

Using a Physical Education Environmental Survey to Identify Areas of Concern and Improve Conditions

By Grant Hill and George Hulbert

School environmental conditions can impact learning in physical educational classes. Clear air, freedom from excessive noise, adequate indoor and outdoor space, sufficient storage, properly functioning heating and ventilation systems, adequate lighting systems, proper indoor and outdoor drainage systems, and adequate outdoor and indoor surfaces are essential for a safe environment that is conducive to learning. Unfortunately, not all schools have adequate physical education facilities. Factors may include the age of the school facilities, geographical location of schools, physical space limitations, or insufficient financial resources.

It is important to control environmental health hazards, not only to promote a conducive school learning environment, but to also reduce associated health risks. For example, exposure to pollutants such as sulfates and particulates from aging building materials increase the incidence of morbidity and premature mortality (Gauderman et

al., 2000). Close proximity to roadways with high truck traffic density tends to result in adverse health effects on the respiratory system of teachers and children (Houston, Ong, Wu, & Win-er, 2006; Ciccone et al., 1998). Green, Smorodinsky, Kim, McLaughlin, & Ostro (2004) found that many teachers and children in California who were regularly exposed to elevated levels of traffic-related emissions at school had poor respiratory health. Since the majority of the students were economically disadvantaged and non-white, these findings have raised concerns about environmental inequities affecting Latinos in California (Pastor, Sadd, & Morello-Frosch, 2004). Excessive background noise and air pollution has been shown to lower the achievement and educational performance of students (Korenstein & Piazza, 2002; Raven, 2002; Knecht, Nelson, Whitelaw, & Feth, 2002).

In many schools, physical education is the school subject most affected by air and noise pollution because

classes are often conducted outside and, consequently, closer to some or all of the primary environmental pollutants. When aerobic activities are performed in environments polluted with carbon monoxide, there is often a significant reduction in performance levels (Singh, 1988; Rofen, 1980). Consequently, it is not advisable to jog, run, train, or exercise at schools located near highways, particularly at times of peak hour traffic flow.

Traffic and vehicle exhaust are not the only pollution problems in the schools. Students in schools near refineries and factories have to stay indoors on certain days because the odors are so intense (Johnson, 2004). Power plants release both pollutants and large amounts of steam into the air. This process is extremely noisy and can be distracting to the surrounding community. Pesticide spraying on nearby fields or farmland and noise pollution from airplanes taking-off and landing are additional deterrents to the school-learning environment.

Figure 1. Physical Education Environmental Survey

Directions: Please answer each question by circling a number 1 through 5, as it relates to this school. Circle the number that most clearly reflects your perception of the accuracy of the statement using the scale below.

Scale:	1	2	3	4	5
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
General					
1. The areas and facilities at this school adequately serve the interests and needs of physical education students and teachers.	1	2	3	4	5
2. Activity spaces are adequately isolated from sources of distracting noises.	1	2	3	4	5
3. Storage areas for indoor and outdoor physical education equipment are adequately sized.	1	2	3	4	5
4. Storage rooms are accessible to activities areas.	1	2	3	4	5
5. Buildings, specific areas, and facilities are clearly identified with signs, and hazards are noted.	1	2	3	4	5
6. Locker rooms are arranged for accessibility and ease of supervision.	1	2	3	4	5
7. All available physical education space on campus is currently being utilized.	1	2	3	4	5
8. Shower and dressing facilities provided for professional staff members are conveniently located.	1	2	3	4	5
9. Drinking fountains are conveniently placed in locker room areas or close by.	1	2	3	4	5
10. There is sufficient space and equipment in relation to number of participants.	1	2	3	4	5
11. An adequate number of locker and dressing	1	2	3	4	5
12. Toilet facilities are adequate in number. They are located to serve all student groups for which provisions are made.	1	2	3	4	5
13. Toilets used by large groups have circulating (in and out) entrances and exits.	1	2	3	4	5
14. Size of grass field space is adequate for physical education activities.	1	2	3	4	5
15. There is adequate space and/or areas for indoor physical education activities.	1	2	3	4	5
16. There is adequate space and/or areas for outdoor physical education activities.	1	2	3	4	5
Climate Control					
17. Adequate provision is made in indoor physical education facilities for climate control—heating, humidity control, and air conditioning.	1	2	3	4	5
18. Adequate ventilation is provided for locker, dressing, shower, drying, and toilet rooms.	1	2	3	4	5
Air and Noise Quality					
19. Noise level in the outdoor activity areas does not negatively impact the physical education environment.	1	2	3	4	5
20. The school lacks excessive traffic and industrial noise.	1	2	3	4	5
21. The school lacks excessive noise from airplanes.	1	2	3	4	5
22. Indoor physical education activity areas are free from distractive, outside noise.	1	2	3	4	5
23. The air quality outside does not negatively impact the physical educational environment.	1	2	3	4	5
24. The air quality in indoor physical activity areas is adequate.	1	2	3	4	5
Ceilings and Electrical					
25. Lights in strategic areas are key controlled.	1	2	3	4	5

