grades six through eight and promoted successful instructional strategies to encourage problem solving through rich tasks, technology, and research-based practices. Expected outcomes of this professional development were three-fold: (1) to improve teacher mathematics content knowledge, (2) to improve teacher quality, and (3) to improve student problem-solving ability. Although CAM^{2}P focused on three outcomes, this study specifically evaluates only the first and third outcomes. CAM^{2}P also sought to develop valid and reliable problem-solving measures aligned with the CCSSM for grades seven and eight. CAM^{2}P focused on developing the problem-solving measures for grades seven and eight since a problem-solving measure for grade six had already been developed (see Bostic & Sondergeld, 2015). A logic model is provided in Figure 1, which outlines the inputs, activities, outputs and outcomes for the CAM^{2}P PD program.

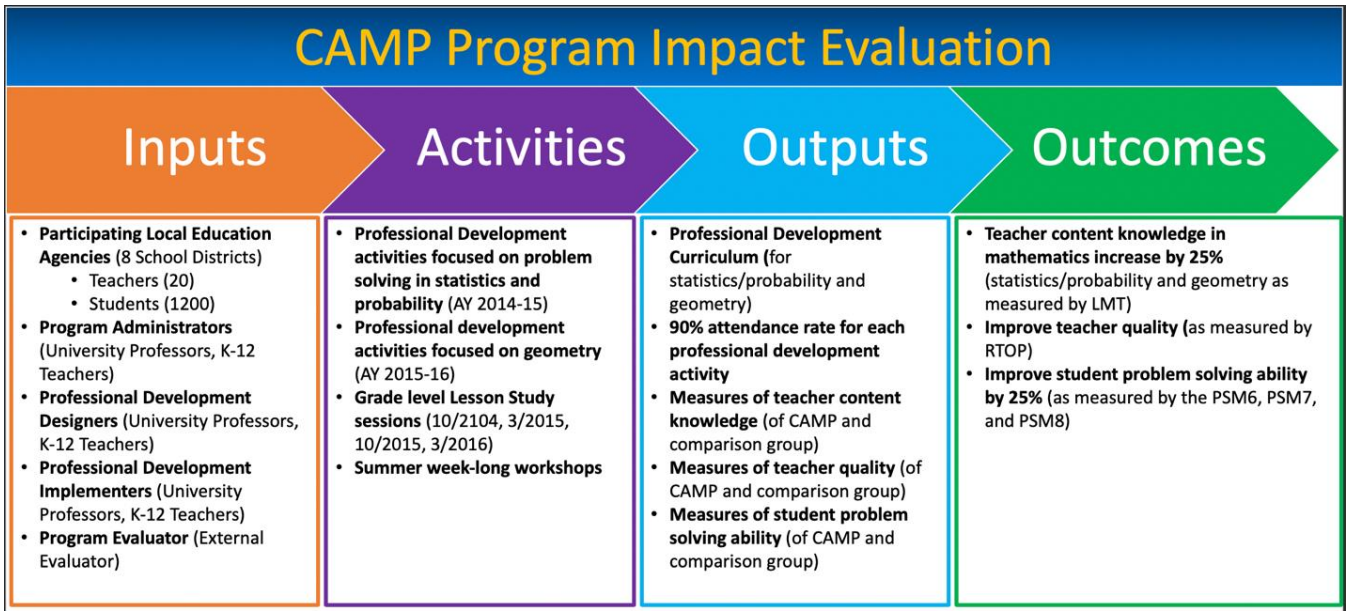

Figure 1.

CAM²P PD Program Logic Model. The logic model provides the inputs, activities, outputs and outcomes for the CAM²P program.

Overall CAM²P programming. The CAM²P program consisted of three years of combined summer workshops with intermittent follow-ups throughout the school year. Each year focused on a specific mathematical content domain as the lens through which activities were conducted. Through the analysis of a teacher survey and student performance data, the domains most commonly reported by teachers and of lowest performance by students were selected for the focus: year one focused on statistics and probability; year two focused on geometry; and year three focused on patterns, functions, and algebra. The program followed a similar structure each year, with only the mathematical content focus changing across the years. The instructors of CAM²P included two mathematics educators, one K-12 mathematics teachers, one mathematician, and one special education faculty member. The general procedure of the program is explained in the following sections.

CAM²P programming in fall and spring. Participants met four times in the fall semester and four times in the spring semester each year to explore the SMPs, the NCTM Professional Teaching Standards (2007), as well as teachers' knowledge of statistics and probability (year one), geometry (year two), and patterns, functions, and algebra (year three). Participants engaged in hands-on, inquiry-based mathematics problems throughout the PD that illustrated the spirit of the CCSSM. The eight SMPs as well as the characteristics of effective mathematics teaching as described in the NCTM Professional Teaching Standards were a focus of PD; instructors modeled them and teachers practiced new ideas as part of lesson study.

Teachers explored the SMPs (NGA & CCSSO, 2010) through class discussion, observations of students engaged in these practices, and role-plays of students engaged in the practices. Teachers explored and completed online modules designed by the mathematics faculty and project director to explore the SMPs and mathematics content. Finally, teachers and the instructors engaged in lesson studies with grade-level teachers throughout the semester. During one session, grade-level teams wrote lessons and implemented them once during the semester. Once written, teachers and instructors observed one teacher instructing that lesson. Then, one instructor met with grade-level teams to examine what went well and what could be improved to revise the lesson. Later that same day, a different teacher from that district taught the revised lesson in the same school.

CAM²P programming in the summer. During each summer, teachers participated in an eight-day Summer Institute designed to enhance their pedagogical content knowledge and content knowledge. The intent of the Summer Institute was to focus on one mathematical domain per year and appropriate pedagogical content knowledge related to that domain. Participants were engaged in hands-on activities to enhance their understanding of the mathematical domain being studied (i.e., statistics and probability, geometry, or patterns, functions, and algebra) and how to teach this to their students. Each participant designed two standards-aligned inquiry-based lessons for his/her classroom that emphasize reasoning and sense making within each content domain. These lessons were implemented in the subsequent fall semester and shared broadly.

PURPOSE AND RESEARCH QUESTIONS

The purpose of the present study was to evaluate the impact of CAM²P, a PD program centered around the CCSSM. Specifically, the study aimed to identify growth in content and pedagogical knowledge of CAM²P teachers as well as growth in problem-solving ability of students of CAM²P teachers, both over time and as compared to a comparison group. The research questions for the study are presented below:

> *RQ1*. To what degree do CAM²P teachers demonstrate changes in their mathematics content knowledge after experiencing CAM²P professional development and compared to non-CAM²P teachers?
>
> *RQ2*. To what degree do students of CAM²P teachers demonstrate changes in their problem-solving ability over time when compared to students of teachers not in CAM²P?

METHODS

Design and Instrument(s)

The present study utilized a longitudinal, quasi-experimental group-comparison design (Creswell, 2012). Two groups of teachers, an experimental and comparison group, were followed for a three-year time frame, over the duration of CAM^{2}P. Students of those teachers were also evaluated during the same period. Two sets of instruments were used for evaluation: 1) the *Learning Mathematics for Teaching (LMT)* and 2) the *Problem Solving Measure for Grades Six, Seven, and Eight* (*PSM6*, *PSM7* & *PSM8*, respectively). These instruments were used to measure growth in teacher pedagogical content knowledge as well as in student problem-solving ability across CCSSM domains.

Learning Mathematics for Teaching. *LMTs* were administered to middle grades teachers in order to test their mathematical content knowledge needed for teaching the content areas designated for their grade (Hill, Schilling, & Ball, 2004). These assessments were created for to include items that reflect the real mathematics tasks teachers face in classrooms, including assessing student work, representing numbers and operations, and explaining common mathematical rules or procedures (LMT Project, 2019). The *LMTs* measure the ability of teachers' mathematics content knowledge in the following content domains: (1) statistics and probability (SP), (2) geometry, and (3) patterns, functions, and algebra (PFA) (LMT Project, 2019). Sufficient validity evidence to measure pedagogical content knowledge of K-8 mathematics teachers and acceptable psychometric evidence to support the *LMTs* use in measuring middle school teacher's mathematical knowledge for teaching in specific domains has been reported (see Hill et al., 2004). The *LMTs* have been used to measure the structure of teacher knowledge (Hill et al., 2004), how teachers learn mathematical knowledge for teaching (Hill & Ball, 2004), and how teacher knowledge relates to gains in student mathematical achievement (Hill et al., 2005).

Problem Solving Measures. *PSM6-8* assessments were administered to students to measure their problem-solving growth over the course of an academic year. The *PSMs* were designed in the first two years of CAM^{2}P as problem-solving measures for middle school students that aligned with U.S. national standards (see Bostic & Sondergeld, 2015; Bostic, Sondergeld, Folger, & Kruse, 2017). *PSMs* "assess students' mathematics content knowledge through open, complex, and realistic tasks" (Bostic & Sondergeld, 2015, p. 281), which allows students to exhibit mathematical problem-solving behaviors as described by the CCSSM.

The *PSMs* have undergone a rigorous multi-year validation study which supports their ability to measure sixth, seventh, and eighth grade students problem-solving ability, and have demonstrated strong alignment with the CCSSM (Bostic & Sondergeld, 2015; Bostic et al., 2017). Each *PSM* contains between 15 to 18 open-ended items. Each task is "open" in the sense that it may be solved in more than one unique way, "complex" in the sense that students may not have a known solution strategy to use, and "realistic" in the sense that the items are situated in real-world contexts. Students are suggested to show their work to solve the task and write their answer on the answer line. Each item is scored dichotomously (i.e., correct or incorrect). Students are provided approximately 75 minutes to complete the test (usually spanning two class periods). Student performance on *PSMs* was measured using Rasch methods (Rasch, 1960, 1980), which results in interval-level data reported in Logits (log-odd units) that range from negative to positive student measures to be used in all statistical analysis.

Sample

Teachers. Across years, there were a total of 84 CAM²P teachers who completed an *LMT* and 51 comparison teachers. There were no comparison group teachers during year one, and no demographic variables were collected for teachers when they completed *LMT* assessments.

Students. Because years 1 and 2 of the CAM²P program were used for developing and validating the student *PSM* assessments, there were no outcome data for those years. A total of 2,713 students across grades 6-8 from CAM²P and comparison teachers' classrooms participated in year 3. Student demographics for year 3 students at each test time are provided in Table 1.

Table 1.

Year Three Student Sample Demographic Comparison Between Groups and Over Time

Demographic *Group*	Baseline	End-of-Year
Total Students		
CAM²P	960 (35.4%)	681 (29.3%)
Comparison	1753 (64.6%)	1645 (70.7%)
Grade Level		
6th CAM²P	421 (43.9%)	289 (37.6%)
6th Comparison	679 (38.7%)	649 (39.5%)
7th CAM²P	245 (25.5%)	223 (29.0%)
7th Comparison	693 (39.5%)	629 (38.2%)
8th CAM²P	294 (30.6%)	256 (33.3%)
8th Comparison	381 (21.7%)	367 (22.3%)
Ability Level (Teacher Identified)		
Above Average CAM²P	169 (17.6%)	8 (1.2%)
Above Average Comparison	527 (30.1%)	12 (0.7%)
Average CAM²P	486 (50.6%)	73 (10.7%)
Average Comparison	789 (45.0%)	22 (1.3%)
Below Average CAM²P	173 (18.0%)	10 (1.5%)
Below Average Comparison	419 (23.9%)	21 (1.3%)
Not Identified CAM²P	132 (13.8%)	590 (86.6%)
Not Identified Comparison	18 (1.0%)	1590 (99.5%)

Note. Percentages represent parts of the whole in each category.

Procedures

Data Collection. Given the longitudinal, quasi-experimental research design, data collection occurred frequently over the three years of CAM²P for both teachers and students. Sources and time of data collection for teachers are identified in Table 2 and for students in Table 3.

Table 2.
Data Collection for Teachers Between Groups and Over Time

Year *Semester*	Participants	LMT Test	Purpose
Year 1			
Fall *Spring*	CAM²P	SP & Geometry	Year 1 Baseline Year 1 Growth & Group Comparison
Year 2			
Summer *Spring*	CAM²P & Comparison	SP & Geometry	Year 2 Baseline Year 2 Growth & Group Comparison
Year 3			
Summer *Spring*	CAM²P & Comparison	PFA	Year 3 Baseline Year 3 Growth & Group Comparison

Table 3.
Data Collection for Students Between Groups and Over Time

Year *Semester*	Participants	Instrument	Purpose
Year 1			
Fall *Spring*	CAM²P & Comparison Students	PSM 6, 7, & 8	Year 3 Baseline Year 3 Growth & Group Comparison

DATA ANALYSES

SPSS version 25.0 was used for all statistical analysis. In order to measure change in teacher mathematics content knowledge over time and to allow for comparisons to the non-CAM^{2}P group (RQ1), a series of 2-between and 2-within RM-ANOVAs were performed for each *LMT* content area and appropriate years of test administration. In order to measure change in problem-solving ability from pre- to post-test for CAM^{2}P students, a series of dependent samples t-test were performed for each grade level. For all grade levels during year three, students in the comparison group scored significantly higher in terms of *PSM* scores at baseline. As such, a "change score" was computed for students by subtracting their pre-score from their post-score. Average "change" over time was then compared between CAM^{2}P and comparison students at each grade level using a series of independent samples t-tests. Type III Sums of Squares was used for analysis given the unbalanced sample sizes between the CAM^{2}P and comparison students.

RESULTS

CAM^{2}P Teacher and Comparison Group *LMT* Differences Over Time (RQ1)

For SP mathematical content knowledge, CAM^{2}P teachers significantly increased their *LMT* scores over time ($p<.01$) while comparison teachers remained similar ($p>.05$) at baseline and post-testing points (Figure 2). At baseline, comparison teachers had slightly higher average *LMT* scores in SP compared to CAM^{2}P teachers, however, by post-test, CAM^{2}P teachers had significantly higher *LMT* scores than comparison teachers (see Table 4). The effect size was medium with 15% ($\eta^2 = 0.150$) of the difference in scores attributed to group membership.

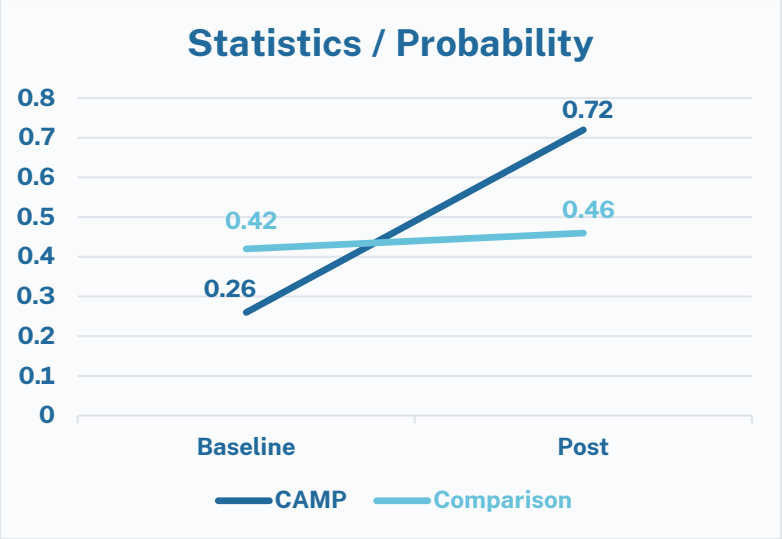

Figure 2.

Year two CAM²P and Comparison teacher SP *LMT* assessment pre-post graphical representation. The graphical representation indicates the difference in CAM²P and comparison teachers from baseline to post for year two.

With regards to Geometry content, comparison group teachers started with higher *LMT* scores than CAM²P teachers and stayed at the same level through post-test (Figure 3). However, CAM²P teachers increased their scores and, on average, scored higher than the comparison group at post-test to close the gap between groups (see Table 4).

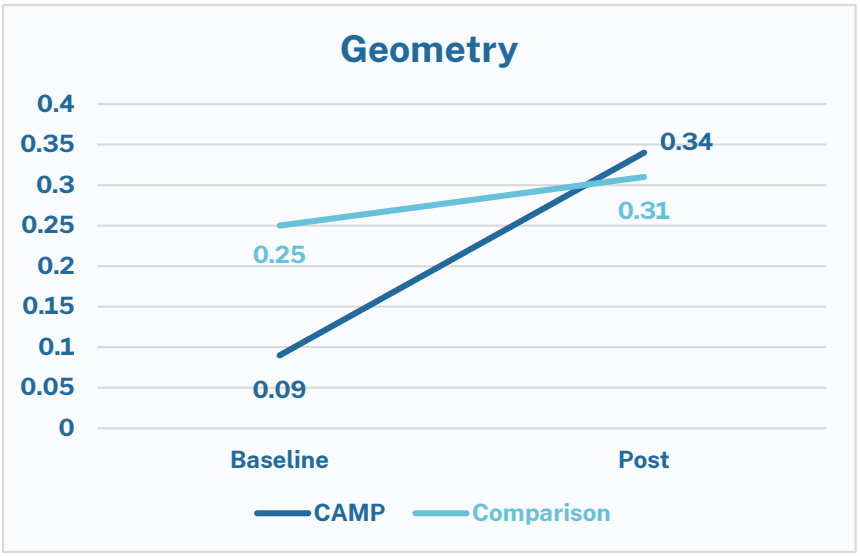

Figure 3.

Year two CAM²P and Comparison teacher Geometry *LMT* assessment pre-post graphical representation. The graphical representation indicates the difference in CAM²P and comparison teachers from baseline to post for year two.

For PFA content, CAM²P teachers significantly increased their *LMT* scores over time ($p<.01$) while comparison teachers remained statistically similar ($p>.05$) at baseline and post testing points (Figure 4). At baseline, comparison teachers had significantly higher *LMT* scores in PFA as compared to CAM²P teachers ($p<0.05$). However, by post-test, CAM²P teachers' *LMT* scores were no longer significantly different when compared to comparison teachers (p>.05). Overall, there was a statistical difference over time by group ($p<.05$) with CAM²P teachers catching up to the PFA *LMT* level of comparison teachers over time. The effect size was medium with 15% ($\eta^2 = 0.150$) of the difference in scores attributed to group membership. See Table 4 for statistical results of these analyses.

