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PEDAGOGY

Significance of High-Quality Physical Education Teachers

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Abstract

This study investigated the extent to which public school K–12 staff in the United States teaching physical education were certified in physical education and had an academic major in physical education during the 2015–2016 school year. Data were collected from a nationally representative sample of public school teachers in the United States. Descriptive statistics were used in the description of physical education teachers' certification and academic major. These characteristics were investigated with regard to school grade level, census region, urbanicity, and newly hired. Results showed that over 30% of public high school physical education teachers did not have an undergraduate or graduate degree in physical education. Nearly 20% of physical education teachers were not certified in physical education. Furthermore, less than 70% of physical education teachers had both characteristics of a qualified teacher. Results from this study show the need for an increase in the percentage of high-quality physical education teachers who have both teaching certification and an academic major in physical education, which would positively impact public health in the United States.

The impact of high-quality teachers on student success has been an area of interest to educational researchers and policy makers. There are several characteristics of quality teachers, often referred to as qualified teachers, that have been identified in the literature.

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For example, teachers of high quality demonstrate knowledge and skills that have allowed them to obtain an undergraduate or graduate degree from a higher education institution. In addition, these teachers have also obtained teacher certification (also called licensure or endorsement) from the certification agent in their state (Darling-Hammond, 2006; Elfers et al., 2004; Ingersoll, 2002; Napper-Owen et al., 2008; National Association for Sport and Physical Education [NASPE], 2007; Stronge, 2018; U.S. Department of Education, 2015).

Specific to quality physical education teachers, You (2011) indicated that certified physical education teachers have physical education pedagogical content knowledge in six domains including curricular knowledge, understanding of instructional methods, knowledge of how students learn physical education, understanding assessments, knowledge of instructional environments, and knowledge of physical education content. In addition, Napper-Owen et al. (2008) described four dimensions of a highly qualified physical educator. First, highly qualified physical educators have good pedagogical knowledge that includes management, lesson planning, assessment, and technology. Second, they possess content knowledge that is accurate as well as current. Third, they have had extensive preparation that has included a variety of field-based experiences. Finally, they have professional dispositions that allow them to develop "a trusting and respectful rapport with students" (p. 27).

Professional preparation is another area that contributes to the development of qualified physical education teachers. The Centers for Disease Control and Prevention (CDC, 2014) summarized, physical education teacher education programs provide teacher candidates with the ability to manage course content; to motivate students; and to help students obtain the knowledge, skills, and confidence needed to develop lifelong physical activity practices (NASPE, 2007; SHAPE America, 2017).

Professional preparation in physical education ensures that teachers will develop content area knowledge, pedagogical knowledge (i.e., classroom management), and pedagogical content knowledge (i.e., teaching specific topics) that is specific to teaching physical education. Research results have supported the importance of this professional knowledge and its influence on student learning. Childs and McNicholl (2007) reported that the level of subject area

knowledge influenced pedagogical practice and effectiveness of a lesson. Similarly, Wenglinsky (2002) indicated that teacher academic major and pedagogical knowledge (i.e., professional development in higher order thinking skills) was positively associated with student achievement. In addition, results from a study by Yeh and Santagata (2015) conveyed that teaching effectiveness required a combination of content knowledge and pedagogical content knowledge (i.e., ability to analyze student thinking).

Research results have indicated that teacher qualifications such as having a bachelor's or master's degree and teacher certification in the area they are teaching positively impacts student academic success (Childs & McNicholl, 2007; Darling-Hammond, 2000; Darling-Hammond et al., 2005; Goldhaber & Brewer, 2000; Laczko-Kerr & Berliner, 2002; Stronge, 2018; Yeh & Santagata, 2015). With regard to teacher certification, Darling-Hammond et al. (2005) found that uncertified teachers generally had negative effects on student achievement in comparison to certified teachers who completed traditional teacher certification programs. Feng and Sass (2013) reported similar findings. They reported lower student achievement among students who were taught by teachers with out-of-subject certification; however, they reported greater student achievement among students who were taught by teachers who were certified in the area they were teaching. Moreover, these results were consistent with other research findings that subject-specific teacher certification positively influenced student achievement (Andersson et al., 2011; Clotfelter et al., 2007; Darling-Hammond, 2000; Wayne & Youngs, 2003).

