




PHYSICAL ACTIVITY

School Websites: Local Contexts of Physical Activity and Physical Education Information

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Abstract

As the digital age continues to evolve, websites provide a potential way for physical education (PE) programs and schools to offer information on how they handle the topic of physical activity (PA). Charter schooling and charter schools have become substantially prevalent over the last 30 years, and the trend does not appear to be slowing. A variety of studies to gather information about PE and PA have already been conducted (Hill et al., 2010; Kahan & McKenzie, 2020; Kahan & McKenzie, 2021; Kahan et al., 2019). Specifically, Kahan and McKenzie have performed a variety of website analyses in the state of California, content-analyzing the sites to surveil PA and PE information on school websites. Further, they have looked at school factors such as local demographics, school size, religious affiliation, and public/private/charter affiliation. By following an intended partial-replication protocol, we looked to surveil Arizona-based charter schools to study the local context of another charter “hotspot.” We collected data through data collection protocols communicated by Dr. Kahan (circa June 2019). By conducting a quantitative descriptive study, we looked at characteristics and ran binary regression models to look for inferentially underlying trends. Descriptively, most findings mirrored those of previous research, with marginal presence of

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any information specific to PE and PA. We found significant predictors for website information for the categories of sports, PE frequency, presence of a PE teacher, school levels, and recess. We found similarities and differences between school types, but these targeted certain factors that may be expanded on or used to guide future website analyses both in Arizona and nationally. This is significant because as the prevalence of charter schools continues to grow, it is important to keep students sufficiently physically active and physically educated throughout a school day.

The National Center for Education Statistics (NCES, 2021a) reported Arizonan students to spend an average of 6.43 hr/day, 32.15 hr/week, or 5,787 hours/year at school. Given this substantial proportion of time spent in school, Kelder et al. (2014) identified school sites as crucial venues for students to engage in physical activity (PA) and reach the guideline of at least 60 min/day of moderate-to-vigorous PA (MVPA; U.S. Department of Health and Human Services, 2018). In 2008, the Society of Health and Physical Educators America (SHAPE America) published an official position statement that introduced the Comprehensive School Physical Activity Program (CSPAP) model (Webster et al., 2020) to increase the amount of PA throughout the school day.

Comprehensive School Physical Activity Program and Policy

The CSPAP is a framework for planning and organizing various components of school systems and practices that aim to increase PA opportunities for both students and school staff (SHAPE America, n.d.). This initiative builds upon the Whole School, Whole Community, and Whole Child (WSCC) framework developed to support public health on the basis of the ecological systems theory (Bronfenbrenner, 1992). The CSPAP components consist of (a) quality physical education (PE), (b) before- and after-school PA opportunities, (c) PA during school, (d) family and community engagement, and (e) staff involvement. The overarching goals of CSPAP are to ensure students engage in 60 min/day of MVPA and to create a healthy and active school culture for not only students but also the staff and the community at large.

The local educational governing policies and policymakers have the responsibility to ensure widespread CSPAP implementation so students have opportunities to be active through quality PE and other PA opportunities (e.g., recess, before-school programs, classroom PA breaks, extracurricular programming). The historical impact of the No Child Left Behind era has not been supportive of the CSPAP initiative. For example, during this time, PE has not been included in the core curriculum (Barnd & Harris, 2004) and thus has been considered a noninstructional expenditure, which has led to the loss of PE time, teachers, and programs (Chakrabarti et al., 2015; National Public Radio, Robert Wood Johnson Foundation, & Harvard School of Public Health, 2013). However, the more contemporary Every Student Succeeds Act era has been more favorable to marginalized “specials” (e.g., PE) and recess in terms of increased focus on movement, and the act has been arguably more important financially, per Title II and Title IV.

A survey conducted by National Public Radio, Robert Woods Johnson Foundation, and Harvard School of Public Health (2013) indicated that from 2005 to 2013, guardians’ overall approval of schools’ curricular emphases, as it relates to PE, significantly declined, from a 35% approval rating to a 25% approval rating, respectively. One in 5 parents reported PE was underemphasized, and 3 in 10 parents reported and assessed the time amount in PE with a C, D, or F. Parental ratings suggest there are inadequate levels of PE being delivered in schools.

Trends in Public Charter School Prevalence and School Website Analysis

A public charter school is funded publicly through tax dollars and is governed by an organization that has a legislative contract (i.e., a charter) with a district, state, or other entity (NCES, 2021b). Charter schools were first enacted in Minnesota in 1991 but at the turn of the century began expanding at a rapid pace. From 2000 to 2017, enrollment in charter schools increased and even outpaced public school enrollment in comparative growth. Specifically, charter school enrollment increased by 2.7 million students, whereas public schools only added 600,000 students. Charter policies vary from state to state, and this trend does not affect each state equally or proportionally. On the basis of their total populations, states such

as California and Florida have a larger number of charter schools than other states. However, other states are more proportionally experiencing school chartering trends at higher rates. For example, the states with the highest proportions of enrollment are Arizona (17%), Colorado (13%), and Louisiana (11%).