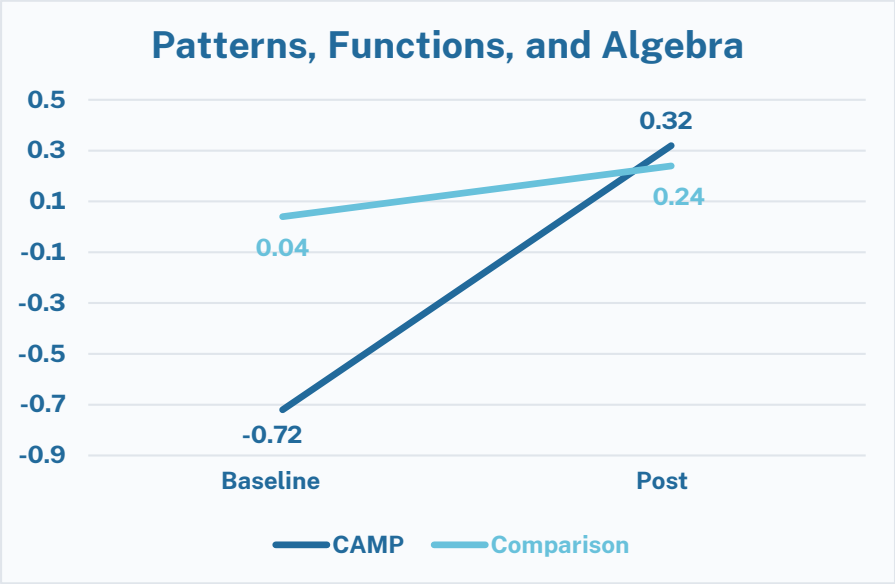

Figure 4.
Year three CAM²P and Comparison teacher PFA *LMT* assessment pre-post graphical representation. The graphical representation indicates the significant difference between the groups at baseline and the statistical similarity at post for PFA *LMT* results for year three.

Table 4.

Descriptive and Inferential Results for CAM²P vs. Comparison Group LMT Results Over Time in Logits

LMT Content *Test Time*	CAM²P *M*(*SD*)	Comparison *M*(*SD*)	*F-stat*
Stats/Prob			
Baseline	0.26 (0.72)	0.42 (0.92)	7.92**
Post	0.72 (0.82)	0.46 (0.83)	
Geometry			
Baseline	0.09 (0.68)	0.25 (0.86)	1.25
Post	0.34 (0.73)	0.31 (0.74)	
PFA			
Baseline	−0.72 (1.22)	0.04 (0.89)	5.29*
Post	0.32 (0.86)	0.24 (1.10)	

Note. *$p<0.05$, **$p<0.01$, ***$p<0.001$

CAM²P Student and Comparison Group *PSM* Difference Over Time (RQ2)

For all grade levels during year three, CAM²P students significantly increased in their problem-solving ability from pre- to post-test ($p<0.001$) (see Table 5). Effect sizes ranged from medium to large for this pre-post change ($\eta^2 = 0.130$ to 0.319) with 13% to 32% of the variance in scores accounted for by testing time.

Table 5.

Descriptive and Inferential Results for CAM²P Student Results Over Time in Logits

PSM Grade Level *Assessment Time*	***M(SD)***	**CAM²P PSM Pre-Post Dependent Samples t-test**	***η2***
PSM6 (*n*=289)			
CAM²P Pre-Test	1.80 (2.08)	6.56***	0.130
CAM²P Post-Test	3.00 (2.79)		
PSM7 (*n*=376)			
CAM²P Pre-Test	2.53 (3.03)	9.85***	0.206
CAM²P Post-Test	5.28 (4.79)		
PSM8 (*n*=257)			
CAM²P Pre-Test	2.40 (2.23)	10.95***	0.319
CAM²P Post-Test	5.09 (3.48)		

Note. *p<0.05, **p<0.01, ***p<0.001

When comparing CAM²P student performance to the comparison group, there were no significant differences noted in change scores between CAM²P and comparison students (p>0.05) (see Table 6). Therefore, although comparison students scored higher than CAM²P students at both pre- and post-test, both groups increased in their problem-solving ability at similar rates across all grade levels. See Figures 6, 7, and 8 for visual representations of these results.

Table 6.

Descriptive and Inferential Results for CAM²P vs. Comparison Group PSM Results Over Time in Logits

PSM Test *Test Time*	CAM²P *M*(*SD*)	Comparison *M*(*SD*)	Change Score Independent Samples t-test
PSM6			
Baseline	1.80 (2.08)	2.09 (2.11)	
Post	3.00 (2.79)	3.25 (2.76)	−1.04
Change Score	1.20 (2.42)	1.16 (2.51)	
PSM7			
Baseline	2.53 (3.03)	4.39 (2.99)	
Post	5.28 (4.79)	7.40 (4.70)	0.20
Change Score	2.75 (3.03)	3.01 (3.12)	
PSM8			
Baseline	2.40 (2.23)	3.42 (2.25)	
Post (EOY3)	5.09 (3.48)	6.04 (3.53)	0.32
Change Score	2.69 (2.99)	2.62 (3.07)	

Note. $^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$

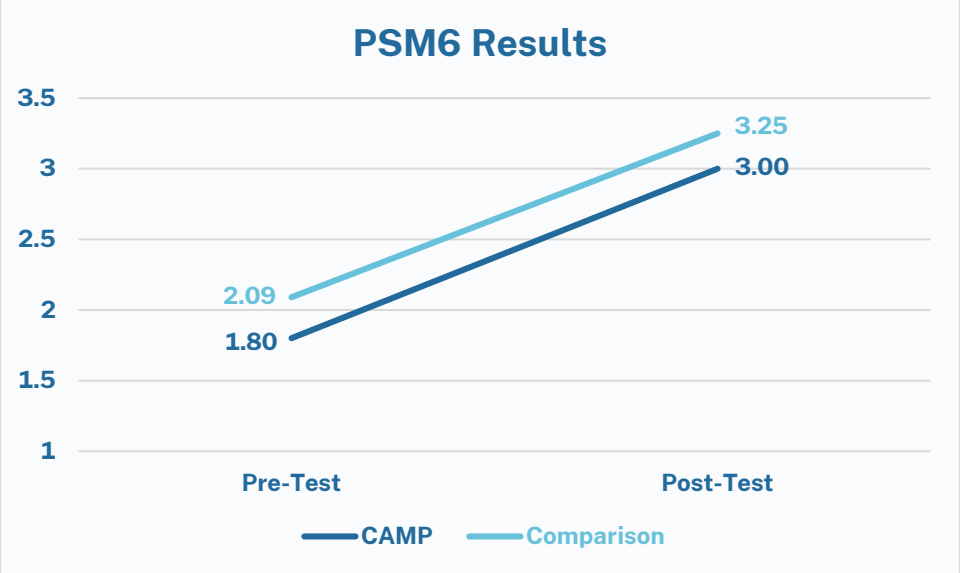

Figure 6.
Year three CAM²P and Comparison group grade six students change in problem-solving performance over time. Both groups significantly increased at the same rate in problem-solving performance over time for year three.

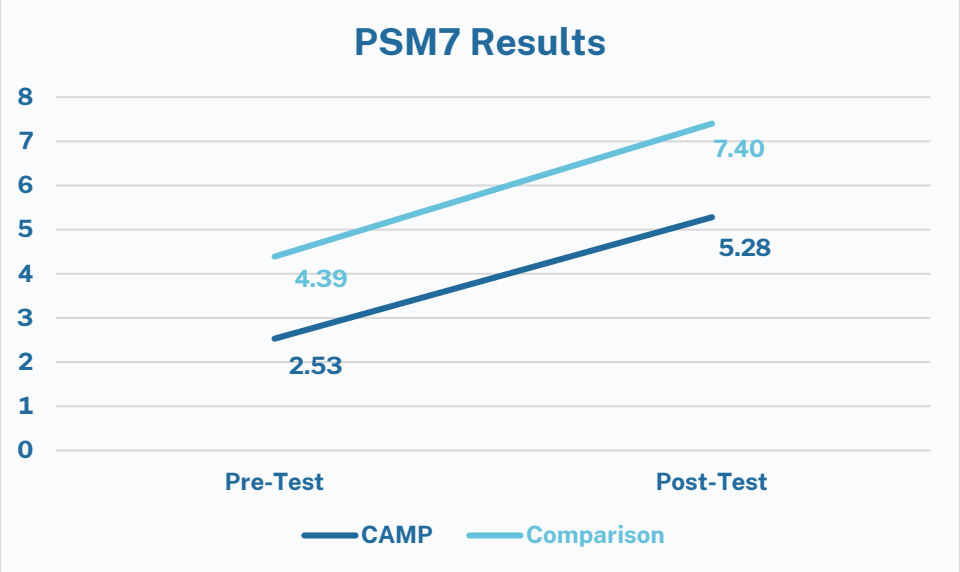

Figure 7.
Year three CAM²P and Comparison group grade seven students change in problem-solving performance over time. Both groups significantly increased at the same rate in problem-solving performance over time for year three.

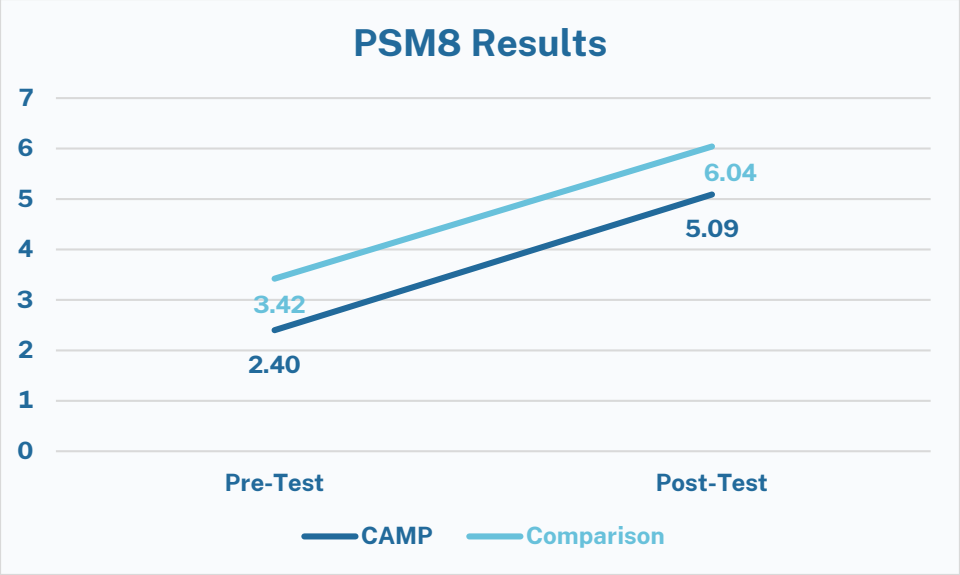

Figure 8.
Year three CAM²P and Comparison group grade seven students change in problem-solving performance over time. Both groups significantly increased at the same rate in problem-solving performance over time for year three.

DISCUSSION

Most research evaluating mathematics PD is comprised of small qualitative samples (Borko, Jacobs, Eiteljorg, & Pittman, 2008; Koellner et al., 2011; Sherin & van Es, 2009; van Es & Sherin, 2010) and few studies have sought to make the causal connection between an increase in teacher knowledge with an increase in student performance (Clements et al., 2011; Hill et al., 2005; Jacobs et al., 2007). The longitudinal, quasi-experimental design of this evaluation study satisfies the need for more robust research to assess the change in teacher knowledge and student performance as a result of mathematics PD (Sztajn et al., 2017). Further, since CAM²P's design and curriculum were aligned with three high-need domains of the CCSSM and centered on student problem-solving, content studied in this evaluation research is of high importance.

Teacher Content Knowledge

CAM²P teachers significantly increased their mathematical content knowledge over time in both SP and PFA. Specifically, the growth in SP was retained in year two, even though the focus of year two was Geometry. Such a finding supports the idea that the design and curriculum of the PD was successful at not only initially increasing teacher mathematical content knowledge, but also contributing to the retainment of

that knowledge over time. Additionally, CAM²P teachers initially had lower mathematical content knowledge when compared to the comparison group, but surpassed, or became similar to, the comparison group over time. These results suggest that PD, such as CAM²P, might provide important opportunities for teachers to increase their mathematical content knowledge over time, which would likely not occur otherwise. These results align with the findings of existing studies, which argue that PD centered on student learning and mathematical tasks have increased classroom teacher's content and pedagogical knowledge (Ferrini-Mundy et al., 2007; Jacobs et al., 2007; Kabasakalian, 2007).

Unlike SP and PFA teacher content knowledge results, there was no significant increase in teachers' mathematical content knowledge for Geometry. The comparison groups' Geometry *LMT* scores decreased from baseline to post, whereas the CAM²P teachers' scores increased. Although the growth was not statistically significant, it demonstrates a steady trend of increasing scores over time. Therefore, it is still promising that CAM²P teachers' mathematical content knowledge related to Geometry did not decrease over time, as was observed by the comparison group. It is probable that problem-solving and inquiry-based learning in Geometry might be more difficult for teachers to grasp as compared to SP and PFA. Another hypothesis is that Geometry content may be more difficult as it can include more inductive reasoning and argumentation than statistics, probability, and algebra (National Council Teachers of Mathematics, 2007).

Student Learning Outcomes

While growth in teacher knowledge is a vital outcome of mathematics education PD, evaluating student performance is of upmost importance and rarely performed for middle school students (Sztajn et al., 2017). Similar to the findings in teacher knowledge, the students of CAM²P teachers significantly increased in their problem-solving performance over time. The *PSMs* were designed to assess problem solving across all mathematical domain; albeit, the teachers engaged in PD focused on problem-solving and inquiry-based learning for three domains: SP, Geometry, and PFA. As a result, the *PSMs* were assessing problem solving across domains that were not the focus of the PD, which might suggest some degree of misalignment between the PD curriculum and the instrument. However, as teachers were learning how to utilize problem-solving and inquiry-based learning techniques, it was a goal for the teachers to also promote problem-solving across all five content domains during instruction. Growth in problem-solving ability, as measured by the *PSMs*, indicates that students were acquiring skills to more successfully navigating the problem-solving process, regardless of the domain. The growth in student performance as a result of teacher mathematics education PD aligns with limited similar research (Clements et al., 2011; Hill et al., 2005; Jacobs et al., 2007). Thus, this

study contributes to the body of literature supporting the notion that teacher PD may result in statistically significant increases in student performance.

When looking at CAM^{2}P students compared to non-CAM^{2}P students, the comparison group demonstrated a significantly higher baseline ability across all *PSM* measures. Although the CAM^{2}P students did not exceed the performance of their peers by post-test, growth from baseline to post-test was found to be statistically similar between groups. These results suggest that CAM^{2}P students were growing at similar rates to their higher-performing peers. It has been found that higher-performing students are usually presented with higher teacher expectations involving complex concepts, critical thinking, and student-centered discussions, which leads to higher performance as compared to the lower-performing students (Oakes, 1985; Sadovnik, Cookson, & Semel, 2001). Therefore, CAM^{2}P reduced this typical differential performance such that the lower-performing students increased their ability to engage in the complex cognitive process of problem-solving at the same rate as their higher-performing peers.

Limitations

As with all research, this study has its limitations. Particularly, the retention of teacher participants from year two to year three was approximately 50%, which resulted in recruiting a new set of teachers for the third year of the PD. It is likely that students from the new teachers could have been less experienced in problem solving, which resulted in lower baseline PSM scores than expected. This also suggests the need for sustained PD, since the new teachers who joined year three did not benefit from the prior two years of problem-solving PD. Additionally, the study evaluated the growth in teacher knowledge and student performance, without evaluating the growth in teacher practice. Understanding how mathematics education PD changes practice is important to evaluate the success of a program. However, mathematics education PD ultimately seeks to improve student performance, and thus evaluating growth in student performance provides insight into the impact of the program.

Implications

The present study provides positive implications for mathematics educators since the results suggest that a mathematics education PD focused on problem solving and the CCSSM increased teacher mathematical content knowledge and student performance, when compared to comparison groups. While growth was not consistent across all groups and years, the findings suggest the PD was largely successful for participating students and teachers. Additionally, the study provides implications for evaluators seeking to

better understand the impact of a mathematics education PD. The use of a longitudinal, quasi-experimental design allowed for important between-group and across-time comparisons to better understand the impact of the PD. However, participant attrition between years poses a significant threat to the evaluation of PD. Therefore, school administrators seeking to implement meaningful mathematics PD for their teachers should consider replicating many of the characteristics of CAM^{2}P.

The content of CAM^{2}P was centered around high-need areas as indicated from an exploratory survey completed by teachers at the schools. Such a process allowed the CAM^{2}P developers to tailor the curriculum to content that would most likely result in meaningful growth in both teachers and students. Additionally, the PD program followed a longitudinal design, consisting of three years of repeated workshops, mentoring, and peer feedback. The observed participant attrition between years two and three likely resulted in the differential performance of students of CAM^{2}P in year three. As a result, it is of upmost importance for teachers and school leaders to commit to the entirety of a long-term PD experience to optimize teacher learning and knowledge, and relatedly, student performance. Lastly, the primary focus of CAM^{2}P involved problem solving and inquiry-based learning. It is recommended for PD to embody the type of learning activities for which it advocates in the classroom. Research on longitudinal PD programs that include both out-of-classroom and job-embedded learning on problem solving and inquiry-based learning has great potential to advance scholarship and practitioner-related outcomes.

While the present study demonstrates the causal connection between teacher knowledge and student performance, future research should seek to explore the change in teacher practice as a result of a mathematics PD. One way to explore this is to use an observation protocol aligned with the CCSSM and problem solving that has robust validity evidence, which may help to investigate the benefit of attending mathematics education PD on teachers' practices. Additionally, problem solving and inquiry-based learning should focus on the domain of Geometry to identify successful means of fostering learning in that domain. Future mathematics education PD should strongly consider designing their longitudinal PD around problem solving and inquiry-based learning aligned with the high-need domains of the CCSSM.

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ABOUT THE AUTHORS

Lance Kruse, Ph.D., is a Research Scholar in STEM Education at North Carolina State University. His research interest includes the intersection of research and measurement within STEM education focusing on assessment development, teacher education, and program evaluation.

Toni A. Sondergeld, Ph.D., is an Associate Professor in Drexel University's School of Education. She teaches educational assessment, research, statistics, and program evaluation courses. Dr. Sondergeld's research often focuses on evaluating the impact of STEM educational initiatives as well as survey and test development and validation.

Jonathan D. Bostic, Ph.D., is an Associate Professor of Mathematics Education at Bowling Green State University, located in Bowling Green, Ohio. His research interests include exploring validity and assessment within mathematics education and investigating instructional contexts that aim to impact teachers' and students' outcomes.