Finally, the CDC (2014) provided a summary of research results that emphasized the importance of teacher knowledge and subject-specific teacher certification. The CDC (2014) summarized, "Certified physical education teachers instruct longer lessons, spend more time developing motor and movement skills, impart more knowledge, and provide more moderate and vigorous physical activity to students relative to classroom teachers with little or nonspecialized physical education training" (p. 3). In summary, teachers who have the content knowledge, are knowledgeable about how students learn, and can implement principles of content-specific instruction are more likely to have a positive impact on student learning.

While there is robust evidence regarding the connection between teacher qualifications and effective teaching, questions still remain regarding physical education teacher qualifications. Specifically, how common is it in the United States for a physical education teacher to be certified and have an academic major in physical education? It is vital to answer this question because of the importance of content knowledge and pedagogical content knowledge related to physical education teacher effectiveness, which serves as a cornerstone for quality physical education programs (CDC, 2015; SHAPE America, 2016).

Therefore, the purpose of this study was to determine if physical education teachers had either characteristic of high-quality teachers, by investigating if they were certified, licensed, or endorsed to teach physical education and if they had an academic major in physical education during the 2015–2016 school year. In addition, we investigated these characteristics of quality teachers with regard to the categories of school grade level, census region, urbanicity, and newly hired. We also investigated the extent to which public school K–12 staff in the United States teaching physical education had both certification, licensure, or endorsement and an academic major in physical education during the 2015–2016 school year.

Method

Participants

Data for this study were derived from the National Center for Education Statistics (NCES) 2015–2016 National Teacher and Principal Survey (NTPS). This study is a secondary analysis of a large national survey of K–12 public schools[1], principals, and teachers performed by the U.S. Department of Education (Goldring et al., 2017). For the purpose of this analysis, "teachers" were defined as staff members in United States public schools who teach regularly scheduled classes to students from public schools within the 50 states and the District of Columbia, not including territories (N = 31,950). Teachers were selected for inclusion in this analysis on the basis of their teaching at least one class of physical education during the 2015–2016 school year; therefore, a total sample size of 1,540 public school physical education teachers was used for analysis.

[1] Public schools include traditional public and charter schools

Instrumentation

The NTPS was redesigned from the Schools and Staffing Survey (SASS), which was a comprehensive national survey conducted by the NCES (n.d.). The NTPS was administered as a large nationally representative sample survey of traditional public and public charter school teachers. The teacher survey contained items related to preservice education, certification, classroom organization, beliefs and attitudes, working conditions, and professional development (NCES, 2015).

Sampling Procedure

The NCES was the primary federal entity responsible for collecting and reporting NTPS data. Details regarding NTPS data collection and reporting were provided by Goldring et al. (2017) and are briefly described in the next sections as they pertain to this study. The initial sample frame of the 2015–2016 NTPS data collection consisted of 87,600 entities identified as traditional public schools and 6,500 entities identified as public charter schools operating in 2015.

As Goldring et al. (2017) described, the NTPS used a complex sampling design to systematically oversample certain identified units based on urbanicity (city, suburban, town, and rural), grade span (primary, middle, high, and K–12 combined), type of public school (traditional and charter), and poverty status (more or less than 75% of students receiving free and reduced lunch). The NCES used a probability to size sampling algorithm wherein full-time equivalent teachers for each school was the measure for size. After application of the algorithm, 7,100 traditional public schools and 1,200 public charter schools were sampled with this method and the initial sample of buildings created. Within each building, a roster of teachers was obtained and individual teachers were sampled from the roster, stratified by subject taught and with equal probability within the subject area strata. Schools in Alaska, District of Columbia, Hawaii, Rhode Island, Vermont, and Wyoming were oversampled to compensate for the small number of schools in these states (Taie & Goldring, 2017). Greater details regarding the estimation domains are provided in the document titled *Survey Documentation for the 2015–16 National Teacher and Principal Survey* (Cox et al., n.d.). In the end, a maximum of 20 teachers per building were sampled for

a total of 43,700 traditional public school teachers and 5,300 public charter school teachers (Goldring et al., 2017).