26. Locker room lights are mounted above the space between lockers.	1	2	3	4	5
27. All lights are shielded. Special protection is provided in gymnasium, court areas, and shower rooms.	1	2	3	4	5
28. The ceiling height is adequate for the activities that are offered indoors.	1	2	3	4	5
29. All ceilings, except those in storage areas, are acoustically treated with sound-absorbent materials.	1	2	3	4	5
Walls and Floors					
30. The playing floors and fields are properly marked and finished to provide maximum safety.	1	2	3	4	5
31. Abrasive, non-skid, slip/resistant flooring that is impervious to moisture is provided in all aquatic areas and shower facilities.	1	2	3	4	5
32. Floor drains are properly located, and the slope of the floor is adequate for rapid drainage.	1	2	3	4	5
33. Protection matting is placed permanently on the walls in areas where such protection is needed.	1	2	3	4	5

Suggestions for improving the physical environment of this school's physical education environment: _____

Name (*optional) _____

School Site _____

Date _____

Gender: Male Female

Years taught physical education _____

Years of total certified teaching experience _____

Years taught at current school _____

School type (Indicate grades): _____

Check facilities available at this school site:

Gymnasium

Locker rooms with lockers, showers, and toilets

Physical education/coach's office with dressing room

Storage room/equipment room

Trainer's room

Official's room

Weight and exercise room

Dance studio

Laundry room

Apparatus room

Classroom

Adapted physical education room

Other, please specify: _____

Indoor physical education classes may also be affected by environmental factors. Students exercising indoors may be exposed to unclean air and may have to deal with mold and inefficient ventilation systems. A study by Villaire (2002) focused on the dangers of mold, pesticides, exhaust, and radon. In it, he described specific ways to promote better indoor air quality in schools. Indoor air pollutants may also result from small pools of water in the heating/ventilation/air/conditioning system. The pollutants are believed to contribute to the incidence of asthma among teachers and students (Czubaj, 2002).

The physical education environment may also be negatively impacted by lack of facilities and inadequate field space. Some schools do not have gymnasiums, sufficient locker rooms, shower facilities, or indoor apparatus/classrooms. Many do not have proper storage space for physical education equipment. Many schools are old and in dire need of repairs and remodeling. Locker rooms may be old, with poor drainage, and inadequate lighting. Showers, toilets, and drinking fountains may be non-operational with only a limited number available for students and faculty members. Outdoor drinking fountains are sometimes either non-operational or poorly placed, or in some cases, removed from the physical education area. Many of these problems are related to the age of schools—older schools and schools that have not been recently remodeled are often in need of major repairs and remodeling.

Physical education programs may also have lost space to other school programs. With class size reduction becoming more popular and an increasing need for more classrooms, many schools have turned to the physical education program's space. While converting physical education space to serve other academic areas is a benefit to those subject areas, students lose

valuable sport and recreation field participation opportunities. At some schools, physical education programs have lost their tennis courts so districts can use the space for portable buildings because they already have a stable foundation and can easily be hooked up to electricity.