Edward Waddell, Ph.D., is an educator and scientist dedicated to improving undergraduate education through using learner-centered teaching strategies to promote science identity, celebrate diversity, and increase inclusivity in the classroom, on campus, and in the community.

Guillermo Ibarrola Reclade, Ph.D., is a Postdoctoral Researcher for the *Center for Innovation Engineering and Science Education (CIESE)* and the *Department of Chemical Engineering and Materials Science (CEMS)* at Stevens Institute of Technology.

Gregory Stone, Ph.D., Professor of Research and Measurement at the University of Toledo and CEO of MetriKs Amérique LLC is a specialist in high-stakes testing, advanced measurement, and standard setting. He is widely published nationally and internationally, including his pioneering work on *Objective Standard Setting* with Dr. Benjamin Drake Wright, generally recognized as the leading scholar in Rasch measurement. Dr. Stone works to promote fairness and equity in assessment, and to promote sustainability throughout education.

SCHOOL FUNDING INEQUALITY IN PENNSYLVANIA:

A Base–Superstructure Analysis

DAVID BACKER, Ph.D.
Assistant Professor
West Chester University
DBacker@wcupa.edu

ABSTRACT

This essay provides a brief overview of the base-superstructure model for social analysis, which is then applied to the problem of school funding inequality in Pennsylvania. A review of contemporary data, followed by a discussion of the historical practices and institutions behind these data, along with recent survey attempts to address funding inequities, is presented. The author argues that while legal actions through state and federal courts has been the predominant strategy to address school funding inequality, raced and classed practices in real estate markets are ultimately more impactful in maintaining that inequality. Following Tegeler and Hilton's (2018) research on disrupting the mutually reinforcing cycle of housing and school inequality, a reframing of the problem in terms of property relations and point to policy recommendations for educational leaders based on that analysis is recommended. This essay illustrates that educational leaders must become local housing advocates to equalize school funding across the state.

INTRODUCTION

What is a society? In the history of European social thought, different theorists give different answers. For Plato, society was like the soul: a rational part that leads (rulers), a brave heart that defends (auxiliaries), and desirous part that produces and consumes (workers) (Reeve, 2004). Adam Smith also used a body analogy, noting that markets work like an invisible hand. The English political theorist Thomas Hobbes likened the state to the biblical Leviathan, while the French sociologist Emile Durkheim is known for his concept of collective consciousness. Yet the German political economist Karl Marx advanced a different model for thinking about society, shifting his focus from the human body to that of architecture. In the Preface to his *A Contribution to the Critique of Political Economy*, Marx (1904) wrote:

> *In the social production of their existence, men inevitably enter into definite relations, which are independent of their will, namely relations of production appropriate to a given stage in the development of their material forces of production. The totality of these relations of production constitutes the economic structure of society, the real foundation, on which arises a legal and political superstructure* (p. 12).

Rather than a body, a society is more like a building. The building has a foundation, or basement, with different floors and structure rising up from it. The foundation is the economic structure, or the economy, and legal and political features of society like government and laws sit atop that foundation. This analogy is the basic expression of what has become known in social science as the base-superstructure model of society. Other researchers would make important clarifications to the model. The Italian historian and theorist Gramsci (1999) clarified two points: that the superstructures are complex, encompassing government, law, and the military as well as cultural institutions in civil society. Gramsci (1999) also pointed out that the model requires we not think of social forces like physical forces, in the sense that social forces are the result of individuals and groups working together to achieve their shared goals according to shared interests. In modern societies where interests differ, this collaboration between groups leads to conflict or social struggle.

The French philosopher Althusser (1970) explained the model makes something important visible: that economic conditions have an important, but not all-powerful, determining force in society. Just like a house with a cracked foundation has a basic flaw that makes the rest of the house dangerous to live in, or how an earthquake shaking the foundations of a building no matter how sturdy its middle and top are, so too are social life according to the base-superstructure model. Of course, the roof and midsections of a building have

their own distinct kinds of integrity and express crucial forces in keeping the building upright. The base however, also exerts a distinct, and distinctively foundational, force in society. The British philosopher Cohen (2000) described the model by using the image of the smallest form of building: a hut with four posts and a roof. He wrote:

> *Four struts are driven into the ground, each protruding the same distance above it. They are unstable. They sway and wobble in winds of force 2. Then a roof is attached to the four struts, and now they stay firmly erect in all winds under force 6. Of this roof one can say: (i) it is supported by the struts, and (ii) it renders them more stable* (p. 231).

Cohen's (2000) analogy is clear, rendering the base-superstructure model easy to apply to societies. Certain kinds of practices and arrangements in society exert the first kind of force, a support from the bottom upon which everything rests, while other practices and arrangements in society exert the second kind of force rendering the entire structure stable.

Althusser (1970) described it as the roof, pressing down on the structure, exerts a repressive force. The government, police, legal system, and military are institutions whose practices exert this force typically using physical and non-physical violence. What we sometimes call culture, everything from family to media to sports to school and art, exert a reproductive force, maintaining the integrity of society over time. Finally, the economy exerts the foundational force. Each of these forces, Althusser (1970) argued, are relatively autonomous. Rather than one of them absolutely determining the others, individuals and groups enacting practices in those institutions act freely but always in relation to one another. Like Cohen's (2000) assigned numbers to the forces, Althusser (1970) claimed that each practice, institution, and apparatus can be given an index of effectivity, a measurement of the pressures they exert, according to their history.

While others like Poulantzas (2000), Hall (1977), Williams (1973), and Carnoy (1982) in the economics of education, along with Anyon (2005) in education policy, would continue to clarify and expand the base-superstructure model, the following points are the most important for the present purposes of understanding school funding inequality in Pennsylvania: 1.) Society is a structure whose features are the result of forces, 2.) Social practices, institutions, and apparatuses exert three distinct forces: production, repression and reproduction, and 3.) Each force, and each practice contributing to that force, has a unique index of effectivity that results from its relative autonomy in society. Understanding a problem like school funding inequality in Pennsylvania with the base-superstructure model therefore requires a political-economic look at the social forces involved in the issue.

OVERVIEW

Social Forces in Pennsylvania School Funding

According to the Civil Rights Data Center (2020) for all districts in the state of Pennsylvania, topography across the state favors children who are predominately white and wealthier. In 2016, the non-profit Research for Action issued a policy brief called *Racial Disparities in Educational Opportunities in Pennsylvania: A First Look at New Civil Rights Data*. In that brief, Slaughter et al. (2016) concluded that

> *[W]hile Pennsylvania appears to provide high levels of access to rigorous coursework, school counselors, and experienced educators compared to the nation, white students are disproportionately the beneficiaries of that access. Black and Hispanic students in Pennsylvania are less likely than white students in Pennsylvania—and less likely than Black and Hispanic students across the country and region—to have access to these essential resources and learning opportunities, and more likely to encounter adverse experiences that decrease their chances of academic success* (p. 22).

The Civil Rights Data Collection (CRDC) website uses seventeen indicators to determine whether educational resources are distributed equitably: access to dual enrollment, access and enrollment in gifted and talented programs, access and enrollment in advanced placement courses, access and enrollment in chemistry, physics, calculus, access to full-time counselors, student to counselor ratio, presence of teachers with more than two years of experience, out of school suspension, retention, and chronic absenteeism. Slaughter et al. (2016) found that Black students in Pennsylvania have more limited access to eleven of these indicators than Black students in the region and the nation, and Hispanic students in Pennsylvania have more limited access to eight of them. White students, however have more access to twelve of these indicators.

Mosenkis (2016) of POWER Research, along with the Public Interest Law Center (PILC) shows class inequality at work within the racial inequalities shown by Slaughter et al. (2016). Drawing from Mosenkis's (2016) data, Churchill and Urevick-Ackelsburg (2016) of PILC use per pupil student funding, and the percentage of students on free and reduced-price lunch in Pennsylvania school districts, to compare schools whose students are more than 92% white with schools whose populations are less than 92% white. They find that schools with predominately white students and fewer students on free and reduced priced lunch receive more per pupil funding. Conversely, schools with students who are predominantly of Color receive less funding per pupil across the board, but also less funding as the number of students on free or reduced-price

lunch increases. There are certainly some schools with mainly white students that have high levels of free and reduced-price lunch who also receive less funding per pupil, but the majority of this inequality affects populations of Color, while the majority of white students get more funding per pupil.

Less funding per pupil means fewer educational opportunities. Schools serving mainly students of Color have fewer counselors, less access to rigorous coursework, higher absenteeism, and fewer teachers with extensive experience. But higher enrollment in free and reduced-price lunch programs means higher poverty, which means that students lack access to equitable educational opportunities and are also living with fewer resources outside of school in general in terms of income and wealth. Baker (2018) confirmed that the state of Pennsylvania is one of the worst states when it comes to the extent of disparities between wealthy and poor districts.

The aforementioned research demonstrates there is a relationship between race, poverty, and educational resources in Pennsylvania. There is an inequality between schools serving wealthier, predominately white students and schools serving poorer students who are disproportionately students of Color. Schools where students have more resources in general get more per pupil funding and better access to/enrollment in school resources according to the indicators listed above. There is a set of practices, enacted throughout the Commonwealth of Pennsylvania, exerting a force with disparate impact in the schools, funding them unequally. Using the base-superstructure model, we can see these data as the results of practices, all of which exert the dis-equalizing social force. Yet, we have not discussed what these practices are. In order to shift the larger balance of forces to equalize school funding, one would have to individuate those practices, assign them indices of effectivity, and come up with a strategy for changing them. Finding points of tension and pressure are critical to figuring out where, when, and how much to push to make the stated change.

Individuating Practices, Arrangements, and Apparatuses

Looking at school districts receiving higher per pupil funding, and where that funding comes from, begins to distinguish the practices that exert this disparate force in Pennsylvania. The suburbs, for example, are a nerve center of tensions in the social formation. EdBuild, a non-profit research center seeking fairness in school funding, published a report called *Fault Lines: America's Most Segregating School District Borders* in 2016. They found that throughout the United States there is a "system of school district borders that trap low-income children in high concentrations of poverty, while more privileged peers live in better-resourced communities, often right next door" (p. 3). The authors mapped what they call fault lines or neighboring school districts with extremely high inequalities on either side of their boundaries. On one side of the fault

line, students have lots of school resources. On the other side of the fault line, students lack these resources. Of the fifty states in the US, Pennsylvania was chosen as a case study because it has six such fault lines, several of them with pronounced inequalities.

One fault line exists between Reading School District and Governor Mifflin School District. In the latter district, the poverty rate is 11% and local revenue per pupil is $11,437. Median household income is $59, 818. In Reading School District, however, the poverty is five times higher than its neighbor at 48%. Local per pupil revenue is a tenth of Governor Mifflin's at $2,284. Median household income is half, $26,867. The fault line between Governor Mifflin and Reading school districts is staggering. There are equally staggering differences demographically. There are 17,167 students in Reading School District and only 4,082 in Governor Mifflin. According to the CRDC, 82.9% of Reading's students are Hispanic while 6% are white. Governor Mifflin is the reverse, serving 72.8% white students and 16.9% Hispanic students. Given the difference in median incomes, and the fact that the median property value in Governor Mifflin is $169,600 and $67,500 in Reading, families in the latter district do not have many options in terms of moving across school district lines to get higher per pupil funding, which translates to more educational opportunities.

The disparity here is not an isolated distribution. The same pattern holds between Reading and three other neighboring school districts according to the *Fault Lines* (2016) interactive map. Schuylkill Valley, Wyomissing Area, and Wilson School Districts all border Reading. They all have higher per pupil funding, higher median incomes, higher median property values, and higher proportions of white students than Reading. A small part of the practices exerting social force emerges here: distribution by school district lines. Further, the lines between school districts, where per pupil funding is so disparate, correlate with geographic and demographic patterns. Some districts have a predominantly white student population. Other districts have mainly students of Color. Some districts have high median incomes. Others have much lower median incomes. In the case of Reading and the four districts mentioned above (as well as the Clairton School District, on which the *Fault Lines* report focuses), these disparities happen right next to each other in space. Little has occurred to remedy these disparities, which still exist as of this writing, and are exacerbated by the global coronavirus public health pandemic (Hanna & Fernandez, 2020).

Churchill and Urevick-Ackelsburg (2016) also feature Reading School District in their presentation *Education Funding in Pennsylvania: Inadequate, Inequitable, and Unconstitutional*. They compare Reading to New Hope-Solebury School District to show the extent of the inequalities in Pennsylvania statewide. New Hope, PA is in the northeast of the state, about half an hour outside of Trenton, New Jersey. New Hope-

Solebury School District has 1,496 students. 8.8% of these students are in poverty and they are 84.9% white. Total state and local revenue per pupil is $26,414. The district on its own contributes $22,155 of that amount. The tax rate on property, or the amount that the school district levies on property to fund the schools in New Hope-Solebury, is 12.3 mills. Langland (2015), writing for WHYY news, summarized these millage rates in the following succinct way:

> *Millage is a relatively obscure term that represents the tax rate levied on real estate or other property. A mill is one thousandth of a dollar, or one tenth of one cent. The millage rate is the number of dollars of tax assessed for each $1,000 of property value. A rate of 10 mills means that $10 in tax is levied on every $1,000 in assessed value. A school district typically will set the millage rate each spring as it calculates what it needs to fund its final budget. Some years, the rate stays the same; other years, there's an increase* (para. 1).

The millage is therefore the number that determines how much a school district will tax a property. It represents the amount of money needed for funding the schools, but also the amount of money available in terms of property values within the district boundaries. Using the New Hope-Solebury example of 12.3 mills, that district only takes $12.3 for every $1,000 of assessed property value.

It is evident the value of property becomes essential to this process. In coordination with the prices of property as determined by the market (or market value), the local government assesses the value of the property, which can sometimes be different than its price, or what people would pay for it at the moment. Langland (2014) continued:

> *When property values rise, this means the assessed value can lag behind what the house might sell for in the current year. It can even be far less if the value of real estate in the area has spiked and assessments aren't updated…On the opposite side, in some cities and boroughs of Pennsylvania, where housing prices are stagnant or even falling, the assessed value and sale price may be about the same* (para. 8).

New Hope-Solebury decided, based on the assessed value of properties in the district and its budget need for schools ($22,155 per student for 1,496 students), that 12.3 mills was the appropriate rate. The decision is based on how many students there are, what their needs are, and how much assessed property value there is in the district. From their numbers, one can infer that New Hope has relatively high assessed property values. Given that property is worth a good amount there, they can afford a relatively lower millage rate. Compare New Hope's situation to Reading. Urevick-Ackelsburg and Churchill (2016) wrote that Reading

School District has 17,167 students. 90.9% of these students live in poverty. 82.9% of them are Hispanic. Total state and local revenue per pupil is $12,527. The state contributes most of this money ($10,108 per student) to the district, which can only raise $2,419 per student. Reading School District's millage rate is 24.9 mills, or $24.90 per $1,000 of assessed property value.

The disparate force operates intensely between these two districts. In the Reading School District, there are ten times as many students than in New Hope. There is ten times as much poverty in Reading schools as there is in New Hope. And each student in Reading receives one-tenth of the funding than students in New Hope. Finally, and perhaps most importantly, the millage rate in Reading is double than the millage rate in New Hope. That means the district is taxing its property twice as much to get one-tenth the amount of funding New Hope schools get per pupil.

Returning to the base-superstructure model, several practices and institutions stand out with high indices of effectivity when it comes to school funding inequality in Pennsylvania. Specifically, property values and assessments, made visible by the millage rate, are key practices that result in the kind of unequal distribution of resources in the state that were mentioned earlier. Real estate and property have an outsized impact on the inequality of school funding, yet they are rarely considered as a leading cause of funding inequality (Tegeler & Hilton, 2018). We must therefore examine them more carefully when thinking about how to solve the funding inequality problem.

HISTORICAL CONTEXT

Historical Summary of Property Relations and Inequality

To understand these real estate practices, it is important to look at their history in the context of municipal governance, zoning, and real estate trends over the 20th century. In the beginning of this story were cities in the mid-19th century. These cities had suburbs, but were resource poor. To make better decisions about resources and planning, municipalities began to set up home-rule charters that gave them more autonomy from the state. Missouri was the first to give a city this status with a charter in 1875. Nearly every state would follow suit, and municipalities received the ability to maintain their own streets, parks, recreational facilities, provide police and fire protection, plats, construction standards, and tax local residents to finance their projects (Gere, 1982). Shaffner (2014) summarized home rule in Pennsylvania this way:

> *Home rule transfers authority over municipal matters from state laws to a local charter that's drafted, adopted, and amended by voters in the municipality. A home rule charter is essentially a local constitution: it sets up the government structure and outlines its authority and its limitations. Under home rule, a county or municipality can do anything that's not specifically denied by the state constitution, the General Assembly, or the charter itself. By contrast, municipalities run by municipal codes (state laws) can only act where specifically authorized by state law* (para. 2).

She continues, "The bottom line? Home rule provides local control. It gives the municipal government the ability to craft ordinances and make decisions based on local needs, rather than having to follow a one-size-fits-all state code that's decided by state legislators" (para. 4). Between 1875 and 1950 millions of municipalities would establish home rule in the United States (Su, 2017). There are 78 home-rule municipalities in Pennsylvania according to Act 62, the most recently updated legislation establishing local control.

Home rule is a practice exerting a force in the social formation that lets suburbs control their own taxation and property decisions (Su, 2017). To exercise the disparate force we are tracking, suburbs need home rule so their school districts can levy taxes on the property in their purview, which is one piece of the puzzle. Freund (2010) writes that "[h]ome-rule provisions were by no means meant to segregate by race. Nonetheless they provided affluent suburbanites with a means to separate themselves jurisdictionally from populations seen as socially and even racially suspect" (p. 48). Without home rule, districts that predominately serve white students, like the example of New Hope-Solebury, could not set their own millage rates.

We know that school funding comes from how these municipalities tax property, specifically taxes on the assessed value of property. Key to this set of practices is zoning, or making sure that certain parcels of land are used for particular purposes (whether industrial, commercial, residential, public, etc.). Dovetailing with the home-rule movement was a movement that tried to protect homeowners from the rapidly growing urban sprawl of industrialization in the early 20th century. At the beginning of this trend was Benjamin C. Marsh, who was a member of the Committee on Congestion of Population (CCP) founded in 1907 in New York City. This group of nascent urban planners took a trip to Frankfurt, Germany and saw its zoning system. Marsh was impressed and advocated such a system in the U.S. (Silver, 2016). The CCP formed the National Conference on City Planning to encourage scientific thinking about best use practices for land in increasing industrialization. In *An Introduction to City Planning: Democracy's Challenge to the American City*, Marsh

and Ford, as cited in Freund (2010), wrote "The most important part of city planning, as far as the future of health of the city is concerned, is the districting of the city into zones" (p. 50).