Data were collected utilizing United States mail and the internet to administer the Teacher Questionnaire (NCES, 2015). Schools that were flagged as having a higher nonresponse rate based on characteristics of schools that were nonresponders to prior SASS questionnaires were given "priority" status. These priority schools were given more proactive attention to avoid nonresponse bias. Even so, city schools and those with enrollments over 1,000 had response rates of approximately 65%. To address low response rates in city schools, the NCES undertook post hoc analysis and applied weighting variables to correct for unit nonresponse for some survey strata (Goldring et al., 2017).

Of interest to this study, NTPS data were collected related to state teacher certification and degree completion. These were coded into categorical variables including major field of study for the bachelor's degree, master's degree, second bachelor's degree, and additional degrees beyond the master's degree. Data were also collected related to teachers' subject-area certifications, licensures, or endorsements. Respondents reported the content area of their teaching certificates. In addition, various categories were included in the data analysis, such as grade level, census region, urbanicity, and newly hired. Geverdt (2015) explained boundaries for each category and these are described in the following paragraphs.

The grade level categories were based on grade levels provided by the school, which resulted in four categories: (a) primary, (b) middle, (c) high, and (d) K–12 combined. Primary schools had at least one grade lower than fifth and no grade higher than eighth. Middle schools had no grade lower than fifth and no grade higher than eighth. High schools had no grade lower than seventh and at least one grade higher than eighth. Finally, K–12 combined schools had at least one grade lower than seventh and at least one grade higher than eighth. Schools with only ungraded classes (i.e., students were not organized into grade levels) were included with combined schools (Geverdt, 2015).

In addition to the grade level categories, data were also examined in relation to regions of the United States where high-quality physical educators reside. This census region variable was coded as Northeast

(Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont); Midwest (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin); South (Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia); and West (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming; Geverdt, 2015).

Another variable that was investigated regarding high-quality physical education teachers was urbanicity. Urbanicity was derived utilizing the 2013–2014 NCES Common Core of Data Elementary/Secondary Locale Code. This variable represents a collapsed 12-level urbanicity code that includes the categories of (a) city, (b) suburb, (c) town, and (d) rural. A city was defined as a territory inside an urbanized area and inside a principal city. A suburb included territories outside a principal city but inside an urban area. Towns were characterized as areas that were inside an urban cluster but outside of the urbanized area. Rural areas were defined by the census as a territory outside an urbanized area and a territory away from an urban cluster (Geverdt, 2015).

The final variable that was investigated was newly hired teachers who had characteristics of high-quality teachers. For this study, newly hired teachers indicated they began teaching at any point during the 2011–2012 school year through the 2015–2016 school year (NCES, 2015).

Data Analysis

Data were analyzed using statistical weights to account for nonresponse bias due to the stratified sample design. In addition, the weighted measures were also used to approximate the national population of teachers (N = 31,950) at the time of the survey within a known error band. The final weighted sample of the public school teachers in the United States was 3,827,076. These weighted samples were nationally representative of public school teachers and generalizable to the nation with a measurable chance of making a type I error. Data were further analyzed utilizing the weighted measures to

create an approximate national population of staff teaching physical education (n = 1,540) with a final weighted sample of 174,856.

Data were also analyzed using the jackknife methodology. This procedure developed a series of 200 individual replicate weights, which allowed the standard errors calculated to reflect those that would be observed in the larger population of teachers (Goldring et al., 2017). Finally, Stata version 15 statistical software was used to produce the corrected frequencies presented in this study.