Despite these climbing rates of charter enrollment, trends concerning PA opportunities remain understudied. A contemporary tool for assessing PA and PE trends in practice and policy is web-based surveillance (McKenzie, 2019). Advantages of website content analysis are it does not suffer from low survey response rates and the content is accessible 24 hours a day (Kahan & McKenzie, 2019). This type of surveillance can be used for monitoring PA and PE policies. An additional advantage of this type of inquiry is it can be tailored to local context. For example, websites of 37 school districts and 860 randomly selected schools within those districts were analyzed for the prevalence of posting PE schedules and associated PE documents related to stipulations set forth in a lawsuit settlement litigated against said districts for not providing PE minutes in accordance with state educational code requirements for elementary schools. While most district websites posted such documents, only 11% of the schools posted PE schedules (Kahan & McKenzie, 2019). Kahan and McKenzie (2021) suggested that PA and PE information on school websites was sparse overall. Interestingly, private schools offered more information compared to public charter schools.

Though website analysis is not completely novel (Hill et al., 2010; Washburn & Sinelnikov, 2016), additional empirical evaluations can be conducted in other contexts, whether charter school or public school, of educational policy. They can inform national and state entities (e.g., school districts, medical/insurance organizations) to either strengthen current policy or inform researchers of coming trends in a form of future forecasting. Furthermore, replication strengthens the empirical basis of both the data and possible interventions, suggestions, and/or implications that come from such data.

Local Legal Contexts

As the state with the highest proportionally affected location of charter attendance, at 17%, Arizona is a prime example of a state in need of more evaluation. Importantly, the Recess Law (Senate Bill [SB] 1083), signed into law in 2018, mandates that all K–5 students

be allotted at least two recess periods a day (see www.azed.gov/pe/recess). Unfortunately, because of the wording of the legislation, reporting these measures through state oversight processes is not empirically impermeable; the law does not include reporting requirements regarding district adherence or sanctions for not providing students with adequate levels of PA. Thus, evaluations of school website information can provide a proxy indicator of SB 1083 adherence. Such data can inform key stakeholders (e.g., school administrators, state education departments, politicians, parents, researchers) about the current conditions of and progress toward creating healthy, active school environments. This groundwork is the first step for gaining evidence for evaluating PA and PE on the basis of local context, state laws, and CSPAP practices. This information also informs continued conversation about the role of policy in ensuring students achieve minimum rates of health-optimizing levels of PA through access to quality PE and other PA opportunities, such as daily recess time (McKenzie & van der Mars, 2015; Metzler et al., 2013; van der Mars, 2018).

The purpose of this study was to analyze K–6, K–8, and 6–8 charter school websites and better understand the available PE and PA information represented in a singular state context. Secondly, we explored whether information posted on school websites followed the mandate of Arizona SB 1083 in terms of offering at least two recess periods a day for elementary (K–5) students. Additionally, we examined the associations between demographic variables (e.g., school location, school size, school type, median income of surrounding neighborhood) and website variables. Finally, in our replication of Kahan and McKenzie’s (2020, 2021) study, we extended a small but growing evidence base on website analyses of PE, sport, and extracurricular activities. We included recess variables, cross-checked the state certification variables for teachers, and assessed the presence of adapted physical education (APE) to better understand what charter schools communicate to the public.

Method

School Selection and Data Extraction

A list of 609 charter school names from the Arizona Department of Education (ADE, 2014) Charter Search was extracted. Schools

were then categorized into grade levels of (a) K–5, (b) K–8, and (c) 6–8. Demographic variables were acquired for each school, which included school operation status (active or inactive), grades served, enrollment numbers, year opened, county, city, and median income of zip-coded location. Operation status, grades served, year opened, county, and city were acquired from the ADE Charter Search website. Enrollment numbers were extracted from the NCES (2021c) enrollment kiosk. Median income for each zip code was calculated with the U.S. Census Bureau (2019) fact-finder app.

Because the focus of the project included recess, only K–6, K–8, 6–8, and 7–9 schools were further evaluated. Given a small proportion of 6–8 and 7–9 schools, these categories were combined. Out of 261 eligible schools, 15 were inactive, three public schools were miscategorized as charters, one was a fully private school, and one school was not yet open, leaving 241 schools. After initial exclusion, a randomized list was generated for the random selection of the sample. Finally, during analysis, two more schools were excluded because their websites communicated closure of the school, leaving 239 schools for data extraction.

The lead author analyzed the websites systematically and investigated tabs, moving left to right or top to bottom depending on page layout. Typical tabs included about us, our school, academics, athletics, curriculum, calendar, enrollment, parent resources, staff contact, and student information. Furthermore, student handbooks and school wellness policies were also downloaded (as PDF documents) and vetted for pertinent information to the study (e.g., recess frequencies, PE policies, PE or APE curricular information). As Kahan and McKenzie (2021) noted, to complete a quantitative content analysis, coders need to use category rules to assess differences in content from sources. The following variables were coded with an occurrence or nonoccurrence criterion guided by, though not identical to, Kahan and McKenzie's (2021) original study, in pursuit of replication:

- **PE mention:** whether PE was or was not present on the website
- **PE prominence:** the centrality of presence of PE on the website (e.g., was PE mentioned on the primary screen; was there an accessible drop-down menu; were the links navigable?)

was coded categorically, allowing for assessment of visibility and usability features