Realtors and businessmen interested in buying and selling property quickly became interested in the city planning movement, particularly the idea of enforced zoning. As municipal home rule increased and the zoning movement took hold, the real estate industry forged an alliance with the planners that would last until this day. The National Association of Real Estate Boards (NAREB), founded in 1909, created the City Planning Committee in 1914, which "urged local and state governments to provide legal and financial support for planning" and popularized the zoning concept (Freund, 2010, p. 52). According to Rothstein (2017), this era created "a new dedication on the part of public officials to ensure that white families' homes would be removed from proximity to African Americans in large urban areas" (p. 44). Zoning would go from an academic and civic practice to a financial practice as well. The planners were happy for the real estate industry to pay for their conferences and research, while the real estate industry was happy for the planners to craft and advocate policies that would let municipalities map land for particular usages.

For all its alleged promise as a democratic practice, at least to the planners, zoning was also a racial practice. Freund (2010) wrote that:

> *[r]acial science figured prominently in the early planning movement because urban congestion and unregulated development were often associated with migrant blacks, immigrant Asians, and immigrant Europeans, the populations whose cheap labor (and often squalid living conditions) made the era's rapid industrial and commercial growth possible.* (p. 55)

Eugenic views of racial difference, falsely and problematically claimed to be rooted in biological science, were held by powerful leaders in government and economy, including planners. Rothstein (2017) pointed to the work of Whitten, a prominent city planner, whose zoning plan for Atlanta in 1922 advised that "home neighborhoods had to be protected from any further damage to values resulting from inappropriate uses, including encroachment of the colored race" (p. 46). Freund (2010) referenced early zoning advocates Marsh and Ford, in their introduction to planning, where they wrote that the European zoning model is "a means for preventing race deterioration" (p. 56). He also referenced Ely, a prominent economist working with the planning and real estate alliance in its early stages, who wrote that "[n]ew immigrants are 'beaten men from beaten races, representing the worst failures of the struggle for existence'," (p. 60). NAREB updated its code of ethics in 1924 and "forbade realtors to introduce 'members of any race or nationality' into neighborhoods where their presence would damage property values" (Freund, 2010, p. 54). Rothstein (2017) further cited

zoning expert Bettman, who in a report with colleagues explained that zoning was necessary "to maintain the nation and race" (p. 52).

Thus, zoning from its outset was racialized and used to make structurally racist interventions. The Supreme Court of the United States (SCOTUS) showed an awareness of this feature of zoning ordinances, ruling against the practice of racial zoning in *Buchanan v. Worley* (1917). However, the alliance between real estate and the planners was effective. "Between 1921 and 1925, the number of municipalities adopting zoning ordinances went up tenfold, from 48 to 425" (Freund, 2010, p. 89). By then, 27 million people lived in zoned municipalities. The ground was readied for a change in the SCOTUS's thinking. In *Euclid v. Ambler* (1926), the Court overturned the Buchanan ruling. Citing the concept of nuisance as a factor in their decision, they said "a nuisance…may be merely a right thing in the wrong place, like a pig in the parlor" (Freund 2010, p. 83). In the dissenting opinion, judge D.C. Westenhaver wrote that "[t]he result to be accomplished is to classify the population and segregate them according to their income or situation in life" (Freund, 2010, p. 83). And that is exactly what happened.

After this juridical victory for the planners and real estate industry, zoning would spread to 800 cities by 1930. Ten years later, "1,500 counties, cities, and regions in the United States would be zoned" (Freund, 2010, p. 89). At this point, we can say that the repressive state apparatuses in the United States, at the federal, state, and local level, now had the tools to ensure relations of housing production and consumption whose practices would exert a disparate force in property. Rothstein (2017) concluded as much when he wrote, "I think it can fairly be said that there could be many fewer segregated suburbs than there are today were it not for an unconstitutional desire, shared by local officials and the national leaders who urged them on, to keep African Americans from being white families' neighbors" (p. 54). Municipalities could levy taxes for things like schools with home-rule charters. Those municipalities could adopt zoning ordinances to determine how land was used, sold, and built upon. Planners and real estate agents could generate proposals, legitimated by the pseudo-science of the day, to parcel out that land according to the demands set forth by property markets, all protected by federal law.

Real estate agents could, by the ethics established by their profession, prevent anyone deemed nonwhite from purchasing certain plots. Rothstein (2017) referenced a real estate manual from 1924 as claiming that "a realtor should never be instrumental in introducing into a neighborhood…members of any race or nationality…whose presence will clearly be detrimental to property values in that neighborhood" (p. 52). They had the backing of professional city planners and elected officials at every level. State power ensured

the functioning of these relations of production, set the conditions for property to be thus parceled, sold, and occupied with a eugenic and capitalist animus. These initiatives found support from the highest levels of government at the beginning of the century. For example, the Wilson administration, "terrified by the 1917 Russian Revolution…came to believe that communism could be defeated in the United States by getting as many white Americans as possible to become homeowners—the idea being that those who owned property would be invested in the capitalist system" (Rothstein, 2017, p. 60). It would not be until after the Great Depression that the relations of housing, a set of practices exerting the disparate force in school funding we have been examining, with its points of tension in the suburbs, would take full shape.

Herbert Hoover, who had been the Commerce Secretary and helped the growth of zoning in the earlier part of the twentieth century, and after him, Franklin Delano Roosevelt, put in place several structures that would create financial tools and markets for home-ownership in the U.S. (Rothstein, 2017). They changed the housing market in response to the Great Crash of 1929 to maintain the integrity of the United States social structure. To reconstruct the legitimacy of that structure after such a significant faltering, they leaned heavily on homeownership, creating and instituting practices whose force was felt throughout society (Freund, 2010). These interventions came in the form of new repressive institutions and practices in property markets, namely the Federal Home Loan Bank in 1932 (FHLB), the Home Owners Loan Corporation in 1933 (HOLC), and National Housing Act in 1934 (FHA). These institutions protected homes and businesses from fluctuations in resource availability, and simultaneously created wealth for an expanded portion of the working class including both Blacks and whites, yet understandably the results in home prices and accumulation of wealth were highly unequal along racial lines (Taylor, 2019).

The public-private alliance around zoning practices had conceived and experimented with a new kind of mortgage by 1920, for example, one that was low-interest, long-term, and amortized. In the wreckage of the 1929 Crash came an opportunity for this mortgage to get state backing. The government programs as part of the New Deal (FHA, HOLC, FHLB) did the trick. The FHLB asked the savings and loan industry to "design and operate a federal regulatory apparatus, dependent on both US Treasury Funds and federal authority, that enabled" local banks to increase their mortgage lending (Freund, 2010, p. 109). The Federal Housing Act (FHA) was passed in 1934, which backed the mortgages with insurance from the Federal Reserve and stoked secondary markets. By 1936, 20% of all non-farm occupied units of housing were mortgaged through HOLC, which continued to grow residential property markets (Freund, 2010; Taylor 2019). For the people who got access to these mortgages, they felt a new security in their home, a new kind of wealth in an asset that could appreciate in value. Not everyone felt the force equally, however. Remember that the public-private alliance,

which had conceived of this mortgage as well as the land-use practices (from zoning to real estate) that now existed throughout the country, were virulent racists, which manifested in the New Deal housing policies. As Taylor (2019) wrote:

> *The FHA's racial politics were neither benign nor marginal to the agency's primary goal of home ownership. Racial concerns shaped the public policies of the FHA from its inception. Because the federal government relied on 'experts' from the housing industry to shape its emergent housing policies, it imported the racial common sense of the real estate industry, including the foregone conclusion that Blacks and other nonwhites should be separated from whites to preserve property values* (p. 34).

Their beliefs about race were eugenic, and the practices they created were shot through with their beliefs as the passages from their manuals and textbooks attest. The mortgage revolution would create wealth and security for those who qualified in that white supremacist structure, which, while it became more inclusive of certain minorities after the 1929 Crash, was still closed to many. Taylor (2019) referenced Clarence Mitchell, a member of the National Association for the Advancement of Colored People as saying that the 1949 National Housing Act was a "cruel and disgusting hoax as far as colored citizens of the United States are concerned" (p. 35). The well-known practice of redlining was one result. Freund (2010) noted that FHA authorities "refused to insure mortgages for most racial minorities and thus excluded them for at least three decades from a fast-growing and lucrative market for suburban homeownership" (p.128). He continued:

> *HOLC appraisal and lending practices…offered whites a means to segregate neighborhoods universally and systematically, following standardized procedures, and with the blessing of financial support of the federal government…Continually regulated by federal authorities and both insured and supplemented by US Treasury Funds, that market went on produce untold wealth in housing and related industries. Consumers benefited by gaining access to affordable credit, and thus to housing, which eventually translated into substantial home equity.* (Freund, 2010, pp. 116-123)

After this brief history of property relations, combined with knowledge of taxation practices that generate school funding, it is easier to understand the inequality in Pennsylvania. The dynamic, structured by the response to the Great Depression, resulted in the following dynamic: property values stay high in high-value suburbs (largely white demographic), assessments were therefore also high, and the funding available for schools is, relatively, high, disparately high compared to their urban and rural neighbors. Residents want to

own homes in neighborhoods where the property values are high, and they want their kids going to schools unblemished by the presence of those who, by dint of the social forces born before and after 1929, were kept out of the American Dream. Historical data from the beginning of this section make a kind of terrible sense in this context. As Tegeler and Hilton (2018) confirmed:

> *Shared municipal authority over land use and school assignment…can exacerbate these patterns of segregation and school sorting, as school districts' local zoning boards practice exclusionary zoning to prevent the entry of lower-income students into affordable housing in the district, thus ensuring a higher tax base, higher test scores, and a well-resourced school system for local students* (p. 438).

CURRENT CONTEXT

Recent Strategies for Change: Using the Courts

In light of this history, how can we understand recent attempts to change school funding inequality in Pennsylvania? One tactic has been to leverage the repressive state apparatus, via federal and state courts, to force a change in the balance. This tactic was effective during the most recent civil rights movement, starting with the historic *Brown v. Board of Education* (1954) decision that overturned the separate but equal doctrine dating back to the late 19th century. What are these strategies and are they effective?

In principle, one could claim that unequal school funding is a violation of the Equal Protection clause of the Fourteenth Amendment. Recently in *Gary B. v. Snyder* (2018) the plaintiffs, students in Detroit Public Schools, claim that their Fourteenth Amendment rights were being violated because lack of resources to their schools subsequently denied them access to literacy (Peak & Hanford, 2020). The case is meant to establish some grounds for a right to education in the United States Constitution through the Equal Protection Clause. However, in an opinion for the Eastern District of Michigan, Judge Stephen Murray III dismissed the case because "access to literacy is not a fundamental right — at least not in the positive-right sense…The Complaint therefore fails to state a claim for relief based on the Equal Protection Clause and must be dismissed" (*Gary B. v. Snyder*, 2018, p. 32). This decision upholds an earlier ruling of the SCOTUS in *San Antonio Independent School District v. Rodriguez* (1973), that "[e]ducation, of course, is not among the rights afforded explicit protection under our Federal Constitution. Nor do we find any basis for saying it is implicitly so protected" (p. 32). The ruling in *Gary B. v. Snyder* (2018) was appealed and plaintiffs settled with Gov. Gretchen

Whitmer, for a nearly $100 million literacy program focusing on Detroit Public Schools. Courts later vacated the motion due to the settlement, dashing hope for national legal impact (Evans, 2020).

In the 1990s, the School District of Philadelphia (SDP) made a big push to address this issue through a different juridical strategy, rather than going through the Fourteenth Amendment. In a number of cases, SDP argued that the disparity in school funding was a civil rights violation (Backer, 2017). One such case was *Powell et. al v. Ridge et al.* (1999). Powell was a parent in the District and filed this suit against Governor Tom Ridge with a number of parent and clergy groups, along with superintendent David Hornbeck. They argued that the Basic Education Funding Formula in Pennsylvania government used to distribute money to schools "ignored or significantly diminished the impact of the 'aid ratio' factor that operates to increase aid to school districts that are relatively less wealthy" (*Powell et al.*, 1999, p. 23). They went on to say that "the Commonwealth Defendants knew or should have known [how this funding] represents a disproportionate allocation of funds away from the largest concentration of minority students in the Commonwealth" (p. 23). Therefore, "racial distinctions in the distribution of revenues for education, under the Commonwealth Defendants' policies and practices, are legally unjustifiable and racially discriminatory and Commonwealth Defendants had knowledge of such efforts each time prior to taking action which achieved these results" (*Powell et al.*, 1999, p. 27).

The plaintiffs made the case that this discrimination, which they called "the racially discriminatory impact of the Commonwealth Defendants' system for funding school districts," (p. 24) violates the Civil Rights Act of 1965, which states that "[n]o person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving Federal financial assistance" (p. 30). Since Pennsylvania receives federal financial assistance, *Powell et al.* (1999) claimed the state had to address the disparity, or disparate impact of the school funding formula.

Their case made it through the first Federal Circuit court, which took several years to get a decision. But before the case could be settled, SCOTUS issued a decision that would make *Powell et al.* (1999) and every other civil rights case against disparate school funding impossible to argue. In *Alexander v. Sandoval* (2001), SCOTUS found that "there is no implied private right of action to enforce disparate impact regulations" (Laufer, 2002, p.1613). At issue was whether or not individuals could sue to use the force of Civil Rights legislation against policies with disparate impact. In a 5-4 decision, the court decided that no, only agencies could claim this right, not individuals. The conservative judge Antonin Scalia wrote the majority opinion.

Because *Powell et al.* (1999) filed a class action lawsuit—a group of individuals, not a government agency—they could not sue the Governor or Pennsylvania Department of Education to enforce against the disparate impact of the Basic School Funding formula.

In the United States however, with its federal, state, and local repressive state apparatuses, the Pennsylvania Commonwealth Court is another direction to go. People have tried to redistribute educational resources at the state level, with varying degrees of promise. The first was to reform the school funding formula (McCorry, 2016). Tom Wolf, Governor of Pennsylvania, oversaw a change to the Commonwealth's school funding formula in 2016. Changing how the state government allocates money to schools seemed like a crucial, if not definitive, solution to the problem. If money gets distributed according to schools' needs, then the disparate force would be no more. But the story is more complex. After a lengthy research process in 2015-2016, the Basic Education Funding Commission (2015) recommended the following:

> *The allocation of basic education funding needs to allow for accountability, transparency and predictability. The main objective of the new funding formula is to equitably distribute state resources according to various student and school district factors. The new formula will include factors reflecting student and community differences such as poverty, local effort and capacity, and rural and small district conditions* (p. 4).

The formula does achieve this allocation, changing the way the state counts a district's student population by averaging three-year totals rather than any given year, replaces traditional aid ratios to account for unequal abilities to tax, and adds weights for poverty, concentrated poverty, charter enrollment, and English Language Learners (McCorry, 2016). It does a lot. However, according to the Public Interest Law Center (2020), it does not do enough. The new formula only applies to funding after its adoption, which means that historical inequalities, valued at $1.1 billion, are baked into the new distributions (Public Interest Law Center, 2020). Furthermore, the funding formula only takes into account state funding. It does not address inequalities due to differences in local funding.

The inequalities between districts remain. According to Collins (2016), the extent to which wealthy and poor districts rely on state funding in Pennsylvania varies a great deal. Wealthy districts in the suburbs, for instance, fund their schools using 88% local tax funds, whereas medium-sized cities with populations between 75,000 and 100,000 rely on state funding for 59% for their school funding. Similarly, SDP takes roughly half state funding. If those proportions were more equal the funding formula might make a difference. If the suburbs relied on state funding as much as the cities, changing the state funding formula might be a more

powerful practice in redistributing resources. Yet, the new formula leaves the heart of the inequality largely in place, there is a lot of money for schools in the suburbs and not as much in the cities (Public Interest Law Center, 2020).

Unlike the U. S. Constitution, the Pennsylvania Constitution does guarantee education: "The General Assembly shall provide for the maintenance and support of a thorough and efficient system of public education to serve the needs of the Commonwealth." This clause is called the education clause, and the Public Interest Law Center has brought suit against the Pennsylvania Department of Education for failing to uphold it, as well as Pennsylvania's Equal Protection Clause. *William Penn School District et. al v. PA Department of Education et. al* (2017) has gone through a pinball machine of juridical statuses (Fernandez & Hanna, 2020). In 2015, it was dismissed by a Commonwealth Court for not being justiciable, or hearable by courts. In 2017, after an appeal to Pennsylvania's Supreme Court, that court overturned the Commonwealth Court's decision, allowing the case to move forward. This means that the Commonwealth Court has to hear the arguments. As of this writing, the PILC is preparing to offer those arguments. If they succeed, they can force the Pennsylvania government to rectify the funding disparity (Fernandez & Hanna, 2020).

If Pennsylvania legally had to equalize this disparity, the solution would most likely be higher taxes of one form or another. While this might address some of the inequalities embedded into the school funding system in Pennsylvania, since medium-sized cities and large cities get most of their school funding at the state level (Collins 2016), it would not address forces that generate the inequality in the first place, local property values and taxation, collected and maintained by home-rule charters and enforced by racist and capitalist property market choices (Freund, 2010; Rothstein, 2017; Taylor, 2019).

A final path towards equalizing school funding through the repressive apparatuses, one which takes the above insight into account, would be to tax property in differential ways to meet school districts' needs. Yet, the Pennsylvania Constitution, through a clause called the Uniformity Clause, prohibits taxing differentially. The first clause of Article VII reads, "All taxes shall be uniform, upon the same class of subjects, within the territorial limits of the authority levying the tax, and shall be levied and collected under general laws." Since school districts are the authorities levying property taxes, a school district has to levy its taxes uniformly. This law came into play in 2017 when the Upper Merion Area School district brought suit against the commercial real estate firm Forge Towers Apartments, to ensure that the new development would be taxed according to the district's needs (*Valley Forge Towers v. Upper Merion SD*, 2017). At that point, the commercial real estate company Forge Towers filed for relief against the School District, claiming that Upper

Merion, by attempting to tax the commercial property differently, had violated the Uniformity Clause. The Pennsylvania Supreme Court decided in the company's favor in *Valley Forge Towers v. Upper Merion SD* (2017), indicating:

> *The particular appeal policy employed by a taxing district lies within its discretion. Our task is limited to enforcing the constitutional boundaries of any such approach, and our holding here is limited to the conclusion that the appeal policy Appellants have alleged—in terms of its classification of properties by type and/or the residency status of their owners—transgresses those boundaries. Accordingly, Appellants' complaint sets forth a valid claim that the School District's appeal policy violates the Uniformity Clause* (para. 40).