Results

Overall among staff who were teaching at least one physical education class during the 2015–2016 school year (n = 174,856), approximately 61% were male. The percentage of physical education teachers who identified as White was nearly 83%.

Concerning research questions investigating specific characteristics of qualified teachers related to teacher certification and academic major, Table 1 shows that approximately 82% of K–12 staff in the United States teaching physical education were certified, licensed, or endorsed to teach physical education and close to 25% did not have an academic major in physical education. Among school grade levels, physical education teachers at the high school level had the lowest percentage of staff (79.8%) who were certified in physical education. Furthermore, at the high school level, respondents were least likely have an academic major (67.8%) in physical education.

Regional locations throughout the United States showed differences in the percentage of physical education teachers who were certified. Close to 90% of physical education teachers in the Northeast and Midwest regions reported they were certified in physical education as compared to just three quarters of physical education teachers in the South and West regions of the United States. Similar trends among regions were found with regard to respondents majoring in physical education. Approximately 67% of physical education teachers from the South and West regions of the United States had an academic major in physical education as compared to over 80% in the Midwest and Northeast.

Regarding urbanicity, city and rural locations showed the least qualified physical education teachers as measured by certification status and academic major as compared to towns and suburbs. Approximately 20% of staff teaching physical education in city and

Table 1
Percentage of Physical Education Staff (weighted n = 174,856) With Teaching Certification and Academic Major in Physical Education: NTPS 2015–2016

	Certified in PE		Academic major in PE	
School category	**%**	**95% CI**	**%**	**95% CI**
School grade level				
Elementary	84.8	[80.2, 88.5]	79.0	[74.0, 83.2]
Middle	83.9	[79.0, 87.8]	75.7	[70.6, 80.1]
High	79.8	[75.0, 83.0]	67.8	[62.6, 72.6]
K–12 combined	81.3	[76.7, 85.1]	74.5	[69.7, 78.8]
All schools	82.2	[79.9, 84.2]	73.6	[71.1, 76.0]
Census region				
Midwest	89.6	[86.0, 92.3]	83.1	[79.0, 86.5]
Northeast	92.5	[87.3, 95.7]	87.4	[81.8, 91.5]
South	77.7	[73.9, 81.2]	66.9	[62.7, 70.8]
West	75.7	[70.4, 80.3]	66.9	[61.2, 72.1]
Urbanicity				
City	79.3	[74.6, 83.4]	71.3	[66.1, 76.1]
Rural	80.8	[76.6, 84.4]	72.5	[68.0, 76.5]
Suburb	83.7	[79.8, 87.0]	76.2	[71.5, 80.3]
Town	85.7	[80.5, 89.7]	72.9	[67.1, 78.0]
Newly hired				
2011–2012 through 2015–2016	80.2	[74.3, 85.0]	69.8	[63.5, 75.4]

Note. Design adjusted 95% confidence interval for population estimate boundaries (upper, lower).

rural areas were not certified in physical education as compared to about 15% in suburbs and towns. Likewise, roughly 5% less of physical education teachers working in cities reported having a major in physical education as compared to physical education staff in suburbs.

The School Health Policies and Practices Study (SHPPS; CDC, 2017) indicated that 78.2% of districts adopted staffing policies that newly hired elementary physical education staff should be certified to teach physical education. In addition, 86.0% of school districts adopted the same policy for newly hired middle school physical education teachers, and 89.6% of the school districts adopted the policy that newly hired high school physical education teachers would be certified to teach physical education. Results from this study show that close to 80% of all newly hired physical education teachers were certified in physical education.