- **APE mention:** whether APE was or was not present on the website
- **PE curriculum:** a description including scope and content identified generally, such as fitness activities, games, and locomotor skills, or specifically, such as badminton and soccer, as well as its sequence—grade by grade or upper elementary versus lower elementary; additionally, curricular verbiage mentioned, such as Fitness for Life (Corbin et al., 2018), Dynamic Physical Education (Pangrazi & Beighle, 2019), or Sport Education (Siedentop et al., 2020)
- **PE frequency and PE duration:** described either generally, such as regularly and every week, or specifically, such as twice weekly and daily; further, duration defined by scheduled length of a lesson (i.e., 30, 45, or 60 min).
- **PE teacher description:** if teacher was listed on the website, we used a combination of website information and ADE educator certification lookup to check for teacher endorsements in PE and/or general teaching licensure in Arizona
- **Recess frequency and recess duration:** described generally, such as daily, or specifically, such as twice daily; further, duration defined by the cumulative time of one recess session (i.e., 10, 15, or 20 min)
- **Interscholastic sports program:** a minimum of two schools compete and includes at least one sport opportunity or team identified
- **Noninterscholastic extracurricular PA program:** at least one PA opportunity such as dance, karate, running club, rec games, or after-school PE
- **PA images:** at least one still image or automatically playing video overview (typically on the home page) depicting at least one student engaged in PA; images categorized as PA/PE only, sport only, or both PA/PE and sport; posed sport images, such as team photos, included; we did not assess galleries or videos, unless they could be seen without interacting with or clicking on links

Data Coding and Treatment

Demographic variables were created on the basis of the Kahan and McKenzie (2020) study and the ADE Charter School Directory. School zip codes were entered into the U.S. Census Bureau's factfinder app, and median income was extracted. After extraction, and on the basis of the median family income in Arizona of \$58,945, we coded these values dichotomously into either higher income bracket (1 = \$58,945 + \$1.00) or lower income brackets (2 = \$58,945 - \$1.00). To greater contextualize differences among rural and urban cluster locations, we also used zip codes to find population density and dichotomously coded urban clusters as 1 (population over 50,000 people) or 0 (population under 50,000 people). Grade levels at each school were coded as 1 (lower elementary and upper elementary; K–6) and combinations of grades within this span, 2 (lower elementary–upper elementary–middle school; K–8) and combinations including the seventh grade within this span, or 3 (upper–elementary–middle school–lower high school; 4–9). For coding the school enrollment, we used total enrollment based on NCES statistics including all grade levels present, subsequently calculated balanced tertiles, and coded a school as 1 (small, ≤ 190 students), 2 (midsize, 191–495 students), or 3 (large, > 495 students).

Following demographics, we adapted and created variables for webpage content. PE mention was coded as 0 (no verbiage) or 1 (verbiage included). APE mention was coded as 0 (no verbiage) or 1 (verbiage included). If PE was mentioned, PE Prominence was coded as 0 (not prominent = evidence of PE was present only in the form of a PE teacher being listed with no other reference on the website, PE items [e.g., the need for appropriate footwear] being mentioned in the student handbook, and/or the PE link being broken); 1 (somewhat prominent = evidence of PE was present in terms of PE being briefly mentioned in “curriculum,” in a handbook, or on the educational program's webpage, being misclassified as athletics [i.e., called athletics instead of PE], or being mentioned in daily schedules); 2 (prominent = evidence of PE in centrally located information hubs such as a principal's welcome, under curriculum tabs, on a PE-specific webpage or teacher's page, and/or detailed in the wellness policy/student handbook).

We coded PE frequency as 0 (not mentioned) or 1 (mentioned). When the specific frequency was present, we entered the lowest value (e.g., every other day = 2) as a continuous variable indicating lessons per week. If PE duration was mentioned, we calculated an average value depending on given information or averaged these numbers if they varied across grade levels (e.g., kindergartners had 30-min lessons and middle schoolers had 50-min lessons).

PE Teacher Presence was coded as 1 (teacher listed by surname on website) or 0 (no teacher mentioned). If a teacher was present, we crosschecked the teacher with the ADE educator lookup and coded as 0 (no information other than name on site and no matching name found on the ADE website), 1 (no information other than name on site and no matching names licensed as teacher or endorsed in PE), 2 (teacher bio indicated licensure and/or matching name displayed teacher licensure—not necessarily PE endorsement), or 3 (teacher bio indicated licensure and PE endorsement and/or matching name located on ADE website). In cases of multiple names (e.g., John G. Smith, John R. Smith), if one of those names registered licensure or endorsement, we applied the applicable code.

Recess frequency was coded as 0 (not mentioned) or 1 (mentioned). When frequency was specifically mentioned, we entered the daily value (e.g., daily recess or twice daily recess) as a continuous value. Recess duration was averaged for daily value (e.g., one 15-min recess and one 20-min recess = 17.5 min). Sport (Opportunity) and Extracurricular PA were coded as 0 (not mentioned) or 1 (mentioned). Furthermore, we aggregated total opportunities for PA before school, at recess, in PE, and after school in sport or non-interscholastic (e.g., karate or running club) as a continuous variable from 0 (minimum) to 5 (maximum). Finally, we coded PA image as 0 (no image on website), 1 (only sport was depicted), 2 (PA or PE was depicted, but not with sport), or 3 (both codes 1 and 2 were present).

Coder Reliability

An independent coder went through website searches and coded the information on the basis of the codebook. The second coder was trained to scour every available tab and PDF downloads of wellness policies or anything that might contain PA or PE information. The second coder was trained to use the Ctrl+F command to target specific information both on the website and in the wellness

policies. Search commands included terms such as “PE,” “Physical Education,” “Adapted Physical Education,” “APE,” “Recess,” “Sport,” “After-School,” and “Before-School.” These search terms ensured a thorough search of each site. We then drew a 10% random sample to allow for an assessment of the primary coder’s reliability. This resulted in intercoder reliability of 91.3% agreement (agreements plus disagreements, multiplied by 100), which means the data can be considered accurate.