The Physical Education Environmental Survey

To help physical education leaders determine the quality of physical education facilities in schools, the Physical Education Environmental Survey was developed (see figure 1). The Physical Education Environmental Survey was initially designed by conducting a thorough review of literature associated with school environmental factors. Of particular value were two previously developed and validated inventories (Penman & Adams, 1980; Daughtrey & Woods, 1976) and an indoor air quality checklist for schools developed by the United States Environmental Protection Agency (2005). Once the initial inventory was designed, it was reviewed for content validity and clarity by over 30 secondary school physical education teachers, including four current or past department heads, as well as a committee of three university kinesiology department faculty members.

The survey addresses physical education teachers' perceptions of the following school areas:

- 1) Quality of outdoor activity spaces,
- 2) Quality of indoor activity spaces,
- 3) Impact of noise and air on indoor and outdoor physical education classes,
- 4) Quality of indoor support areas such as locker rooms, bathrooms, and storage rooms,
- 5) Teachers' perceptions of the adequacy and safety of indoor and outdoor physical education facilities.

For each of the 33 identified survey questions, respondents use a five-point Likert scale (1= strongly dis-

agree; 2= disagree; 3= undecided; 4= agree; 5= strongly agree). Scores for schools may be compared on an item-by-item basis, or by composite scores (range = 33 - 165).

Benefits of Using the Survey

Having physical education teachers complete the environmental survey may result in several benefits. First, areas of concern are identified so schools can develop specific plans to address each of those areas. This may lead to the establishment of new spending priorities within department and school budgets. Second, at the district level, administrators can compare the environments of schools and pursue planning that will create greater equity between school sites. This may result in remodeling current facilities, adding gymnasiums and fitness rooms, securing additional field space, and building additional swimming pools. While some schools located in high socio-economic neighborhoods surrounded by residential homes may have adequate space and be free of any distracting noises, heavy traffic, and industrial noise, others may score much lower on the survey. Consequently, by using this survey, inequities among various school sites will be identified and, hopefully, provide impetus for major improvements in schools at the lower end of the spectrum. In addition, by identifying areas of concern, physical education teachers may be able to better coordinate their schedules and more fully utilize the best activity areas throughout the school year.

The environmental survey may also be completed by a team appointed by the school district that visits all schools in the district. Using an external team of observers should result in more objectivity in scoring and provide a more valid basis for comparisons between the environments of various schools. External assessment teams should not only include professional environmental inspectors, but also ex-

perienced school administrators and physical educators. External assessors may need to combine direct observation with direct interviews of physical education teachers to determine accurate scores for each survey item.

Recommendations

1. School districts should consider having extensive safety inspections of their indoor facilities by an outside firm to determine if immediate remodeling is needed. Schools with poorly maintained indoor facilities, including flooring, restrooms, locker rooms, ventilation systems, and heating and air conditioning will need to be remodeled if schools are to provide a healthy environment for their students.

2. Joint school/community facilities may be developed for use by the school site during the day and the community members in the evenings and weekends (e.g., city or county Parks and Recreation Department).

3. Districts should create special task forces to study the differences in quality of facilities at various school sites. Once differences are determined, the task force should create an itemized budget request (levy) to put before voters in the next local election.

4. If a professional suspects a problem, the school district can hire an independent firm to determine the actual air quality (both indoor and outdoor) at each school site and determine steps needed to improve air quality. Another firm could determine the noise volume levels at each school and recommend soundproofing techniques.

5. Districts should also try to construct new schools outside of high traffic or industrial areas, if possible.

Conclusion

It is essential that students, teachers, and staff at every school have safe, quiet, and updated school facilities in order for optimal learning to occur. By using the Physical Education Environmental Survey, physical educators will

help identify areas of concern and expedite the process of change.

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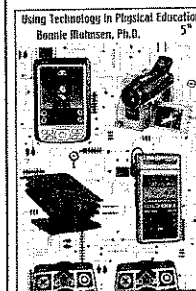
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