Moreover, the SHPPS (CDC, 2017) reported many districts adopted policies regarding academic training for newly hired teachers. The SHPPS results showed that school districts reported having policies stating newly hired elementary (70.6%), middle, (74.2%), and high (81%) school physical education staff should have undergraduate or graduate training in physical education or a related field. Results from this study indicate that approximately 70% of all newly hired physical education teachers had an academic major in physical education. In general, results from this study suggest a disconnect between the SHPPS (CDC, 2017) physical education staffing policy report and the NTPS 2015–2016 responses with respect to qualifications of newly hired physical education teachers in terms of certification status and academic major in physical education.

Table 2 displays results regarding the number of public school K–12 staff in the United States teaching physical education who were high-quality teachers. High-quality teachers were defined as having both certification, licensure, or endorsement in physical education and an academic major in physical education (Darling-Hammond, 2006; Elfers et al., 2004; Ingersoll, 2002; Napper-Owen et al., 2008; NASPE, 2007; Stronge, 2018; U.S. Department of Education, 2015; You, 2011). Results from this study revealed that over 30% of physical education staff were not high-quality teachers who possessed both subject-specific teaching certification and an undergraduate or a graduate degree in physical education. Moreover, over 13% of physical educations teachers in U.S. public schools during the 2015–2016 school year had neither a degree nor certification in physical education.

Table 2
Percentage of Physical Education Staff (Weighted n = 174,856) With Both Teaching Certification [a] and an Academic Major [b] in Physical Education: NTPS 2015–2016

Certification in PE	Academic major in PE	%
Yes	Yes	68.9
Yes	No	4.7
No	Yes	13.3
No	No	13.1
Total		100.0

[a] Certification includes state teaching certificate, licensure, and endorsement.
[b] Academic major includes graduate and undergraduate degrees.

Discussion

The NTPS 2016–2017 survey was conducted by NCES, the primary federal entity for collecting and analyzing data related to education in the United States (NCES, n.d.). For this study, we analyzed NTPS 2016–2017 data. These data provided the most current estimates regarding certification and academic major among teachers and we used these data to determine if physical education teachers in the United States have characteristics of high-quality or qualified teachers (Darling-Hammond, 2006; Elfers et al., 2004; Ingersoll, 2002; Napper-Owen et al., 2008; NASPE, 2007; Stronge, 2018; U.S. Department of Education, 2015; You, 2011). Specifically, all teachers in the NTPS 2016–2017 sample population reported subjects they taught during each class period, their areas of teacher certifications, and academic majors.

Findings from this study indicate that during the 2015–2016 school year, 82% of public school staff teaching physical education were certified in physical education; however, just 74% of physical education teachers reported having an academic major in physical education. Therefore, findings suggest that certification requirements, which are determined at the state level, may not include all elements of a high-quality teacher such as an academic major in physical education. This is contrary to recommendations by NASPE (2007) that highly qualified physical education teachers are certified

to teach and have completed an accredited physical education teacher education program. Other notable documents that support this recommendation include the Physical Education Curriculum Analysis Tool (CDC, 2015); *Shape of the Nation* report (SHAPE America, 2016); and the Whole School, Whole Community, Whole Child model (CDC, 2018).

Research has provided additional support for the recommendation that physical education teachers should be certified to teach and have completed an accredited physical education teacher education program. For example, Napper-Owen et al. (2008) indicated that having an academic major in the area of certification enhances a teacher's subject-specific content knowledge. They also emphasized that the special demands of physical education require a preparation program with both specific pedagogical knowledge and deep content knowledge of physical education. To ensure that K–12 students have quality physical education teachers, state departments of education should consider certification requirements that include an academic major in physical education.

The need for an academic major in physical education was greatest for high school physical education teachers. Results from this study revealed that nearly 30% of high school physical education teachers did not have an undergraduate or graduate degree in physical education, which is one characteristic of a qualified teacher. Additionally, high school physical education teachers were the least likely to be certified in physical education as compared to physical education teachers in elementary, middle, and K–12 combined schools.