Data Analysis

SPSS Statistics 27 (Armonk, NY) was used in the calculation of frequencies and descriptive statistics for measures of central tendency (e.g., means, standard deviations, variance). Replicating Kahan and McKenzie (2020), binary logistic regression analyses were used with the dichotomous variables of PE mention, APE mention, PA image, PE frequency, PE curriculum, PE teacher, recess mention, sport, and extracurricular PA. School demographic variables served as predictors. PE mention and APE mention were used as predictors with PA image, sport, extracurricular PA, and recess mention; PE prominence was used only as a predictor with the sport regression analysis. We dummy coded PE prominence and PA image when they were used as predictors. The stability of the regression was determined on the basis of the significance of the chi-square, Cook’s distance, leverage values, standardized residuals, DFBETA values, and tolerance of variance inflation values.

Results

School Demographics

The 239 schools in the study represented 51 cities and suburbs within 12 of Arizona’s 15 counties. Out of the 12 counties, most charter schools were in Maricopa ($n = 159$), Pima ($n = 33$), and Yavapai ($n = 13$) counties. In terms of enrollment statistics, 91,670 students attended charter schools, with high between-school variability ($M = 403.8$, $SD = 329.5$). Data were unavailable for 12 of the schools. Most schools ($n = 192$) were in urban clusters, or zip codes with more than 50,000 residents. Most of the schools (59.4%) were located in areas where the a household income was below the median in Arizona (\$58,945) and the rest of the schools (40.6%)

were located in areas where the a household income was above the median income in Arizona. In areas where the a household income was below the median in Arizona, salaries varied ($M = \$43,646$, $SD = \$9,225$), and this trend was observed with greater magnitude in the higher income areas ($M = \$80,051$, $SD = \$17,736$). For further clarity, this salary information was based on census data for median household income, thus providing a picture of what each family earns and reports to the Internal Revenue Service in each zip code.

Most schools included elementary or combined elementary and middle school grades (K–5; 56.1%), followed by contiguous elementary and upper elementary schools (K–8; 36.8%). There were few freestanding middle schools (6–8; 7.1%). Although school size was categorized by enrollment tertiles, as school sizes increased so did the variability within school size categories: small ($M = 117.7$, $SD = 49.8$), midsize ($M = 312.3$, $SD = 81.7$), and large ($M = 780.3$, $SD = 288.3$) enrollment. Table 1 compares schools of varying levels that included PA, PE, and sport.

Table 1
Frequencies for PA, PE, and Sport Offerings

Grade level	Website content					
	PA images		PE mentions		Sport offerings	
	None %	Present %	None %	Present %	None %	Present %
K–6	43.2	56.8	28.4	71.6	71.6	28.4
K–8	40.3	59.7	20.1	79.9	37.3	62.7
6–8	52.3	47.7	23.5	76.5	52.9	47.1
Total	42.3	57.7	23.4	76.6	46.9	53.1

Note. PA = physical activity; PE = physical education.

Extracurricular Programs and Physical Activity Images

Just under half (46.0%) of school websites included information about the presence of an interscholastic sports program. Few school websites (2.9%) included information about the presence of both sports and an extracurricular program. Conversely, 24.7% of school websites advertised noninterscholastic extracurricular PA opportunities. Cumulatively, about one eighth of school websites (12.6%) had no information pertaining to PE, recess, sports, or nonsporting

activities (e.g., karate, dance). About one fifth (22.4%) of school websites offered information about one of the movement opportunities. About one fourth (24.3%) included information about two of the five possible PA opportunities (including PE). Just over one fourth of school websites (28.9%) presented information about a combination of three of the opportunities (e.g., PE, recess, or sport/dance/karate/yoga/other recreational movement). About one eighth (12.1%) of schools provided information about all four opportunities.

Recess and Adapted Physical Education

Only just over half the school websites (54%) mentioned recess, and only 42 school websites (17% of total) offered more detailed information such as frequency and duration of recess. Out of those that mentioned recess, one school offered recess three times a day, 17 (7.1%) schools offered recess two times a day, and 24 schools (10%) offered recess once a day. Recess duration varied, and school websites reported 15- (2.5%), 20- (7.1%), 25- (1.3%), and 30-min (3.3%) recess periods. Only 10 (4.2%) school websites offered information about APE services.

Physical Education and Teacher Information

Most school websites (76.6%) mentioned “physical education.” About one third of school websites (31%) prominently displayed PE-related information; one fourth (25.9%) somewhat prominently presented information; just over one fifth (21.3%) did not prominently display PE information, but some evidence was present; and a final fifth (21.8%) presented no evidence of PE. Few school websites ($n = 42$ or 16.7%) included information on lesson frequency per week: 1 day (30%), 2 days (15%), 3 days (2.5%), 4 days (27.5%), and 5 days (25%). Fewer school websites mentioned duration of lessons, but those that did reported PE duration of 25 (0.4%), 30 (1.7%), 40 (4.6%), and 45 (0.4%) min. Socioeconomic factors were significantly related to whether or not the school website mentioned PE. For curriculum, about one third (33.5%) of websites mentioned details about PE sequencing or content, and about two thirds (66.5%) did not. Teachers responsible for teaching PE were listed on less than half of the school websites (45.2%). Thus, a slight majority of the

websites (54.8%) did not list their PE teachers. When they were listed and crosschecked, 14 (13.1%) were licensed and endorsed in PE, 19 teachers (17.8%) were licensed teachers (though not endorsed in PE), 50 teachers (46.7%) were not licensed as per ADE, and 25 teachers' names (22.4%) were not present in the ADE database.