Murphy (2017) wrote, "[t]he Court properly sought to advance the goal of tax uniformity in *Valley Forge*, but its decision will not cure the pervasive inequities in the current system" (para. 2). In Pennsylvania, school districts cannot tax certain properties differently due to the uniformity clause in its Constitution.

These examples, taken together, show the difficulty in mobilizing the repressive state apparatus to redistribute disparate school funding. Fourteenth Amendment cases are thwarted because the U.S. Constitution does not provide for education. Civil rights cases do not work because the *Alexander v. Sandoval* (2001) ruling dictates only agencies can sue to enforce racial discrimination in disparate impact (Laufer, 2002). Reforming school funding only works in part, as it does not account for the historical inequalities of school funding. One can sue the Pennsylvania Department of Education, targeting the Governor, but it will take a long time and may result in raising taxes, which is a largely unpopular demand.

RECOMMENDATIONS

Focusing on the Base Rather than Superstructure

The base-superstructure model expects that the basic, foundational economic force of property inequality is exerting a driving force in the problem of school funding inequality in Pennsylvania. Rather than government or court systems, this inequality tracks with real estate practices and institutions. This conclusion has strategic consequences. Tegeler and Hilton (2018) confirm this conclusion, and its relative absence in research. "In spite of their deep and obvious connections, housing and school policy have evolved separately, with little attention to their mutually reinforcing impacts" (p. 436). The authors say housing and education policy are in a "mutually reinforcing cycle" (p. 442) that "must be disrupted" (p. 434). In the analysis above,

property values, assessments, and millage rates are key practices in exerting the unequal force. Those practices get enacted in a context of racialized and classed property markets, protected by the home-rule charters of school districts (Freund, 2010; Rothstein, 2017). These foundational economic practices are at the base of the school funding issue. Educational leaders should therefore study and target these practices directly when addressing this issue.

In terms of recommendations, readers might be reminded of recent attempts to change school funding revenue sources from property taxes to other taxes. Conservative politicians in Pennsylvania have introduced House Bill 76 to eliminate property taxes and delink similar revenues from school funding (Francis, 2020). However, Price (2018) found that across all Pennsylvania families, property tax elimination would increase taxes by $334 per family. While property taxes would fall by an average of $1,685 per family, sales and income taxes would rise by over $2,000 on average per family. Inequalities would be exacerbated because the largest amounts of property tax relief would go to affluent families in wealthy school districts that have the highest property taxes because those school districts choose to amply funding for local schools.

Tegeler and Hilton (2018) pointed to a number of other more viable solutions in line with the conclusions reached here. They encouraged educational leaders to look at "exclusionary zoning" when it is "explicitly designed as 'fiscal zoning'" (p. 441). They are critical of "federal mortgage interest tax deduction, which favors higher-income homeowners and, in effect, subsidizes schools in higher-income, less diverse districts," and the concomitant "exaggerated deference that the federal government pays to local government decisions about participation in government housing programs" (p. 441). They point to state-level racial imbalance laws, such as those in Connecticut and Massachusetts, to prevent the kinds of segregation seen in and across school districts. The authors pointed to a 2013 Pennsylvania case in East Stroudsburg where "broadly-worded statutes can be adapted to take into account the impacts of segregation" (p. 443). Most salient for the conclusions generated by a base-superstructure analysis, Tegeler and Hilton (2018) listed a set of housing policies to battle racial and economic segregation:

> *Affordable house siting policies for the Low-Income Housing Tax Credit and other programs that take into account school composition and performance; housing voucher policies that target high-performing, low-poverty schools; mortgage assistance programs that promise school integration; state zoning laws that prioritize school integration; eliminations of tax incentives that reward purchase of homes in high-income school districts; and real estate market practices that emphasize the value of school integration* (p. 444).

Each of these policies could equalize school funding equality in Pennsylvania, though more research needs to be done to find precedent and assess viability of certain actions over others. And while Tegeler and Hilton (2018) are interested in "incremental progress" (p. 436), the base-superstructure model would recommend larger steps. There are examples throughout the country of progressive and redistributive school funding policies. Vermont's state pooling system (Rebell & Metzler, 2002) and the Twin Cities' revenue sharing program (Orfield & Wallace, 2006) are promising school funding reform policies that work against real estate inequality and segregation at the regional and state levels. Other options circumvent the problematic funding circuits entirely.

While the coronavirus pandemic has devastated local and national economies, it has inspired programs like the Municipal Liquidity Facility (MLF) that purport to provide liquidity for state and local governments impacted by shutdowns necessitated by shutdowns (Pew Charitable Trusts, 2020). School districts could work with the Action Center on Race and Economy to demand better terms for MLF bond issuance terms (ACRE, 2020). Stronger actions, however might be necessary. The decommodification of property would ensure that land use could not be subject to economic forces structured by racism, preventing housing and school inequality. Activists in Germany, for instance, nearly influenced Berlin city government to expropriate private housing for public use (Oltermann, 2019). Expropriating suburban properties in Pennsylvania, for example, could reconfigure the terrain of school funding inequality in fundamentally egalitarian ways.

CONCLUSIONS AND RECOMMENDATIONS FOR RESEARCH

The base-superstructure analysis of school funding inequality in Pennsylvania results in the following general recommendations:

- Careful study and examination of property markets at the school-district level in Pennsylvania;
- Development of strategy for targeting practices and institutions involved in property markets and taxation at the school-district-level such as those mentioned above;
- Implementation of interventions reorienting these practices and institutions.

These recommendations are general. Future inquiry should continue to articulate viable strategies based on these three steps that are specific to Pennsylvania. In general, we can say that rather than only moving

through court systems, educational leaders may have to study the history of property markets, zoning, real estate, and taxation and engage in organizing, advocacy, and other forms of social change to address school funding on those terrains. In short, educational leaders must become housing advocates and pursue the kinds of policies Tegeler and Hilton (2018) recommended, as well as thinking outside the box about more structural interventions like revenue pooling, tax sharing, liquidity support, and expropriation of suburban property. No educational leader should tolerate the disparate and unjust reality of school funding in Pennsylvania.

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ABOUT THE AUTHOR

Dr. David I. Backer is an Assistant Professor of Social and Cultural Foundations of Education, Department of Educational Foundations and Policy Studies, College of Education and Social Work, at West Chester University of Pennsylvania. Dr. Backer's research focuses generally on education and ideology. He is currently at work on an educational reading of Louis Althusser's philosophy and its implications for school policy and practice. His research has appeared or will be published in *Harvard Educational Review*, *Educational Theory*, *Democracy & Education*, *Hybrid Pedagogy*, and *Issues in Teacher Education*. Backer has also written on education and politics for general audiences in *Jacobin*.

A SURVEY OF CURRENT DRIVER EDUCATION PRACTICES IN PENNSYLVANIA

KATHLEEN E. AMMERMAN, M.Ed.
Indiana University of Pennsylvania
K.E.Ammerman@iup.edu

KEVIN E. WOLFORD, B.S.
Indiana University of Pennsylvania
K.E.Ammerman@iup.edu

LOUIS J. PESCI, Ed.D.,
Indiana University of Pennsylvania
lpesci@iup.edu

TIMOTHY J. RUNGE, Ph.D., NCSP, BCBA
Indiana University of Pennsylvania
trunge@iup.edu

ABSTRACT

The purpose of this study was to examine the current state of driver education in Pennsylvania public schools. Data were collected via an online survey regarding driver education instructor demographics and credentials, curricula used, and instructional practices employed. Results suggest that certified public-school driver education teachers are most likely to be mid-to-late career male teachers whose training was primarily in the health and physical education fields. It has been 10 to 20 years since most driver education teachers completed driver education coursework. One in five teachers never completed any coursework related to driver education, a somewhat concerning indication that many driver education instructors have not received formal training in an area in which they practice professionally. Most survey respondents indicated using an evidence-based curriculum in their classrooms. Further need for empirical study of driver education's methods, as well as, a need for expanding teacher training opportunities are discussed.

INTRODUCTION

Drivers age 15 to 24 have much higher crash and fatality rates compared to all other age groups (Arnett, 2002; Shope, 2006). These sobering facts about novice drivers' behavior while behind the wheel are often attributed to a variety of factors including internal personality traits, developmental status, and driving context. Given these statistics and their likely causes, instruction for novice drivers should focus on these factors or on increasing knowledge, skill level, problem-solving, and automaticity while driving. One such target at skill development is driver education. Driver education can occur in a classroom, behind-the-wheel of a vehicle, or in an online learning format. All types aim to increase the driver's knowledge, skills, and ability to quickly make life-saving decisions while operating a motor vehicle (Shope, 2006). While public and private driver education programs have existed since the 1950s, little is known about the current status of driver education in Pennsylvania. This study aimed to examine current public-school driver education practices in the state of Pennsylvania via online survey. More specifically, results report the characteristics of the teachers' educational history, the instructional format of the courses, and curriculums in use today.

Historical Trends in Driver Education

Prior to 1920, high school driver education in public schools was rare and programs operated independently. It was not until the mid-1930s that an organized national driver education movement began in

the United States. This movement coincided with increased concern over traffic collisions and the expansion of transportation safety structure (Aaron & Strasser, 1977; Albert, 1997). After initial local organization in Bergen County, New Jersey and State College, Pennsylvania, many states began to design and implement driver education courses. According to Stack (1966), by 1940, over 20 states had designed and implemented courses of study in driver education.

The driver education movement continued to gain momentum through the 1950s and began to more closely resemble the courses we see today. For example, in the 1957-1958 school year, the mean classroom time spent on driver education was 36 hours. On average, schools also provided six hours of behind-the-wheel instruction. Furthermore, these courses became more widespread and highly utilized as many states began requiring them for licensing (Albert, 1997). For example, enrollment jumped from 200 students in 1947 to 1,300,000 in 1964, and public schools offering driver education increased from 3,000 schools to over 12,000 in this same time period. This increase was also influenced by insurance companies beginning to offer discounts for successful course completion (Mayhew, 2002, 2007).

The decline of driver education began in the 1960s and continued into the 1970s due to two significant events which began to call the effectiveness of driver education into question (Crabb, 1994). In the late 1960s, the National Highway Traffic Safety Administration (NHTSA) conducted a study in DeKalb, Georgia to evaluate the effectiveness of driver education. Known as "The DeKalb Study", this project found a significant short-term decline in crash rates among novice drivers (Peck, 2006). However, according to Crabb (1994), due to the short-term nature of these effects, many interpreted this study as evidence that driver education was not effective in the long-term. Therefore, this study contributed to a decline in driver's education programs across the country. Additionally, public opinion of driver education furthered its decline, when in 1977 the Insurance Institute of Highway Safety (IIHS) questioned driver education. The IIHS stated that if public schools eliminated driver education, then teens would need to wait until 18 years-of-age to drive. According to Crabb (1994), the nationwide spread of media regarding this statement had broad and lasting impacts on the public's view of driver education. Moreover, the lack of teachers specifically trained in driver education further called the discipline into question (Smith, 1994).

Higher Education and Driver Education

Colleges and universities are key in preparing teachers to work both in private and public driver education, as well as, developing curriculums and offering a wide range of learning opportunities that include both classroom and in-service training (Aaron & Strasser, 1977; American Driver and Traffic Safety Education

Association [ADTSEA], 1980). Universities began offering driver education certifications in the 1940s, and by the 1950s, new driver education programs were producing many teachers credentialed in driver education (Crabb, 1994). However, the prevalence of these programs has declined significantly since the 1950s. From 1956-1958, 18 universities and colleges across the commonwealth of Pennsylvania offered safety/driver education teacher certification programs. In 2007, the Pennsylvania Department of Education (PDE) listed four institutions of higher education offering Driver Education Certification courses in Pennsylvania. According to Pesci (2009), only two universities offering these course sequences remained at that time, representing an 80% decline in college certification programs since 1958. The current number of existing programs is no longer reported by the PDE but is believed to be just one.

Credentialing and Certification

In the 1970s, a lack of adequate teacher preparation and regulatory consistency across state borders was cited as a limitation to the field of driver education (Aaron & Strasser, 1977; Hales, 1975). Since that time, the National Education Association and ADTSEA published recommendations for states regarding credentialing requirements for driver education teachers. Historically, the National Education Association (1964) recommended that driver education teachers "hold a bachelor's degree from an accredited university or college, have a teaching certificate in secondary schools with a supplemental twelve credit hours in traffic safety and driver education, possess the physical qualities validated by a health certificate and have a valid driver's license and acceptable driving record" (National Education Association, 1964 as cited in Pesci, 2009, p. 24). ADTSEA (2002) further made recommendations regarding educational requirements to become and maintain credentialing as a driver education teacher. First, ADTSEA recommended that all teachers take at least nine credits in college courses or 14.5 credits in continuing education units pertaining to driver education teacher preparation. Course topics in these recommendations included: the analysis of the specific steps necessary to operate a motor vehicle safely, topics necessary to teach behind-the-wheel driver education, and necessary teacher training in classroom driver education theory.

Currently, to become a certified driver education instructor in Pennsylvania, a teacher already holding an Instructional I or Instructional II teaching certification can add the Safety/Driver Education Certification to their credential. Certified teachers must pass the Pennsylvania Safety Driver Education Teacher Certification Assessment. Prior to 2011, teachers were also required to have completed 12 college credits and continuing education requirements (Pennsylvania State Transportation Advisory Committee, 2013). However, this educational requirement is no longer in place for certified teachers. Additionally, applicants

who are para-professionals within the public schools must: (a) have passed both the theoretical and practical exams, (b) posess a high school diploma, and (c) have a three-year driving record free of "Vehicle Code" violations, traffic violations, or accidents, and (d) complete 12-credits in driver education (PDE, 2020d).

Driver Education Curriculums

The "Driver Education Content and Performance Expectations" describe what students should know and be able to do at the end of a thirty-hour classroom and six-hour behind the wheel instruction" (PDE, 2007, p. 3). This document outlines content areas taught in the area of driver education. These content areas include: "Pennsylvania law and regulations, knowledge of vehicle operations, perceptual skills development, decision-making/risk reduction, driving conditions, and, influences upon driver performances" (PDE, 2007, p. 3). The 14 essential skills outlined by this document include: "judging speed going around a curve, recognizing a stopped vehicle, staying in driving line, starting from a stop, making a left turn into traffic, scanning environment and staying in driving lane, recognizing when to brake, looking before pulling out from driveway or stop sign, judging speed and distances of on-coming traffic, driving at night, driving in the rain, driving in the snow, identifying lights, signs, and road markings, and, selecting a sufficient gap to enter traffic" (PDE, 2007, p. 4).

Currently, PDE publishes a list of approved public and private driver education programs in the commonwealth and describes administrative and curricular materials (PDE, 2020a; PDE, 2020b). To be included on the online list of approved programs, schools must have a driver education program that includes 30 hours of classroom theory instruction and six hours of behind-the-wheel instruction, unless otherwise indicated. Classroom theory includes learning experiences presented in a traditional classroom environment with units similar to those outlined in the Pennsylvania Enhanced Curriculum Guide. These units include:

> *decision making-process, perceptions and driving strategies for different environments, responsibilities when entering Pennsylvania's driver licensing system, man-made laws, natural laws in relation to driving a motor vehicle, psychological conditions, physiological conditions, adverse conditions, alcohol/other drugs, financial responsibility, trip planning, and buy/maintaining a car.* (PDE, 2020c, p. 17)

Behind-the-wheel instruction consists of instruction in an approved driver education vehicle in both off-street and on-street environments. This instruction should include learning experiences designed to develop the skills necessary to drive efficiently and safely (PDE, 2020c). While schools approved by the state to

have a comprehensive driver education program must have both classroom theory and behind-the-wheel course offerings, some schools may offer just one or deliver classroom theory online. Online theory offers learning experiences equivalent to the 30 hours of typical classroom theory instruction (PDE, 2020c).

Previous Surveys

Pesci (2009) previously examined the opinions and practices of driver education teachers in Pennsylvania. Results at that time indicated over half of driver education teachers surveyed would reach retirement age within the next decade. Eighty percent of driver education teachers surveyed were male. One-third of respondents had been teaching for over 26 years. In regard to educational background, results indicated that 45% of respondents held a bachelor's degree, 48% had a master's degree, and 13% had attained less than a bachelor's degree. Furthermore, Pesci (2009) found that most driver education teacher's had degrees in the field of health and physical education (48%). Additionally, the majority of teacher's held a public certification (67.3%), followed by both private and public certifications (20.8%), and private certification alone (10%).

In regard to driver education teacher training, 27.5% reported having completed driver education courses over 25 years earlier, with just a small proportion (17%) indicating they completed classes in the previous five years. Interestingly, 10.5% of respondents did not complete any driver education college courses. Most driver education teachers surveyed completed 10-12 credits in driver education teacher preparation (55.6), with 26% completing more than 13 hours of formalized preparation. Most teachers taught driver education for 10 years or less. Almost a quarter of respondents (24.1%) had been teaching driver education for 21 or more years. In sum, these data suggested that most Pennsylvania driver education instructors had completed formal training a number of years earlier and tended to be more senior teachers with extensive experience teaching driver education.

Survey respondents' reports of instructional practices were quite varied. Forty-five percent of teachers reported that they taught driver education for more than three hours per day. Most reported that during the school year, they taught driver education before or after school (59.6%), with 40% teaching classes on weekends. Over 60% of driver education teachers reported teaching a subject other than driver education. Seventy percent of respondents indicated that they taught driver education in the summer. The majority of respondents reported that they used the Pennsylvania Enhanced Driver Education curriculum (44.1%). Very few teachers reported using a multiple car range, or a driver simulation system in their driver education programs (13.4% and 6.5% respectively).