States with the lowest percentage of physical education teachers with an academic major in physical education were located in the South and West. These two regions of the United States also employed fewer physical education teachers who were certified to teach physical education. Findings from this study suggest that efforts to increase the number of physical education teachers who are certified to teach physical education and have an academic major in physical education should target states located in the South and West regions of the United States.

Another priority for targeted efforts to ensure K–12 students in the United States have high-quality physical education teachers

is to focus on teachers working in schools located in cities and rural areas. Results from this study indicated that physical education teachers employed in cities and rural communities were least likely to be certified in physical education. This finding has ramifications for school districts regarding compliance with the Every Student Succeeds Act (ESSA, 2016). ESSA (2016) legislation requires that states with Title I schools must meet the certification requirements set by the state. In fact, ESSA legislation has indicated state certification in the subject area being taught is a characteristic of an effective teacher, which is problematic for districts that have a high percentage of staff teaching physical education who do not hold a teaching certification in physical education. Another issue related to physical education staff teaching without certification in physical education is that ESSA legislation ensures equitable distribution of effective teachers; therefore, districts that employ physical education teachers without certification in physical education risk being out of compliance with ESSA legislation. Findings from this study suggest cities and rural areas have a greater need to attend to ESSA requirements for effective physical education teachers who are certified in physical education as compared to suburbs and towns.

Policies at the district level may facilitate the hiring of high-quality physical education teachers who have both certification and an academic major in physical education. The SHPPS 2016 questionnaire (CDC, 2017) asked if districts had specific staffing policies for newly hired staff who teach physical education, by school level. High schools were the most likely to have specific staffing policies to hire physical education teachers who have an undergraduate or graduate degree in physical education or related field (81.2%) and who are certified, licensed, or endorsed to teach physical education (89.6%). However, results from this study indicated that high schools were the least likely to have certified physical education teachers (79.8%) and physical education teachers with an academic major in physical education (67.8%). Hopefully, more high schools will adopt and implement policies that all newly hired physical education teachers are certified and have an academic major in physical education.

Results from this study have implications for the CDC's (2013) Comprehensive School Physical Activity Program (CSPAP) initiative. One CSPAP policy signifies a certified physical education teacher

should teach physical education. School districts that employ staff to teach physical education who are not certified in physical education risk implementing CSPAP programs that are not effective and/or lack the quality needed to increase school-aged children's physical activity levels. Moreover, the results of this study suggest that efforts to improve the percentage of high-quality physical education teachers with a teaching certification and academic major in physical education are needed if current CSPAP programs are to positively impact public health in the United States.

Limitations

Subjects self-reported the data used to measure postsecondary education and state certification. Data were subjected to a series of computer edits related to consistency of responses and deletion of questions that should have been skipped as per questionnaire directions. These edits were reviewed by external analysts. External analysts also imputed missing data. Imputed data underwent computer edits for verification that inputs were consistent with existing questionnaire data (Cox et al., n.d.).

Conclusion

The effect of teacher qualifications on student success is hard to ignore. Results from this study indicate that attempts to increase the percentage of staff teaching physical education who are certified to teach physical education and have an academic major in physical education have implications for student learning. In addition, there are far-reaching consequences in relation to ESSA compliance for districts that do not employ physical education teachers with a physical education teaching certificate. Finally, there are potential repercussions regarding the CDC's work to increase the amount of physical activity in which school-aged children engage on a daily basis. A lack of physical education teachers with proper credentials will make it difficult for the CDC to achieve their goals of increasing physical activity and creating behavior change that results in school-aged children voluntarily engaging in physical activity outside of the school day.

Future research should investigate if teacher qualifications influence student success differently depending on the location of the school (e.g., urban, suburban, rural). In addition, it would be

interesting to examine if factors related to geography and/or socio-economic status correlate with teacher qualifications and student success. Furthermore, studies should be implemented to determine if schools that successfully implemented CSPAPs, which include qualified physical education teachers, increased physical activity levels among youth as compared to schools that do not implement CSPAPs.

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