Regression Models

Table 2 shows the constants and significant predictors for the nine regression models run. All regressions showed no (or minimal) levels of outlier influence while demonstrating no multicollinearity. PE frequency (40%), PE curriculum (37%), and APE mention (36%) explained the greatest variance between predictors and outcomes. Extracurricular PA opportunities (25%) and PE mention (18%) explained the least. Models included 0 to 6 predictors (maximum of 13) and seven predictors (total) surpassed medium ($OR = 2.5$) or large ($OR = 4.3$) effect size criteria. There were 24 significant cases (Table 3), though most ($n = 17$) were significant because their absence negatively predicted the presence of the outcome variable.

The most prominent predictors for sport offerings were school size ($OR = 345.51$), socioeconomic status ($OR = 3.3$), and PE frequency ($OR = 3.0$). For PE frequency, school size (middle school status) was a strong predictor ($OR = 3.7$). For presence (and website visible presence) of a PE teacher, school level—both middle school ($OR = 6.7$) and the N/A coded level (enrollment data not available on 2019–2020 school year; $OR = 6.2$)—served as strong predictors. When recess was mentioned, school level (elementary) served as a predictor ($OR = 4.0$), as well as school size level (enrollment not available for 2019–2020; $OR = 6.2$).

Discussion

The school website is not only meaningful to the organizations' ability to facilitate communication, engagement, and learning (Taddeo & Barnes, 2016) but also has implications in terms of marketing the school's digital visibility (Scott, 2011). This creates or enables potential for expressing or sustaining a reputation that nevertheless reflects positively, negatively, or neutrally on the school (Park & Lee, 2009) in an increasingly digitally reliant society. Therefore, efforts to develop and/or maintain websites are not to be overlooked.

Table 2

Binary Logistic Regression Analyses for PA and PE Listed on School Websites

Characteristics of predictors	β	SE β	χ^2	<i>p</i>	OR (95% CI)
PA Image					
Constant	2.32	1.24	3.51	.06	—
Socioeconomic	-0.85	0.35	5.92	.02	0.43
Sport/intramurals	-2.05	0.39	28.11	0	0.13
Sport/intramurals					
Constant	0.09	1.44	0.00	.95	—
School (K–8)	-2.38	0.75	10.12	<.001	0.09
Socioeconomic	1.20	0.41	8.66	0.003	3.33
Urban cluster	-1.62	0.50	10.46	<.001	0.20
PE frequency	1.10	0.55	3.98	.046	3.01
PE curriculum	-0.96	0.45	4.46	.035	0.38
PA image	-2.11	0.41	27.15	0	0.12
Extracurricular					
*No significant relationships	—	—	—	—	—
PE frequency					
Constant	0.55	1.56	0.13	.723	—
School size (6–8)	-2.26	0.90	6.24	.012	0.10
Sport/intramurals	1.31	0.60	4.80	.029	3.71
PE curriculum	-2.68	0.51	28.03	0	0.07
Recess mention	-1.08	0.51	4.48	.035	0.34
PE curriculum					
Constant	2.15	1.39	2.38	.123	—
Socioeconomic	-0.68	0.35	3.75	.053	0.51
Recess mention	-0.72	0.37	3.80	.051	0.49
Sport/intramurals	-1.02	0.41	29.41	.013	0.36
PE frequency	-2.55	0.47	29.41	0	0.08
PE teacher					
Constant	0.14	1.19	0.01	.907	—
School size (6–8)	1.90	0.84	5.12	.024	6.69
School size (2019–2020 schools)	1.93	0.84	4.71	.030	6.22
Extracurricular PA	-0.99	0.35	8.06	.005	0.37

Table 2 (cont.)

Characteristics of predictors	β	SE β	χ^2	p	OR (95% CI)
Recess mention					
Constant	3.25	1.41	5.30	.021	—
School level (K–6)	1.39	0.67	4.24	.040	4.01
School size (2019–2020 schools)	1.67	0.74	5.03	.025	5.29
Socioeconomic	-0.75	0.40	0.37	.022	0.47
APE mention	-2.66	1.29	4.62	.032	0.07
PE frequency	-1.16	0.49	5.55	.018	0.31
APE mention					
Constant	-1.565	2.28	0.471	0.493	—
Recess mention	-3.357	1.486	0	0.024	0.03
PE mention					
Constant	246.181	30795.58	0	0.994	—
Recess mention	-1.218	0.369	10.918	0.001	0.30
Extracurricular PA	-1.022	0.497	4.23	0.04	0.36

Note. $N = 239$. PA = physical activity; PE = physical education; CI = confidence interval.

Students in Grades K–8 spend almost 12,000 hours in the care of schools (NCES, 2021b; Sallis & McKenzie, 1991). The Centers for Disease Control and Prevention (CDC, 2021) recognizes Comprehensive School Physical Activity Programs (CSPAP) as a feasible approach to offering students at least half of the recommended 60 min of MVPA in a school day. Along with PE as a cornerstone component of the CSPAP, this programming leverages before-school, after-school, and during-school opportunities for PA with staff and family/community engagement.

