

Relationship between Teacher Behaviors and Student Academic Learning Time in Junior Secondary Physical Education

Amy Ha Sau-ching
The Chinese University of Hong Kong

The purpose of this study is to examine teacher behaviors and students' academic learning time in physical education in local junior secondary schools in Hong Kong. Participants in this study were twelve junior secondary physical educators and their physical education classes. Interval recording procedures were employed with the Arizona State University Observation Instrument to collect teacher behavior data. The Academic Learning Time-Physical Education instrument was used to collect data on the appropriate motor engaged activities of the students. Each teacher and their students were observed in four separate classes. Results show that students spent about one third of their time engaged in ALTPE. The most widely exhibited intervals of teacher behaviors were pre-instruction, concurrent instruction, management and silence. The Pearson Product Moment Correlation indicates that pre-instruction, concurrent instruction, and management, had significant relationships with student ALTPE. To conclude, local physical education teachers need to play a dynamic role in using different teaching techniques in order to enhance quality teaching and learning. Future

Correspondence concerning this article should be addressed to Amy Ha Sau-ching, Department of Sports Science and Physical Education, The Chinese University of Hong Kong, Shatin, NT, Hong Kong.

studies focusing on the effects of type of unit, time allocation, class size, and class structure on ALTPE could also aid researchers and teachers to better understand what constitutes an effective teaching-learning environment.

Key words: academic learning time in physical education; teacher behavior; physical educator

Daily physical education is not necessarily quality physical education. A quality program depends partially on setting appropriate class contexts and then monitoring student involvement (Lacy & Claxton, 1990). Valid and reliable methods for determining effective teaching and learning have led to the use of a concept called Academic Learning Time in Physical Education-ALTPE (Parker, 1989). ALT refers to the time that a student is actually engaged with the subject matter at a level of difficulty commensurate with student abilities that result in an appropriate success rate (Fisher, Filby, Marliave, Chaen, Dishaw, Moore, & Berliner, 1978). Although the concept was originally used in academic contexts, it was also subsequently generalized to physical education. Research in physical education pedagogy has demonstrated that high percentages of academic learning in physical education are strongly related to higher student achievement (Randall & Imwold, 1989; Silverman, Devillier, & Ramirez, 1991; Siedentop, Birdwell, & Metzler, 1979; Siedentop, Tousignant, & Parker, 1982). An extensive descriptive analysis of seventy-five high school physical education classes showed that 38% of all intervals were coded as ALTPE (Beauchamp, Darst, & Thompson, 1990). A series of research projects have indicated that students spend anywhere from 18% for gymnastics to 77% for aerobics of their time engaged in motor activity (Lacy, LaMaster, & Tommaney, 1996; Cousineau & Luke, 1990; Silverman, Deviller, & Ramierz, 1991; Lacy & Claxton, 1990; Godbout, Brunelle, & Tousignant, 1983, Beauchamp, Darst, & Thompson, 1990). Although research on this topic has continued for over a decade, researchers have yet to determine an exact percentage of engaged time that is necessary to indicate student achievement. This of course

is based on the assumption that the greater the percentage of time engaged, the greater the amount of student achievement (Randall & Imwold, 1989).

Another teaching variable that has received a great deal of attention over the years in pedagogical research is teacher behaviors. While there are many factors that can affect student physical activity time, it can be hypothesized that the type and frequency of teaching behaviors have a strong relationship with the amount of student engagement (Siedentop, Birdwell & Metzler, 1979; Silverman & Zotos, 1987; Siedentop, 1991; Lacy, LaMaster, & Tommaney, 1996). There are many instruments that can be used to systematically observe teacher behaviors (Darst, Zakrajsek, & Mancini, 1989). But in order to provide a more complete picture of effective teaching, it is important to use similar type of instrumentation. More generalizable results are possible if a series of systematic and consistent observational studies are conducted with valid and reliable instruments (Metzler, 1989). One such systematic observation instrument is the Arizona State University Observation Instrument (ASUOI) (Lacy & Darst, 1989). This instrument can be used with event or interval recording and has been used to collect data on teaching behaviors in previous studies (Lacy, LaMaster, & Tommaney, 1996; Avant, 1990; Lacy & Claxton, 1990; Lacy & Lollar 1987). Phillips and Carlisle (1983) have shown that there is positive correlation between teacher feedback and higher levels of engaged skill learning time and achievement. Berkey (1986) further found in elementary schools, that a functional relationship existed between specific sequenced teacher behavior and ALT-PE. A recent study which correlated teacher behaviors and student ALT-PE, reported significant positive relationships between ALT-PE and concurrent instruction; and negative relationships between student involvement and management in primary school settings (Lacy, LaMaster, & Tommaney, 1996). While studying the relationship between teaching behaviors and student ALTPE may contribute to a more complete understanding of what constitutes effective teaching, little research has been conducted at the junior secondary school level. Thus, the purpose of this study is to analyze teacher behaviors and student academic learning time and to examine the relationship between these two variables in junior secondary schools.