Purpose of the Study

Little is known about the current driver education teaching practices implemented in Pennsylvania. Over ten years have passed since Pesci (2009) surveyed Pennsylvania driver education teachers. Since then, there have been significant decreases in college and university training courses, high schools requiring driver education as a graduation requirement, high schools offering publicly-funded driver education instruction, and state requirements for teacher certification and curriculums have since been slightly altered (Pennsylvania State Transportation Advisory Committee, 2013). This study aimed to replicate the past investigation regarding the characteristics of driver education professionals and practices in Pennsylvania's public schools in an effort to track trends over time, place findings in the current educational context, and better inform policies regarding driver education at both the local and state levels. The following research questions guided this study:

> *RQ1.* What is the sex, age, training, and credentialing characteristics of public-school driver education instructors in Pennsylvania?
>
> *RQ2.* What driver education curricula are used by these public-school driver education instructors?
>
> *RQ3.* How much time do public-school driver education instructors in Pennsylvania spend teaching both classroom and behind-the-wheel components?
>
> *RQ4.* How much instructional time do public-school driver education instructors in Pennsylvania dedicate to seat belt use?
>
> *RQ5.* How much instructional time do public-school driver education instructors in Pennsylvania dedicate to distracted driving (e.g., cell phone use)?

Research questions 4 and 5 were unique from previous investigations given the known benefits of seat belt use and prevalence of cell phones in society, with both viewed as important to specifically address in novice driver instruction as preventative measures for crashes and fatalities. These related but distinct behaviors were examined separately both on the questionnaire and in analyses, based on previous literature suggesting these behaviors occur at different rates within the population, with distinct influencing factors, especially in novice teen drivers (Briggs et al., 2008; Delgado, Wanner, & McDonald, 2016; Gershon et al., 2017). Furthermore, an extension of this work will examine developing curricular materials specifically addressing cell phone use and seatbelt use.

METHODS

This quantitative study utilized a descriptive survey research design (Mertler, 2019) to appraise the demographic characteristics of driver education instructors in Pennsylvania's public schools and their instructional practices and curricula used to teach novice drivers. These research questions were answered via completion of a self-report, anonymous survey distributed electronically to all credentialed public-school driver education instructors in Pennsylvania.

Population

Public schools in Pennsylvania are not obligated to offer driver education to their high school students. Consequently, the decision to offer driver education rests solely at the local level. Figure 1 presents a map of Pennsylvania's 500 school districts with indications of whether driver education is offered by that school district. If driver education is offered, the extent to which instruction used (a) classroom; (b) behind-the-wheel; and (c) online delivery is noted.

Note. IU = intermediate unit; DE = driver education.

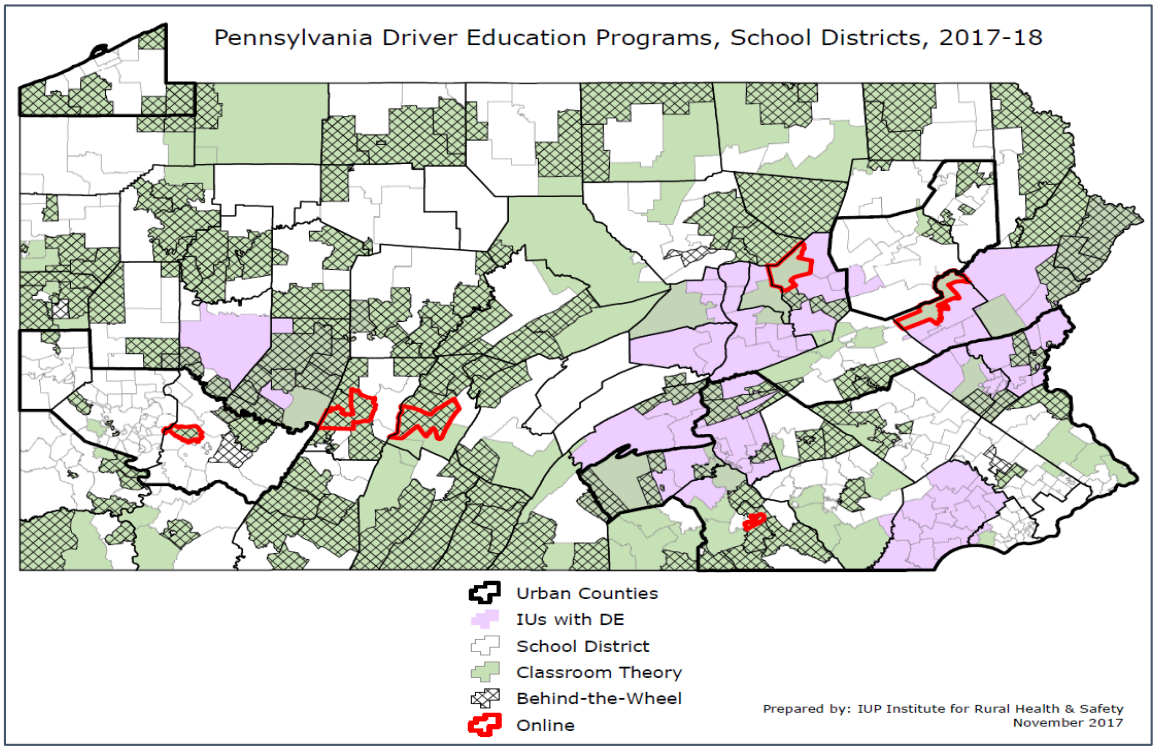

Figure 1.

Pennsylvania Driver Education Programs by Instructional Method

Sample

Pennsylvania Department of Education provided a comprehensive email list of names and email addresses of 315 appropriately-credentialed public school driver education instructors. An initial concern was maximizing response rates to an online survey, therefore literature on best practices for conducting survey research was referenced for survey development and distribution. One systematic review of 45 studies of online surveys indicated an average response rate of approximately 36% could be expected, although a wide range was reported (11.1% to 82.3%; Manfreda, Bosnjak, Berzelak, Haas, & Vehovar, 2008). Manfreda and colleagues and others (Fan & Yan, 2010; Liu & Wronski, 2017) noted that response rates were substantially influenced by a number of survey-design and survey-delivery factors. In general, online surveys that had fewer questions, fewer pages, fewer response options per question, questions worded in simple terms, and those that relied more on multiple-choice questions over open-ended responses tended to result in higher response rates. Moreover, reminders to complete the survey and incentives for completing surveys were also found to increase response rates. With the exception of offering an incentive for survey completion, best practices were generally followed when designing and delivering the survey used in the current study. Recruitment emails were delivered to all 315 potential participants in mid-July 2019 with a follow-up reminder sent in late August 2019 once most schools had returned for the 2019-2020 academic year. One hundred thirty-three completed surveys were submitted for analysis, resulting in a response rate of 42.9%. The authors concluded that this was an acceptable response rate given typical response rates for electronic surveys (Manfreda et al., 2008), thus permitting generalization of sample results to all credentialed driver education instructors in Pennsylvania's public schools.

Table 1.
Driver Education Instructors' Demographic Characteristics

	n	% of Sample
Sex		
Female	31	23.3%
Male	102	76.7%
Age		
21–30	5	3.8%
31–40	28	21.1%
41–50	43	32.3%
51–60	41	30.8%
61 and above	16	12.3%

Note. N = 133 respondents; Percentages may not sum to 100% due to rounding.

Instrument

A 24-item survey was created to answer the aforementioned research questions. Twelve questions were intended to gather demographic data from respondents, including sex, age, highest level of education and major field, licenses/certifications to teach driver education, continuing education credits earned, duration of certification as a driver education instructor, and state transportation district in which they taught, among other characteristics. Twelve additional questions gathered information about the curriculum taught, use of a multiple-car driving range or simulator, how much time was dedicated to teaching both classroom instruction and providing behind-the-wheel instruction, whether they were currently providing driver education instruction, whether their school participated in end-of-course skills testing program or third party testing, whether they taught driver education in summers or weekends, and whether they taught other subjects in school. Two of those questions specifically asked how much instructional time was dedicated to seat-belt use and distracted driving (i.e., cell phone). A very similar version of this survey was used in previous research (Pesci, 2009) and found to be useful in appraising current educator demographic characteristics, professional credentials, and instructional practices (α = .73; for full validity and reliability procedures, see Pesci [2009]). This survey was adapted from the survey utilized in Pesci (2009) with permission from the author. The full set of survey questions is available upon request.

Data Collection and Analysis

Invitations to complete the survey were distributed via email to all individuals whose contact information was provided by PDE. The recruitment email briefly introduced the study, its purpose, and expectations for commitment. The informed consent and survey were hosted on our institution's, secure, web-based Qualtrics platform that individuals accessed if they were interested in participating. Participant anonymity was maintained by not requesting any identifiable information (e.g., name, school district), thus increasing the probability that participants would respond honestly. Raw data were extracted from Qualtrics, and Microsoft ExcelTM was used to analyze the data. Descriptive statistics were utilized to report percentages of each response option for every question (Mertler, 2019).

RESULTS

Data from 133 consenting participants were obtained and used for statistical analysis. Organization of results and discussion is based on the aforementioned research questions.

Demographic Characteristics of Pennsylvania Public School Driver Education Instructors

Demographic characteristics of the sample are provided in Table 1 followed by training, credentialing, and years of service in Table 2.

Over three-fourths of all public-school driver education instructors in Pennsylvania who responded to this survey are male. Further, the age distribution of driver education instructors is somewhat negatively skewed with a higher concentration of respondents indicating they were over 40 years of age (n = 100; 75.4%). In sum, Pennsylvania driver education instructors tend to be mid-to-late career males.

Table 2.

Driver Education Instructors' Professional Training, Credentialing, and Years of Experience

	n	% of Sample
Highest Level of Education		
< Bachelor's degree	2	1.5%
Bachelor's degree	52	39.1%
Master's degree	79	59.4%
Major Field of Study		
No response	1	0.8%
English	3	2.3%
Foreign Language	3	2.3%
Mathematics	3	2.3%
Sciences	3	2.3%
Elementary Education	4	3.0%
Business Education	5	3.8%
Industrial Arts	6	4.5%
Other	6	4.5%
Social Sciences / History	22	16.5%
Health / Physical Education	77	57.9%
Licenses / Certifications Held		
Public School Certified	5	3.8%
Private Driver Training School License	28	21.1%
Public School Certified and Private Driver Trainer School License	43	32.3%
Emergency Certification	16	12.3%
Years Certified as a Driver Education Instructor		
No response	5	3.8%
< 1 year	28	21.1%
1–10 years	43	32.3%
11–20 years	43	32.3%
21 or more	16	12.3%

Note. *N* = 133 respondents; Percentages may not sum to 100% due to rounding.

The sample's highest educational achievement, primary professional discipline, licensure/certification, and years of experience teaching driver education are offered in Table 2. Over half of the sample reported earning a master's degree (n = 79; 59.4%), with a majority of respondents indicating their primary field of study was health and/or physical education (n = 77; 57.9%). The second-highest field of study was social sciences/history at 16.5%. None of the remaining fields of study were endorsed by more than 5% of the sample. Over a third of all respondents (n = 45; 33.8%) indicated they have been teaching driver education for over 20 years. An additional third (n = 48; 36.1%) have taught for 11-20 years. Collectively, these years of teaching suggest that a majority of driver education instructors are in their middle-to-later stages of their professional careers, a finding that is consistent with the sample's self-reported age.

Not surprisingly, nearly all respondents (n = 130; 97.7%) reported maintaining certification to teach in public schools. Two respondents (1.5%) indicated they had a license to teach in private schools only, and one respondent indicated being emergency certificated. Of those who are certified to teach in public schools, 20 (15%) are also licensed to teach in private driver training schools. Finally, while not displayed in Tables 1 or 2, survey respondents identified being located in all 11 Pennsylvania Department of Transportation Districts, thus providing additional validation that the sample adequately represented public-school driver education instructors across all geographic regions in Pennsylvania. However, inferences about the population cannot be made due to the lack of random sampling and absence of inferential statistical procedures. Furthermore, margin of error was not calculated due to the descriptive nature of this study. Therefore, the obtained results cannot be generalized beyond the sample.

Driver Education Training and Continuing Education Experiences

Table 3 summarizes data on respondents' continuing education experiences. The distribution of years since respondents last took a college course in driver education somewhat resembled the normal curve, with the majority clustered around 10-20 years ago (i.e., 1996-2008). Interestingly, nearly 1 in 5 respondents indicated they have never taken a college course in driver education. The majority of those who reported taking college credits in either driver education or related traffic safety issues indicated completing 10 or more credits (n = 91; 68.4%). Finally, 33% of respondents (n = 44) indicated they attended one of the last three Pennsylvania Department of Transportation Safety Conferences. Forty-five percent (n = 60) indicated that they have never attended that annual event.

Table 3.

Driver Education Instructors' Continuing Education Experiences

	n	% of Sample
Most Recent College Credit for Driver Education Courses		
No response	2	1.5%
2014 to present	8	6.0%
2008–2013	15	11.3%
2002–2007	29	22.8%
1996–2001	22	16.5%
1990–1995	13	9.8%
1984–1989	9	6.8%
Before 1983	9	6.8%
Never took college courses in driver education	26	19.5%
Credit Hours Earned in Driver Education or Related Traffic Safety		
No response	2	1.5%
0	26	19.5%
1–3	9	6.8%
4–6	2	1.5%
7–9	3	2.3%
10–12	66	49.6%
13 or more	25	18.8%
Last PennDOT Traffic Safety Conference Attended		
No response	9	6.8%
2018 (last year)	33	24.8%
2017	6	4.5%
2016	5	3.8%
< 2016	20	15.0%
Never attended	60	45.1%

Note. PennDOT = Pennsylvania Department of Transportation;
N = 133 respondents; Percentages may not sum to 100% due to rounding.

Driver Education Curriculum Used

Data regarding the curricula that respondents use are summarized in Table 4. The Pennsylvania Enhanced Driver Education curriculum (48%) was endorsed more than any other curriculum. The ADTSEA's Driver Education Classroom and In-Car curriculum is used second-most in Pennsylvania's public schools, with 20% of respondents indicating they use it. A small percentage of respondents (9.3%) use AAA's How to Drive curriculum. Additionally, 22.7% of responded "Other" and provided an "open-ended" response. These "Other" responses were coded by program mentioned. Of those who responded "Other," 23.5% indicated they use a combination of curricula. Importantly, the specific curricula used in combination were included in their respective tallies above in the table.

Table 4.
Curriculum Used by Driver Education Instructors

Curriculum	*n*	% of Responses
Pennsylvania Enhanced Driver Education Curriculum	72	48%
American Driver & Traffic Safety Education's Driver Education Classroom and In-Car Curriculum	30	20%
AAA How to Drive	14	9.3%
Other:	**34**	**22.7%**
Drive Right	10	29.4%
Pennsylvania Driver's Manual	7	20.6%
Teacher-created	4	11.8%
Glencoe / McGraw-Hill Responsible Driving	2	5.9%
Shields Online	1	2.9%
Online	1	2.9%
Indiana University of Pennsylvania Curriculum	1	2.9%
Unknown	1	2.9%
Combination with any above	8	23.5%

Note. *N* = 133; percentages will not sum to 100% given the option for respondents to "check all that apply"; "Combination of the above" indicates those respondents who reported using more than one curriculum, and each curriculum reported was tallied in its respective row. Italics indicate coded "open-ended" responses specified when "Other" was selected. % of Responses in italics indicate percent of "Other" responses coded as each category, not total % of Responses.

Driving Range and Simulation System Use

Results indicated that 82% of respondents do not utilize a multiple car driving range when teaching novice drivers. Furthermore, 90.3% of respondents do not utilize a driving simulation system when teaching novice drivers. Less than 1% of respondents did not select answers for these two questions (0.02% and 0.02% respectively). These omitted responses cannot be interpreted as it is unclear whether the respondent did not understand the questions, elected to skip the questions, or if these methods are not utilized.

Time Dedicated to Instruction on Seat Belt Use and Distracted Driving

Given the nature of work related to the grant that funded this project and the crash and fatality data for novice drivers (Arnett, 2002; Shope, 2006), respondents were asked to report the amount of time they spend teaching novice drivers the importance of wearing seat belts and avoiding driving while distracted (e.g., using cell phones while driving). These data are summarized in Figures 2 and 3, respectively.

A plurality of responses was received for the amount of time spent directly instructing on seat belt use and laws, with <1 hour receiving the greatest number of endorsements (n = 46; 34.6%) followed by 1-2 hours (n = 35; 26.3%). Thirty-two percent of respondents reported allocating more than 2 hours for instruction on seat belt use and laws. The 10 no responses (7.5%) cannot be interpreted given that a no response could mean this topic is not directly taught, respondents were unsure of how long they taught that content, or those respondents elected to skip this question.

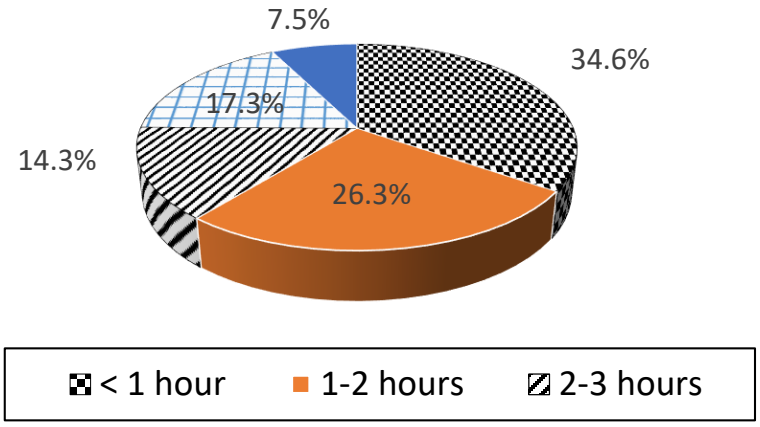

Figure 2.
Amount of time providing direct, explicit instruction in seat belt use and laws.

The time spent providing direct instruction on distracted driving, including refraining from using cell phones while operating a vehicle, was much more evenly distributed across reporting categories (< 1 hour, 1-2 hours, 2-3 hours, > 3 hours). The 12 respondents (9.0%) who did not offer a response cannot be interpreted given a no response could indicate that this topic was not covered, respondents could not recall how long they dedicated to this topic, or respondents elected to skip this question.

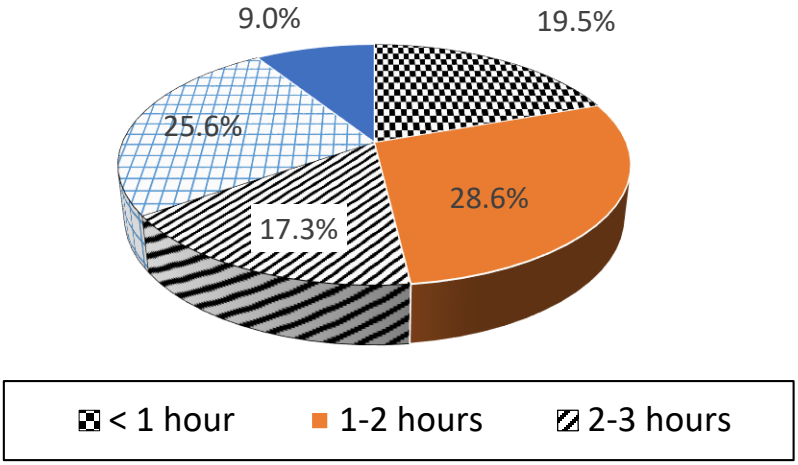

Figure 3.
Amount of time providing direct, explicit instruction in seat belt use and laws.