Websites are now a primary means of communication with students and parents. Thus, they are a practical way of not only engaging but also educating stakeholders of a school's plan for students to move throughout the school day. In an alternative sense, PA researchers, concerned parents, and/or community public health providers can check via website surveillance the degree at which schools promote and encourage daily PA. Moreover, having PA information accessible and available provides at least some reassurance that movement and physical health are a societal priority and not an afterthought.

Table 3
Fit, Influence, Collinearity Diagnostics, and Explained Variance of Logistic Regression Models for Presence of Website Information Concerning Physical Education and Physical Activity

Model	N	Wald's			R^2_{cs}	R^2_N	R^2_{HL}	Cook's D > 1.0 (%)	Leverage > 2 Mlev (%)	Standardized	DfBeta > 1.0 (%)	Tolerance min	VIF max
		χ^2	df	p						residual > 2.0 (%)			
PA Images	239	65.66	15	0	0.24	0.32	8.45	0.0	0.02	1.7	0.0	0.70	1.58
Sports/intramurals	239	129.77	16	0	0.42	0.56	3.55	0.0	0.02	2.2	0.0	0.16	6.28
Extracurricular PA	239	44.40	15	0	0.17	0.25	13.31	0.0	0.20	2.6	0.0	0.64	1.57
PE frequency	239	66.25	14	0	0.24	0.40	15.49	0.0	0.19	3.2	0.0	0.68	1.48
PE curriculum	239	73.22	14	0	0.26	0.37	6.59	0.0	0.02	2.2	0.0	0.69	1.44
Teacher	239	37.07	14	< .001	0.14	0.19	7.11	0.0	0.19	1.8	0.0	0.67	1.50
Recess mention	239	57.75	14	0	0.21	0.29	15.77	0.0	0.20	1.9	0.0	0.67	1.48
APE mention	239	26.67	15	< .032	0.03	0.36	1.47	0.0	0.13	4.7	0.0	0.67	1.49
PE mention	239	30.86	11	< .001	0.12	0.18	7.34	0.0	0.12	1.2	0.0	0.70	1.43

Note. PA = physical activity; PE = physical education; APE = adapted physical education. R^2_{cs} , Cox and Snell; R^2_N , Nagelkerke; R^2_{HL} , Hosmer–Lemeshow.

This study joins a growing foundation of research using website surveillance of PA and PE information on school websites (e.g., Hill et al., 2010; Kahan & McKenzie, 2020; Kahan & McKenzie, 2021; Kahan et al., 2019; Washburn & Sinelnikov, 2016). This growing trend is important because these analyses have legal and policy-based implications (e.g., Kahan & McKenzie, 2019; Thompson et al., 2018). Though Arizona charter schools represent a portion of other data accumulation efforts (Kahan et al., 2019), this study is the first to complete an exhaustive examination of nonsecondary charter schools in the state. This partial-replication study provides thorough information about PE teacher credentials, as well as mentions of APE. Future research can use the results of this study to further knowledge of charter school PE and other PA offerings, to enhance generalizability and highlight differences between school types (e.g., public, private, charter, religiously affiliated). Moreover, the regression analyses provides a greater depth of understanding differences between elementary, middle school, and K–8 school sites.

The results of this study echo and reflect themes of other studies that many schools are not utilizing their websites to promote or explicitly define what PE and other PA opportunities are provided throughout the day (Kahan & McKenzie, 2019; Kahan et al., 2019). However, the discrepancies between what is present and what is not are particularly interesting. For example, most schools mention PE in some fashion on their website, yet only about a third of schools mention it prominently. This reinforces PE as a marginalized subject, when other school subjects (e.g., English language arts, mathematics) are more often and more prominently displayed. While PE is mentioned frequently, those responsible for delivering the program (the PE teachers) are visible on less than half of websites. Furthermore, of those who are featured on the websites, only about 2 out of 10 teachers are licensed and endorsed in PE, while close to half of the teachers are not even licensed. It is also concerning that many schools display wellness policies, yet so few outline the PE specifics in these policies—whereas the CDC (2021) recognizes PE as the cornerstone of campus-wide comprehensive PA programs.

In regard to the law, this website analysis centers on one locale and generalizability of the results requires caution. The Recess Law (SB 1083) requires two recess periods be allotted for Grades K

through 5. Only about half (54%) of the school websites mention recess. Controlling for level (elementary excluding middle levels) improves results to almost two thirds of the websites referring to recess. This indicates recess may be more developmentally appropriate terminology for the younger age (6–12) group, though it should still be important for older students to participate in movement opportunities throughout their school day. As it pertains to the elementary group, only about one fifth of school websites mention how many recess periods per day are offered. From that small group ($n = 17$), almost 6 out 10 specify that the school offers only one recess a day. This clearly violates the SB 1083 recess policy signed into law in 2018. Though the recess law affects K–5, other grade bands such as middle school and K–8 schools mention recess at comparable rates, which is positive. Yet more work needs to be done to promote and ensure (a) school are adhering passed legislation and (b) students are receiving the minimum expected recess periods.

Another area of concern is the absence of information regarding APE. Few schools mention adapted services. This may indicate a global disparity in charter schools. Many of the schools have information concerning fair and equal enrollment practices. However, though speculative, the lack of visibility of services indicates an alternative reality in enrollment of students with disabilities. That is, few students with disabilities find their way into charter schools. A concerning feature of the charter school websites is information about pay-to-enroll preschool options that may act as a barrier to lower income families. The pay-to-enroll process ensures that students who enroll in earlier services lock in or save a spot for kindergarten and grades beyond. Along with other factors such as transportation logistics or prior sibling enrollment, this approach has societal potential for enrollment pooling and social stratification. For example, car-owning families may possess greater flexibility in dropping off and picking their children up from school grounds, whereas families who do not own a car may have to find closer cost-free options.

Regarding extracurricular activities, less than half of the school websites mention interscholastic sports programs and about one quarter mention stand-alone noncompetitive movement activity opportunities. Compared to schools in Kahan and McKenzie (2020), Arizonan charter schools on average offer more information about

interscholastic sports programs in contrast to Californian charter and private schools, though only a fraction of a percentage differentiates the latter. Almost 6 out of 10 Arizona schools depict images of PA/sport on their website, which is well below the percentages of California charter school websites, where almost 3 out of every 4 websites includes such images (Kahan & McKenzie, 2019).

The regression models show strong predictors for sport being mentioned such as socioeconomic status, PE frequency, and school size. Websites of schools in higher income communities are 3 times more likely to mention sport offerings. If a school website mentions PE frequency, it is 3 times more likely to mention sport offerings as well. Interestingly and unexpectedly, school size (larger schools) predicts that a school website is 5 times more likely to mention sport. However, after further investigation, we noticed school size “3” was a dummy code for schools on which the NCES had not gathered enrollment information. All schools in this category began enrolling students in 2019 or later, thus enrollment numbers were not yet statistically reportable. This unexpected result implies a temporal aspect that newer schools are more likely to display PA information on their websites more prominently. One explanation is that newer schools have to compete for prospective students, thus making marketing an important aspect of charter schools (Wilson & Carlsen, 2016).

The major predictor for PE frequency being present on websites is school level—suggesting that middle schools, as well as schools established in 2019 or later, are more likely to report on PE frequency. A possible explanation for this is middle schools use more computer-based communication strategies, such as for homework purposes. This increases the need for more visibility or accountability on more organically trafficked middle school websites. Interestingly, both factors increase the likelihood of PE frequency being mentioned almost sixfold. A major difference in relation to this study’s school-level comparison (i.e., middle school vs. elementary) is the mention of recess. Reflecting an inverse relationship, elementary schools are 4 times more likely to reference recess. Newer schools are roughly 6 times more likely to mention and offer greater details concerning recess dosage.

Implications

Overall, conducting website analyses is a cost-effective method of looking at school practice and functioning surrounding PE and PA practices. As evidence builds, more specific connections and comparisons can be made locally, regionally, and nationally and internationally. The current body of literature is small, but results from the studies may have legal and procedural effect. For example, PE minutes increase in schools involved with lawsuits (Thompson et al., 2018). In a local context, the same processes can be applied to bills and laws such as Arizona's SB 1083 Recess Law.

Though this study focuses on charter schools, other studies include other school types such as public schools. Few schools use their websites to prominently display information about PA, which is an important target for initiatives such as Healthy People 2030 (Office of Disease Prevention and Health Promotion, 2021). As these large health promotion organizations evolve, they might push lawmakers to ensure that schools are following CSPAP programming and/or standardize movement reporting for all school types. A few smaller bills or changes may elevate PA and PE to greater priority in the eyes of stakeholders. Parents do value PE (National Public Radio, Robert Wood Johnson Foundation, & Harvard School of Public Health, 2013), and focusing on improving website infrastructure can lead to more accountability and thus healthier and more active school days.

The results of this study show there are both similarities and differences between regions and school types. Arizona charter schools appear more apt to offer PA information than do their California counterparts. Analyzing these trends may be rooted in socio-economic trends, and discovering what is happening financially may lead to greater equity in school quality or practice. The debate may shift away from charter versus public toward a more targeted analysis such as income differentials between zip codes. Furthermore, in terms of equity, students with disabilities may benefit from analyses like this study. Such results may encourage schools to ensure appropriate services and credentialed teachers are in place to teach the skills necessary for students to be active throughout the school day and beyond.

Characteristics of schools and what they choose to report are apparent. For example, recess is more prevalent at the elementary level

and sport offerings are more prevalent at the middle school level. By improving school websites, such as a minimum mandate for posting recess and PE information, charter schools may see increases in student enrollment, especially among students whose parents are interested in their children's health and wellness. Charter school growth is rapidly increasing, and there appears to be no end in sight for this trend. Further, there is legitimate and arguable value in offering choice, especially for people in impoverished and underfunded districts. However, major efforts that ensure schools are adequately funded are needed, in our opinion.

In the current climate, public schools are potentially being forced to compete directly with private options, which, to date, have not been for students and have engaged in aggressive marketing campaigns. In Arizona, local politics further exacerbate this trend, though politics will always heavily influence private, charter, and public education trends. Charter schools receive substantial state funding per every student recruited, which historically went to public schools. Thus, public school districts weaken further financially when they allocate funding toward marketing their district to compete with charter schools. Anecdotally, it is not unusual that selected Arizona public school districts do mass mailings and produce TV commercials that not only advertise their schools but also their sport and PA.