DISCUSSION AND IMPLICATIONS

The electronically-distributed survey of public-school driver education instructors in Pennsylvania yielded a response rate of 42.9%, which is higher than typical for such research methods (Manfreda et al., 2008); therefore, we believe conclusions drawn from this sample have the potential to generalize to all public-school driver education instructors in Pennsylvania, depending on representativeness of the sample. Due to the voluntary, nonrandom nature of the survey, external validity cannot be determined at this time. Future research should examine these questions utilizing random sampling and inferential statistics to examine the goodness-of-fit between demographic characteristics of the sample and the intended population.

Current results indicate that the at least 60% of all public-school driver education instructors in Pennsylvania who responded to the survey are male, mid-to-late career teachers primarily certified in health

and/or physical education or social studies/history, a finding that is comparable to previous survey results (Pesci, 2009). These data suggest growth opportunities for females, younger educators, and those whose primary credentialing are outside health and/or physical education or social studies/history.

Similar to previous survey results (Pesci, 2009), approximately 20% of driver education instructors in Pennsylvania surveyed have completed a college course in driver education, a somewhat concerning indication that many driver education instructors in the sample have not received formal training in an area in which they practice professionally. Thus, a call for such opportunities offered by institutions of higher education and strong endorsement to complete such in-service training by PDE may be warranted. With only one public institution of higher education in Pennsylvania offering such coursework, there is a need for PDE to consider how to expand formal training opportunities across the commonwealth. Concurrently, stronger endorsement by PDE to take such coursework would be valuable as this would likely increase professional knowledge and competencies in the field of instruction for novice drivers. With a third of respondents indicating attendance at the seminal statewide conference for novice driver education instructors, opportunities for increased attendance is recommended. Incentivizing attendance, through nominal registration and travel fees to attend this conference in State College, and endorsements of such attendance as one path to achieve continued credentialing are potential ways to increase driver education instructors' attendance.

Most survey respondents indicating using an evidence-based curriculum in their classrooms. Over three-quarters of all respondents reported using one of two curricula (i.e., Pennsylvania Enhanced Driver Education; ADTSEA). An additional 11% of respondents indicated using AAA's How to Drive curriculum. These results suggest that most driver education instructors utilize commercially-available, evidenced-based curricula when instructing novice drivers (Pesci, 2009). Very few driver education instructors (3%) reported using their own curriculum, an encouraging finding given the importance placed on used evidence-based instructional materials. In regard to use of driving ranges and driving simulation systems to teach notice drivers, few instructors reported utilizing these instruction delivery methods (15.8% and 8.3% respectively). These findings are consistent with Pesci's (2009) results, suggesting that the use of these instructional methods has likely remained low over the past decade.

One of the greatest known contributors to automobile crashes and fatalities, particularly among novice drivers, is a cluster of behaviors related to distracted driving such as interactions with passengers, operation of motor vehicle accessory controls, and use of mobile devices (Atchley, Atwood, & Boulton, 2011; Prat, Gras, Planes, Gonzalez-Iglesias, & Sullman, 2015). Specifically, use of cell phones while driving is

increasingly cause for concern, especially among notice teen drivers. Additionally, novice drivers' inconsistent seat belt use (e.g., Shults, Haegerich, Bhat, & Zhang, 2016) give rise to the need to focus instruction with novice drivers on both safe driving behaviors in an effort to reduce crashes and fatalities. Direct, explicit instruction in these safe driving behaviors might result in more novice drivers refraining from using cell phones and using seat belts while driving. Empirical inquiry into whether such direct instruction results in improved novice drivers' behavior remains to be conducted; however, it is reasonable to believe that such direct instructional practices would be at least as effective, if not more effective, than simply ignoring direct instruction in these areas. To that end, results from this study indicate at least 9 out of 10 instructors surveyed spend at least some time directly instructing novice drivers on the importance of not using cell phones and wearing seat belts while driving. Despite these encouraging data, it is recommended that *all* driver education instructors provide direct, explicit instruction in safe driving, including cell phone and seat belt use, given these are factors that would likely result in fewer crashes and fatalities. Failure to directly instruct safe driving behaviors, inclusive of cell phone and seat belt use, should be of critical emphasis particularly given the ubiquitous use of cell phones and ease of securing oneself in a car with a seat belt.

There are, of course, some limitations of this study that must be acknowledged. A broader sample of driver education instructor characteristics and practices is needed beyond just Pennsylvania to fully appraise current practices across the United States. Further, a deeper analysis of the methods of instructing around minimizing distracted driving (i.e., safe driving) are needed. For example, what methods do instructors use to teach, reinforce, and emphasize not using a cell phone while driving? What approaches are used to teach the important of seat belt use? Use of scare tactics to change behavior in general (Goldberg, Halpern-Flesher, & Millstein, 2002; Hastings, Stead, & Webb, 2004; Witte & Allen, 2000) and driving behavior, in particular, is of questionable utility (LeGarde, Lubman, & Hartnett, 1971). Therefore, more effective approaches need to be developed and empirically tested. Given that direct, explicit instruction is known to be highly efficacious in many traditional academic areas including literacy and mathematics (Hattie, 2009), it stands to reason that such approaches might generalize well to driver education.

Finally, what would be most insightful is to appraise the extent to which driver education of any kind results in appreciable changes in novice driver behaviors. Such a study would require directly assessing the extent to which particular driver education curricula had an impact on novice drivers engaging in safe driving behaviors. The few studies to date on the efficacy of driver education instruction on novice driver behaviors have been correlational, offering little validation of the cause-effect relationship we need to conclude whether

driver education is effective. Such a study is well beyond the scope of this manuscript, although work we continue to implement aspires to shed some initial light into these cause-effect relationships.

In the end, educating novice drivers about how to engage in safe driving likely is the cornerstone to reducing crashes and fatalities among this and all age groups. Certainly, a multi-faceted approach, including incentives for safe driving (e.g., reductions in car insurance for sustain safe driving) and increases in technology to prevent crashes and fatalities (e.g., airbags, vehicle warning systems; lane drift detection systems), will be important as well in the effort to improve driving safety. But it is also likely that effective driver education will be a necessary component to the solution. Certainly, our youngest drivers, along with everyone else who rides on American roads, is deserving of further empirical study.

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ABOUT THE AUTHORS

Kathleen E. Ammerman, M.Ed., is a fourth-year doctoral candidate in the School Psychology program at Indiana University of Pennsylvania. Her dissertation research examines the use of School-Wide Positive Behavioral Interventions and Supports and applied behavior analysis to improve safe driving behaviors in novice teen drivers.

Kevin E. Wolford is the Project Coordinator for the Novice Driver Statewide Program at the Indiana University of Pennsylvania's Institute for Rural Health and Safety. His experience includes over 10 years of Safety/Driver Education experience in classroom and in-car instruction as well as curriculum development and delivery.

Louis J. Pesci, Ed.D., is an Associate Professor in the Department of Kinesiology, Health, and Sport Science and Director of the Institute for Rural Health and Safety at the Indiana University of Pennsylvania. Since 2000, Dr. Pesci has taught the core of Safety/Driver Education teacher preparation courses at IUP and specializes in teaching the IUP Driver Perceptual Program.

Timothy J. Runge, Ph.D., NCSP, BCBA, is a Professor in the Department of Educational and School Psychology at Indiana University of Pennsylvania. He is a certified school psychologist and a Board-Certified Behavior Analyst. His research interests include School-Wide Positive Behavioral Interventions and Supports, multi-tiered systems of support, curriculum-based measurement, and applied behavior analysis.

ALTERNATIVE METHODS TO RECRUIT QUALITY TEACHERS IN PENNSYLVANIA

Dr. Daniel Roesch
Bloomsburg University
droesch@bloomu.edu

Dr. Amanda Stutzman
Bloomsburg University
astutzman@bloomu.edu

Have you ever advertised for a vacant teaching position, only to find no certified applicants? Did you hire a teacher because they were the only one certified in the content area? Were you ever left filling a teaching position with multiple day-to-day substitutes? The struggle to find, hire, and retain highly qualified and certified teachers is quite real. During any given school year, the issue plagues school districts across the Commonwealth of Pennsylvania. Sadly, not only are school districts losing out on highly qualified and certified teachers, but often students are getting less than a quality education because of this ongoing issue. What is the solution?

The Pennsylvania Department of Education (PDE) website provides links to policy, frequently asked questions, tutorials, and recorded webinars to explain certification types and the requirements for each. What the PDE website does not articulate is a plan for school district leaders to tackle the realities of staffing difficulties of today, tomorrow and beyond. For that reason, it is important to provide a framework for the recruitment and hiring process to ensure every child is taught by a highly qualified and certified teacher in the Commonwealth of Pennsylvania.

The teacher shortage is indeed real, and according to Economic Policy Institute, "When indicators of teacher quality (certification, relevant training, and experience, etc.) are taken into account, the shortage is even more acute than currently estimated, with high-poverty schools suffering the most from the shortage of credentialed teachers (Garcia & Weiss, 2019). With a looming shortage of teachers, students, educators, and the whole public education system is negatively impacted (Garcia & Weiss, 2019). In a study published by Chetty, Friedman, & Rocko (2012) found students assigned to high value-added teachers are "more likely to attend college, attend higher-ranked colleges, earn higher salaries, live in higher socio-economic status neighborhoods, and save for retirement." Coupled with the observations of Glatfelter (2006) found: between kindergarten and 12th grade, the average student in American schools will spend at least one full year with a substitute teacher. Gladfelter (2006) also found that substitute teacher training is lacking, and some states have minimal academic requirements.

Consider this hypothetical situation: your sole chemistry teacher of 35 years will retire at the end of the school year, thus, leaving a significant void in your staff. When you review your current staffing plans you are reminded that she is the only certified chemistry teacher in the entire district. Your typical hiring process involves having your human resources director post the vacant positions internally for five days. The position then gets posted to your district website and advertised through a few external outlets.

You patiently wait for the applications to arrive, but they never do. Unfortunately, the applications may never materialize, despite your best attempts. Depending on the certification area and requirements being sought, you may continuously face the same staffing challenges. You are left in a predicament of wanting to hire only the best educators, in all disciplines, but those applicants do not always seem to exist. What can be done?

Do not simply repost the position with the same criteria. If you are an administrator in the Commonwealth of Pennsylvania, there are other solutions. Rather than depending upon a traditional passive posting, employ a more "active" recruitment process. The utilization of instructional add-on certifications and emergency certifications, coupled with teacher intern programs, to appropriately certify high quality teaching applicants is also encouraged.

In the case of the teacher retiring after 35 years, you may have anticipated this staffing need and incorporated it into your staffing plan years ago. As an educational leader you are continuously evaluating your staffing needs, sometimes planned but often not, and there isn't always one big pool of highly qualified candidates to choose from. What if you considered changing your method of recruitment?

To better illustrate this suggestion in a more concrete fashion, let's get back to that hypothetical chemistry opening. Your district posted the position externally for a minimum of 10 days, and the deadline for application submission has passed, without any success. Now you take an active approach in the recruitment process. Repost the position with new language and begin to search for potential applicants. The following actions outline a more active recruitment approach:

- Immediately repost the position with language that broadens your candidate pool. State something similar to, "Accepting applications from all interested candidates who have a strong background in chemistry and currently hold a valid teaching certification or a bachelor's degree in any science related field."
- Contact any and all local school districts and inquire whether they recently filled any science positions. Ask for the contract information for any science certified candidates they did not offer a position. Through Praxis certification, these prospective candidates might have interest in adding a science area. For instance, a biology or physics certified applicant may be contacted and asked if they are interested in adding on the chemistry certification through Praxis testing. By collaborating with other districts and considering the option of Praxis add-on certifications, quality educators can be considered.

- Refer to Appendix A which is taken directly from the PDE website and delineates the requirements of obtaining instructional add-ons ("Instructional Add-Ons", n.d.).
- Meet with representatives from your human resources department to determine if you have any other applications for science teaching from previous years. Contact those candidates to see if they meet the requirements of the new position posting.
- Review information for any and all substitute teachers including guest teachers to see if they have a relevant degree and would qualify for an Emergency Permit.
- Contact the science department chairs at any and all regional colleges and universities to inquire about recent graduates who may be interested and suited for teaching chemistry. (Chemistry majors would be preferred.) If you are unable to secure a qualified and certified chemistry teacher you may request the potential candidate apply for an Emergency Permit.

A Type 01 Emergency Permit can be granted if a Local Education Agency (LEA) "anticipates future employment for the position." The emergency certified teacher may then enroll in a teacher intern program through an approved provider to work toward a Level I Teaching Certification. Refer to Appendix B which is Certification Staffing Policy Guidelines (CSPG) #13, with exact language taken directly from the PDE (2019) website. The policy explains how prospective teachers obtain a Type 01 Emergency Permit. ("CSPG 13 - Emergency Permits", n.d.).

In addition, if your district recently had to furlough teachers, you may consider invoking the use of The Act 97 Waiver of Certification (Type 02 Emergency Permit). This permit will allow teachers to work for one year in an area that they are not certified. The position does not need to be reposted. If the teacher is needed for the position in subsequent years the LEA is able to convert this to a Type 01 Emergency Permit. Refer to Appendix C which is CSPG #14, with exact language taken directly from the PDE (2019) website. The policy explains how prospective teachers obtain a Type 02 Emergency Permit ("CSPG 14 - Act 97 Waiver for Certification", n.d.).

One last point to consider when utilizing alternative methods to recruit quality teachers, you will want to be sure to educate your school board members on the advantageous methods. The more informed of the various approaches to recruiting and employing the most qualified individual for hard to staff areas, the more comfortable the school board will feel when voting on the recommendation made to hire an individual.

Although staffing issues will not be solved with a one-size-fits-all approach, beginning to recognize there are alternative methods to recruiting and hiring for high-demand areas will help alleviate the ongoing challenges. When educational leaders are scrambling to find personnel to fill their vacancies or are feeling "stuck" when it comes to hiring options, students end up paying the cost. Through the example of the hypothetical chemistry teacher retirement, school district leaders will have a working template to actively recruit teachers for difficult to staff teaching positions and staff all schools with highly qualified and certified teachers. This is just one step in an effective recruitment and retention plan.

To completely support the need of recruitment and retention for high-quality teacher effectiveness, future conceptual White Papers will illustrate the following:

- Methods of providing effective professional development and supervision.
- Development of short-range and long-range staffing plans to address teacher attrition and transfer.
- The importance of student scheduling to maximize effective use of human resources.

There are no one-size-fits-all solutions to address staffing concerns in schools. It takes an educational leader who is knowledgeable about policy, prepared, able to effectively solve problems and willing to do the difficult work to ensure students are taught by the very best version of the very best teacher each day.

APPENDIX A

Instructional Add-Ons

Pennsylvania educators who hold any Instructional or Intern certificate may add instructional content areas by testing alone with no additional coursework required. A PA instructional educator must take and pass the content area test for any **acceptable subject areas** to obtain additional certification areas.

Educators must achieve the **passing** score listed on the Certification Test and Score Requirements chart. You may **NOT** use the GPA score options for testing add-ons.

After you have passed the appropriate content area test and confirmed it has been received by PDE under View My Test Scores on File from your TIMS dashboard, **you must submit an application for the new subject area**. Applications must be submitted through the Teacher Information Management System (TIMS).

The following excluded areas require the completion of a state approved certification program including testing:

- American Sign Language
- Cooperative Education
- Health and Physical Education
- Reading Specialist
- all Special Education areas

Educators who currently hold the Grades PK-4 certificate can add-on Grades 5-6 based on testing alone. This policy does not pertain to any subject area except Grades PK-4. Per Act 82, current PA Special Education PK-8 or Special Education 7-12 educators can add the opposite special education grade scope expansion by obtaining a passing score (no GPA option) on the opposite grade scope special education test. This testing option is available ONLY to PA educators who already hold either the Special Education PK-8 or Special Education 7-12 certificate. This testing option does not require that the educator hold a content area certificate in the corresponding grade span. Educators will apply for the **special education expansion** certificate when applying in TIMS. ("Instructional Add-Ons", n.d.).

APPENDIX B

Certification Staffing Policy Guidelines (CSPG) #13

Vacant Position with an Educational Obligation to Pursue Certification (Type 01)

A Type 01 permit is requested for a position that will exceed 20 consecutive days in a single assignment when the LEA anticipates future employment for the position. Following are examples of qualifying vacancies:

- New Position
- Resignation
- Termination
- Retirement
- Death

Initial Application Requirements:

The educator agrees to enroll in a state-approved teacher certification program in the subject area(s) of the requested permit and complete the required number of credits as outlined below.

Reissuance Requirements:

- Reissuance may be requested if the educator provides evidence of enrollment in a state-approved teacher preparation program and has completed the required credits in the program.
    - First reissuance credit requirements are based on the date of the initial emergency permit issuance following the chart below:
        - August 1 – November 30 = 6 program credits;
        - December 1 – March 31 = 3 program credits;
        - April 1 – July 31 = proof of program enrollment.
    - Second reissuance and all subsequent reissuances may be requested with proof of nine certification program credits.

A permit may be reissued one time after the program is completed for testing purposes IF the test(s) has been attempted in the previous year. The LEA must alert PDE that the permit is being requested based on testing. ("CSPG 13 - Emergency Permits", n.d.).

APPENDIX C

General Policies

The Act 97 Waiver of Certification (Type 02 Emergency Permit) may be requested by a public school for an individual facing furlough, or who has already been furloughed or demoted by that entity.

- The permit lets the individual work in areas that they are not certified for one calendar year from the date of issuance.
- Posting is not required.

Submission Process

1. The educator uses the "Initiate Permit Request" feature to apply in TIMS.
2. When the LEA completes, reviews and submits the application to PDE, they affirm (by submission) that request complies with all requirements:
    - The employee agreed to accept the position,
    - The LEA verified that the employee completed a minimum of 12 semester credit hours in the area for which the waiver is requested,
    - The employee agrees to complete an approved teacher preparation program to meet the requirements for certification in the new subject area(s), and
    - The time needed for the employee to complete the approved teacher preparation program, pass required tests and become certified is agreeable to the LEA.