Results from teacher credentialing investigation are also concerning. Not only do many schools not present information about PE teachers, many of the teachers in place are not endorsed as PE specialists. Moreover, many of the teachers are not credentialed as teachers or their names are not accessible through the ADE educator certification lookup. This may be a failure on ADE reporting and/or district reporting protocols, but it is important to have trained physical educators in place to run a quality PE program, according to SHAPE America (2016). Beyond quality PE, having licensed and certified teachers ensures student safety; disciplinary measures may not otherwise be tracked. In terms of "quality" experiences, there is evidence that licensure indeed matters (Behets, 1995; McKenzie et al., 2001).

Strengths and Limitations

This study reflects two important strengths. First, though the field of PE research remains relatively small, groups coming together

to tackle similar problems may result in real-world impact. As with other fields (Open Science Collaboration, 2015), the PE field has a need for replication studies (Locke, 1977). This is necessary because less than 1% of published educational research studies have been replicated in the top 100 education research journals (Makel & Plucker, 2014). Thus, a major strength of this study is it not only gathers common data to compare but also creates discourse for future methodological development.

A second strength of this study is it includes a homogenous (in terms of charter affiliation) representative sample of 609 Arizona-based schools. After inclusion, 239 schools remained with matching criteria to the study's purposes. While this random sample is not as large as those in other studies, the final list is near exhaustive to eligible schools in Arizona, thus enhancing generalizability of findings. Furthermore, the selection of elementary, middle, and combinations of levels remains in line with overarching questions about recess dosage and its relation to state laws.

This project was not without limitations. Though website searches provide for good data reliability and validity, visiting coupled with observing actual practices of schools improves reliability and validity. However, this type of "ground-truthing" has not been completed at the state level due to cost factors. Certain areas of coding may become obfuscated due to website source reliability because some websites lack key information such as the PE teachers' name or even any mention of PE. For example, teachers with out-of-state certifications may slip through the cracks in the teacher certification coding section. This needs to be ameliorated either at the state website (ADE) level and/or through requested access to teacher résumés, which may be perceived as invasive, thus discouraging a school's direct participation in future research. Adding demographic factors such as school level (elementary vs. K-8), though novel, does not come without its challenges in coding, collection, analysis, and interpretation.

A further limitation is the faith people put in websites being a proxy of the policies and curriculums in schools. Because this information is ungoverned in current scholastic landscapes, schools have the choice of whether to post information and sometimes provide only information they deem necessary. This cannot be detected

through website content analyses. Rather, examination of website content may serve as an initial alarm for a more thorough on-site investigation and/or surveying. Relatedly, schools may also not have the financial resources to maintain a website, keep it current, or expand content. The study is cross-sectional and a slice of time; thus, we only capture a snapshot of the websites at that time. As the pressures of marketing increase, schools may be more likely to update their websites with greater frequency. A better study and/or surveillance system can track this in real time, over time. As well, we assume that schools use websites to convey information to parents, students, and others in the community; thus, the focus on these websites has contextual variation of use by all stakeholders (e.g., administrators, parents, students, and students), all further complicated by demographic factors (i.e., socioeconomic status) and developmental capabilities of students (e.g., kindergartners vs. 8th graders). Similar to the prior studies, this study does not have access to harder data, such as pings to the websites, or the digital characteristics of what is commonly searched or accessed on the websites, which may indicate more explicit information to further studies such as this.

Another limitation of this study is the use of multiple diverse projects for which goals may not be in perfect alignment, so only a partial replication followed. For future replicators, suggestions about replication etiquette may be helpful (Kahneman, 2014). Though the suggested communication with original authors exposes a potential Achilles' heel of unbiased objective research, it visualizes a future in which collaboration is key to the advancement of science. The design of the Kahan and McKenzie (2020) study strongly influenced this study. Yet where Kahan and McKenzie (2020) studied school differences on the basis of religious affiliation, this study is more homogenous with a focus on charter school website representations of PA and PE information, as in Kahan and McKenzie (2021). Future efforts can solidify not only design differences but establish agreed-upon criterion by a diverse team of experts. For example, our criterion for PE Prominence is the expected location of information (e.g., on the home page or mentioned in the principal's message). Having detailed website information on PE practice such as duration, frequency, and curriculum is a sign of a positive trajectory for the field. In this study, a school offering such detailed information

scored more highly in terms of PE prominence—which was not the case in the original studies. Though this study has replicative discrepancies, these coding differences open a dialogue for future directions of website surveillance of PE and PA information, which is a step toward addressing the lack of replication research in PE. Finally, if the field and publishers never expect replication, no problem will exist (Amrhein et al., 2019)—they’ll only extend the problem they have been aware of since 1977 or even earlier (see Pelton, 1970).

Suggestions

Though this partial replication provides interesting interstate comparison possibilities, future research can make an effort to standardize the process of website data mining. Given the potential behind this kind of research, more synergistic efforts can enhance surveillance and comparison of PE and PA dosages. Studies can expand criteria by seeking out information on APE services. Moving forward, teacher educators can prepare future physical educators to create simple web pages that contain accessible information and that are easy to navigate (Washburn & Sinelnikov, 2016). However, the sole responsibility should not be put on physical educators, as web design is not included in a typical teachers’ full-time equivalent. At the very least, these teacher educators can encourage future physical educators to advocate for accurate and more comprehensive information concerning PE and other PA opportunities (e.g., days of the week, minutes per period, curriculum used, and overall goals of the program) on their schools’ websites. Perhaps it is here where dual-sided accountability for PE may be established for both educators and their school districts. Many schools fall below the suggested minutes for PE, as reported by parents (National Public Radio, Robert Wood Johnson Foundation, & Harvard School of Public Health, 2013).

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