Special Considerations

1. The Bureau can issue a Type 01 emergency permit at the school entity's request if the employee:
    - Is needed for subsequent years, and
    - Met the educational obligation inherent to the waiver agreement.
2. Failure to pursue certification shall result in the revocation of the waiver.
3. A waiver will not be granted if an educator would be used as a replacement for another furloughed employee. ("CSPG 14 - Act 97 Waiver for Certification", n.d.).

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ABOUT THE AUTHORS

Dr. Daniel Roesch is an Associate Professor in the Department of Teaching and Learning at Bloomsburg University. Daniel teaches courses in educational leadership and teacher preparation. Daniel also serves as the STEM program coordinator for the Bloomsburg University College of Education. Prior to coming to Bloomsburg Daniel taught physics and chemistry at the high school level and served for 14 years as a school building administrator.

Dr. Amanda Stutzman is an instructor in the Department of Teaching and Learning at Bloomsburg University. She teaches various courses to pre-service teacher candidates and has supervised student teachers, administrator internship candidates, and continues to help districts find highly qualified educators for hard to staff vacancies.

SUBSTITUTE SHORTAGE:

Leveraging Partnerships Between Educational Entities to Create the Best Possible Solution

AUTHORS:

Dr. Molly Hupcey Marnella
Associate Professor
Bloomsburg University of Pennsylvania
mmarnell@bloomu.edu

Dr. Amanda Stutzman
Instructor
Bloomsburg University of Pennsylvania
astutzman@bloomu.edu

Dr. Elizabeth Mauch
President
Bethany College
president@bethanylb.edu

In Pennsylvania, there has been a precipitous drop in the number of individuals seeking teacher certification. There were approximately 16,000 applying for teaching certification in the Commonwealth in 2015, and later the number of applicants decreased to 6,000. This shortage has had a widespread impact beyond the hiring of public-school teachers for full-time permanent jobs. It has also impacted the number of substitute teachers available to cover for in-service teachers in order to train teachers, hold in-school meetings or fill in for unexpected teacher absences. This shortage is costly and stressful for school district administrators who are scrambling to cover classes (Gonzales, 2017). In order to alleviate the shortage, the Commonwealth of Pennsylvania amended Act 86 of the Public School Code to include, in part, a provision for school districts to issue Substitute Teaching Permits for prospective teachers, as long as the prospective teacher meets the following requirements:

The prospective teacher must

- "be currently enrolled in a teacher preparation program in a college or university located in this Commonwealth and accredited by a regional accrediting agency" ...
- Have ... "completed at least sixty (60) semester hours of the equivalent of courses at a college or university located in this (Pennsylvania) Commonwealth" ...
- Have ... "met the requirements" relating to powers and duties of department (set forth in sections 111,111.1 and 1109(a) and 23 Pa.C.S.Ch.63 Subch C.)

The chief school administrator of a school district, an area vocational-technical school or an intermediate unit may issue a Substitute Teaching Permit to those prospective teachers meeting the requirements. This permit allows the prospective uncertificated teacher to substitute for up to 20 days, with no more than 10 of those days being for a single professional or temporary employee (Public School Code, 2016, p. 8).

As this new legislation has taken effect, challenges to its implementation have surfaced making it difficult, in practice, to utilize. These challenges fall into three categories: challenges in scheduling current education majors to substitute teach, challenges in readiness of education majors to enter the classroom, and challenges of the environment in which they will enter.

First, there are a number of scheduling challenges that arise. Unlike traditional substitute teachers, education majors can substitute teach only 20 days per school year. During the academic year, education majors are attending college classes. Having availability to fit school districts' needs may prove difficult. All

substitute teachers, including education majors, also need to have school board approval. School board meetings only occur once or twice a month, and the timing may be a hindrance for education majors having less than flexible schedules. Due to the scheduling conflicts, even the most eager education student willing to get into the classroom prior to his/her student teaching may not have that opportunity.

A second challenge is in readiness. Education majors are required to obtain 60 credits prior to being eligible to substitute teach. They have not yet had all of the necessary pedagogical coursework to be at maximum efficiency. While these prospective teachers will ultimately be taught the skills they will need to be successful, they have not had the coursework to develop all of those skills at the time they become eligible to substitute teach. This can prove to be an impediment to K-12 student learning. Pardini (2000 p. 27) states that, "by the time students complete their K-12 education, research shows they will have spent an average of one school year, or 8 percent of their schooling, with substitute teachers." Hence, it is of utmost importance to ensure that education majors who enter the classroom have additional opportunities for professional development.

Finally, it is paramount that the prospective student who are assisting the school district have a positive experience. According to Rawson (1981), substitute teachers are viewed as second-class teachers by regular classroom teachers and administrators. While one of the goals of this legislation is not to increase the number of people seeking certification, school districts need to be mindful that this experience should be one that encourages education majors to persist in obtaining their teaching certificate.

Collaboration between school districts, intermediate units and universities can maximize the impact of the recent legislation. In Central Pennsylvania, the decrease in certified teachers continues to leave school district administrators scrambling to fulfill the ongoing need for substitutes. A major university that is a supplier of certified teachers for the region has seen nearly a 25% decrease in graduates in five years, with just 184 Bachelor of Science degrees awarded from the College of Education in 2017 compared to the 239 awarded in 2012. (Completion Totals, Bloomsburg University College of Education).

After Act 86 was amended in the fall of 2016, a partnership amongst the university, Central Susquehanna Intermediate Unit, and a local school district was formed to create a two-fold solution to the substitute teacher shortage. The university requires education majors to participate in a Field Experience Stage 3 – Pre-Student Teaching (the student works under a certified teacher and works with small groups of students) (The Framework for K-12 Program Guidelines, Pennsylvania Department of Education) and will now offer flexibility in the scheduling of the field experience during the academic year to provide

opportunities for education majors to substitute in the school district while they are completing their field experience. A priority will be given to ensure a day of the required practicum is free of class requirements for the education majors. School districts will benefit by having substitute coverage, with as many as 15-20 education majors available from the university. By having this coverage, school districts could plan professional development time.

Under the legislation, education majors are only required to have 60 credits in order to substitute teach. Research on best substitute teaching practices can assist in modifying those requirements for prospective teachers. Successful substitute teachers need to understand the policies and procedures of the district in which they are substituting, to be trained in "assessment, engagement, technology," and to understand basic classroom management techniques (Gonzales, 2017, p. 16). In addition, Lamarque (2005) found when providing substitute training workshops, the district gained better prepared and dependable substitutes. Students received more than just a caretaker for the day, and the level of respect for substitute teachers increased throughout the school community. When a trained substitute enters a classroom, already having experiences in the school community, a student's education continues seamlessly. No longer would students lose out on valued instructional minutes.

Recognizing the need for education students to be successful as a substitute teacher, prior to their student teaching, the university requires all of the education majors who are in the practicum to complete an additional training program. The goal of this training is to specifically instill the necessary dispositions and skills needed to be successful as a substitute teacher. Currently the regional intermediate unit in Central Pennsylvania, Central Susquehanna Intermediate Unit, offers all potential substitutes that do not hold a teaching certificate a training program. The training program was extended to include the region's education majors.

The training is divided into three components: professionalism, legal considerations, and practical considerations for classroom interactions. The training on professionalism includes an overview of the Pennsylvania Code of Conduct, tips on communication with the various constituencies, and caveats on the use of technology. The training on legal issues includes an overview of responsibilities of teachers in classrooms, specific laws in Pennsylvania that teachers must know and follow, information on how to obtain required clearances, and instructions for documentation of incidents. The daily classroom guide includes suggested strategies for building rapport and trust with students, creating a classroom management plan which includes an understanding of why problem behaviors may be occurring, and plans for how to set up a

successful learning environment in any situation. Additionally, education majors spend time observing classrooms within local school districts' classrooms. After the observation time, the prospective substitutes are brought back together to discuss best practices observed in the classrooms. Upon successful completion of the training, the prospective teacher's name is provided to the school board for recommendation as a substitute teacher.

As universities see a decrease in the number of certified teacher candidates and school districts continue to scramble to fill day-to-day substitute teacher needs, new Pennsylvania legislation has offered an opportunity for permitting education majors to teach in the classroom sooner. By offering scheduling solutions, providing additional preparation, and creating valuable relationships prior to student teaching, education majors will be able to easily benefit from the provisions in Act 86. The positive impact of providing Substitute Teaching Permits for education majors to enter into the classroom sooner, will be recognized from school districts, intermediate units, post-secondary institutions, and most especially the students sitting in classrooms.

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ABOUT THE AUTHORS

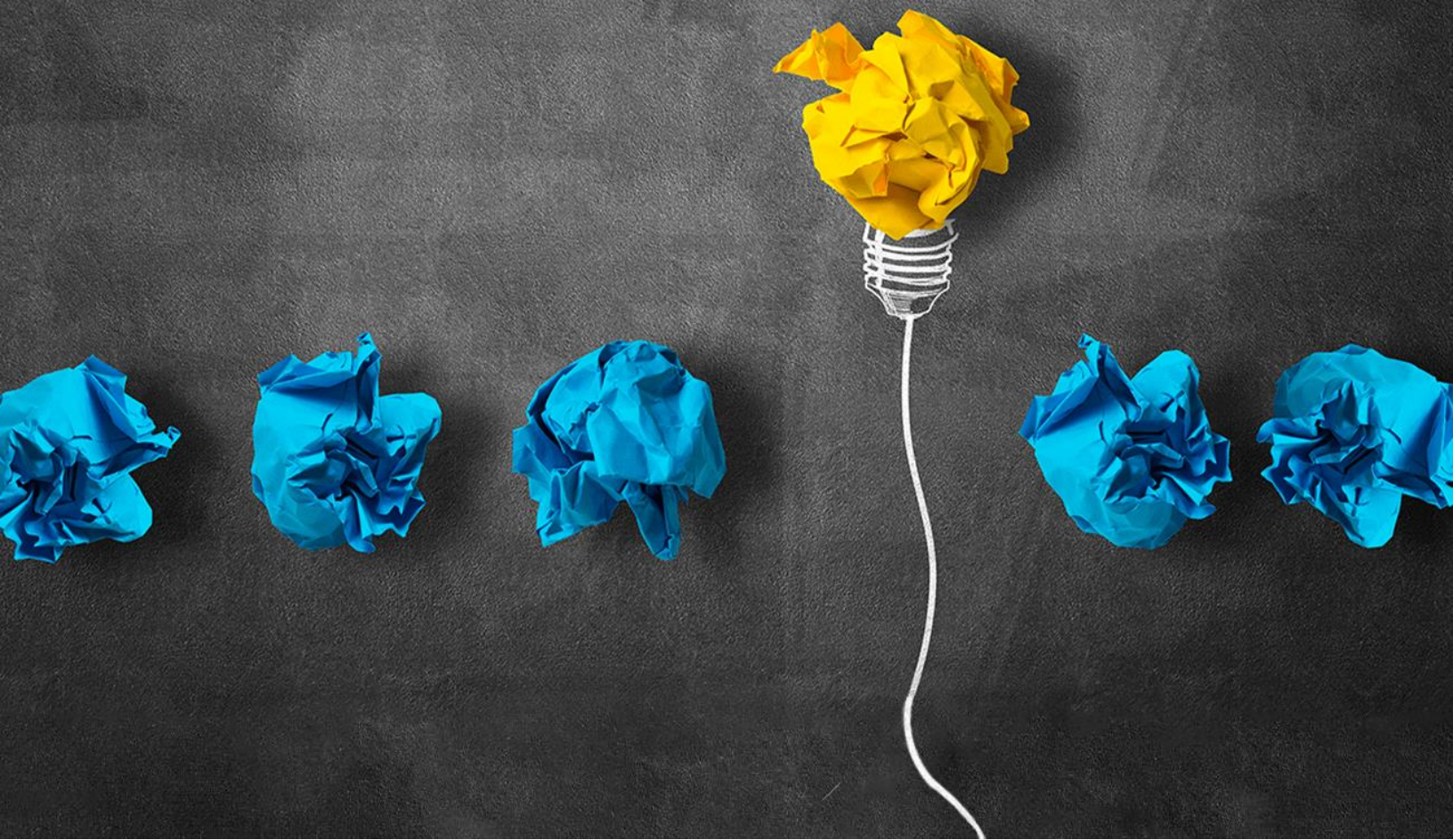
Dr. Molly Marnella is a faculty member in the Department of Teaching and Learning. As a previous chair, she worked with school districts in the area about practicums, student teaching, and the discussion about substitute teaching.

Dr. Amanda Stutzman is an instructor in the Department of Teaching and Learning at Bloomsburg University. She has supervised student teachers, principal and district administrator interns, and has taught courses ranging from introductory classes and math methods to graduate level classes.

Dr. Elizabeth Mauch is the President of Bethany College where she continues to develop partnerships similar to the one described in this paper. In her role as Dean of the College of Education at Bloomsburg University, she worked with school districts on various topics, especially the discussion about a need for substitute teachers.

MISSION-DRIVEN LEADERSHIP

AMY M. EITZEN, Ed.D
Bloomsburg University
amy.eitzen@gmail.com



Christopher Colwell is an educational leader to follow. In the introduction to Dr. Colwell's book, *Mission-Driven Leadership: Understanding the Challenges Facing Schools Today* (2018), District Superintendent Tom Russell calls Colwell "the man, the myth, the legend". That is a common sentiment among educators in Central Florida, where Dr. Colwell has worked for forty years, many in varied levels of educational leadership. I have participated in a multi-faceted project under Dr. Colwell's leadership. Important work was accomplished in a collegial culture, sometimes in the face of obstacles that seemed insurmountable. Dr. Colwell led with a serene transcendence, which allowed multiple stakeholders to engage in meaningful work together. When I learned that Dr. Colwell had published a new book on school leadership, I, as a fledgling leader in teacher preparation, considered it a must-read. Although *Mission-Driven Leadership* was conceived primarily for an audience within K-12 leadership, it soon became apparent to me that many of the included insights are relevant to leadership in higher education as well.

In *Mission-Driven Leadership*, Dr. Colwell presents, in 150 reader-friendly pages, 40 years of impactful experience and research with critical aspects of educational leadership. He has delineated three tiers of leadership that an impactful leader must master:

- Tier 1 - the leader as manager (management power, the management of the operation);
- Tier 2 - the leader as instructional expert (expert power, the instructional leader of the school or district); and
- Tier 3 - the leader as interpersonal expert (interpersonal expert power, mission leadership).

Though Tier 1 management is defined as the organizational foundation on which all work is built, Colwell urges leaders to endeavor to spend fifty percent of their time on Tiers 2 and 3 (instructional and mission-driven leadership) endeavors, which is where he asserts that high-impact leadership lives. Colwell focuses on the crucial nature of Tier 3, which in spite of its importance, is often sacrificed at the altar of the busyness and perceived urgency of Tier 1 functions. The Tier 3 leader infuses mission meaning into the work, thus motivating faculty and staff to more intrinsically value their charges. Much of the text relates to power within educational leadership. However, in true Colwell style, leaders are challenged to "lead up" and "trust down" within the organization, thereby empowering others to continue to grow, improve and learn. The concept of "leading up" and "trusting down" were new to this reader, but it is obvious upon contemplation that on strong teams, each individual learns from another, regardless of title and stature. Colwell writes "Leadership capacity grows when the number of "leaders" in the room grows (p. 25)"; that is, a mission-driven

leader knows and builds the expertise of the team, and empowers team members who are also engaged in the mission, not just through the delegation of tasks, but through the inclusion in meaningful work.

Colwell challenges the leader to examine the true quantity of time encumbered by Tier 1 tasks and then guides the reader to intentionally and consciously increase time spent on the more impactful Tier 3 work. A particularly useful aspect of *Mission-Driven Leadership* is that Colwell provides practical roadmaps to accomplish the work that he describes as critical. Most chapters close with segments entitled "Today is a good day to…", which present suggestions for how to move forward into Tier 3 leadership, to work with resistant faculty, build relationships, and task teams with important work. The "Today is a good day to…" segments contain specific action-oriented verbs such as assess, initiate, share, start, reprioritize, review, and influence, and the recommendations can be implemented fairly straightforwardly. The included suggestions can enable both novice and experienced leaders to improve their daily focus on mission-led leadership and build strong, impactful relationships with the people around them. Colwell encourages the leader to develop "to learn" lists in addition to "to do" lists, which highlights the importance of the continued learning of the leader. At the same time, Colwell comprehensively moves theory to practice as he describes leadership strategies such as how to "dance with the dancers", including those who do not want to dance.

Colwell correctly describes today's educational context as one that is volatile, uncertain, complex, and ambiguous (Bennett & Lemoine, 2014). This is true on many levels, including funding, faculty, leadership and policy that may change on the whim of newly appointed or elected officials at the local, state, and national level. Against this complex backdrop, superintendents, principals, and deans endeavor to meet the needs of all members of the school community, especially the students whose futures have been entrusted to educational leaders. Colwell defines the leader as a "builder of teams" (p. 25), and asserts that, "It is the mission that motivates" (p.2). The impactful Tier 3 leader builds teams and motivates them through the mission. *Mission-Driven Leadership: Understanding the Challenges Facing Schools Today* inculcates educational leaders with strategies that will enable them to build and motivate impactful, successful teams, and that should be the mission of all leaders.

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ABOUT THE AUTHOR

Dr. Amy Eitzen is the Associate Dean of the College of Education at Bloomsburg University of Pennsylvania. She holds a doctorate in Higher Education Administration from the University of Florida.

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Pennsylvania Educational Leadership (PEL) is an open-access, peer-reviewed journal published twice per year and accepts manuscripts 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. Beginning spring 2014, the journal began including a Practitioner's 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.

Manuscripts should be emailed to Co-editor Kathleen Provinzano (*Drexel University*) at ktp37@drexel.edu. The co-editors (Kathleen Provinzano and Mary Wolf (*California University of Pennsylvania*) initially review all submissions. Submissions evaluated as appropriate for review are then sent to three readers for blind review. Manuscripts should follow the guidelines set forth by the American Psychological Association.

Before submitting a manuscript to PEL, please consider the following guidelines carefully:

- Your manuscript should be submitted as a single Word document and include a cover sheet, abstract, body/text, tables, charts, and figures (if applicable), and references list. If possible, please include the Digital Object Identifiers (DOI) for all electronic sources. The manuscript should 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 APA guidelines. Please include the DOI for electronic sources.
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