Methods

Subjects and Schools

The subjects for this study were twelve in-service physical educators and their secondary one to two physical education classes. Participants were selected based on their willingness to participate in the study. Each teacher and their students were observed in four separate classes. There were six male and six female teachers with at least three years of teaching experience at the junior secondary school level. The sports facilities for the twelve schools were standard-equipped including one basketball court, one cover-playground and some leisure spaces. The ratio for student and ball was ranged from 4:1 to 6:1 among the twelve classes.

Instrumentation and Data Collection

The Arizona State University Observation Instrument (ASUOI) (Lacy & Darst 1989) and Academic Learning Time in Physical Education (ALTPE) (Siedentop, Tousignant, & Parker, 1982) were used in this study to collect data on teacher behavior and student learning. Using direct observation method, all coding was done by six research assistants who had been trained thoroughly and familiarised with the data collection protocols of both instruments. During the observation, a micro-cassette tape recorder equipped with an earphone was carried by the research assistant for cueing him/her every ten seconds to observe and five seconds to record. Pilot tapes were used to develop and refine the coding procedures by the investigator and six research assistants. In order to establish reliability of the systematic observation procedures, inter-observer agreements were preformed to ensure accuracy of the data collection. The inter-observer agreement percentage for the ASUOI behavior categories was above 93%. The inter-observer agreement for the ALTPE students behaviors was above 95%. The equation (Van

der Mars, 1989) used to calculate the percentage of agreement between observers is described below:

$$\frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \times 100$$

Data Analysis

The descriptive data were presented as a calculated percentage of intervals ASUOI for each behavior category and a calculated mean percentage of ALTPE time for each of the forty-eight classes. Then, first order correlational procedures were utilized to determine independent relationships between teacher behaviors and the percentage of appropriate motor engaged time across the observed classes. Finally, the data were analyzed by multiple regression procedures to calculate inter-correlational relationships of the ASUOI behaviors to ALTPE in the observed classes.

Results

Student ALTPE

Across all 48 observed classes, the mean percentage of ALTPE was 30.6% ($s=11.5$) shown in Table 1. ALTPE for individual classes ranged from 18% to a 43.2%.

Table 1 Percentage of Observed Intervals of ALTPE for All Classes

Categories	Total intervals	% Context level
<i>Not Motor Engaged</i>		
Waiting	772	13.4
off-task	1111	19.3
on-task	2114	36.7
<i>Motor Engaged</i>		
ALTPE	1763	30.6
	5760	100.0

Teacher Behavior

Data from the 48 observed classes were coded and quantified for each ASUOI behavior category. Pre-instruction (30.45%) was the most frequently coded teaching behavior while concurrent instruction (13.57%), management (13.34%), silence (9.16%), and questioning (7.55%) were the next highest categories. A summary of each ASUOI behavior category is shown in Table 2. When combining the three instructional categories (pre-instruction, concurrent instruction and post instruction), they account for almost 48.68% of the total intervals coded.

Table 2 Mean Percentage of Intervals Coded for ASUOI Behavior Categories

Behavior categories	% of Intervals	
	Mean	SD
Use of name	4.72	5.61
Pre-instruction	30.45	11.93
Concurrent instruction	13.57	11.57
Post-instruction	4.66	5.20
Questioning	7.5	5.04
Hustle	5.12	3.42
Praise	3.81	2.62
Scold	4.12	1.09
Management	13.34	7.8
Silence	9.16	6.8
Uncodable	3.5	2.2

Correlation of Teacher Behaviors to ALTPE

The Pearson Product Moment Correlation indicates that three ASUOI behavior categories had a significant relationship at the .05 level with ALTPE (Table 3). Pre-instruction ($r = -.56$, $p < .01$) had the highest correlation with ALTPE, the concurrent instruction ($r = .48$, $p < .05$) and management ($r = -.42$, $p < .05$) had the second and third strongest relationship.

Table 3 Pearson Product Moment Correlation Coefficient for ASUOI Behavior Categories with ALTPE

Variable Pair	Relationship	Significance
Use of name	.08	
Pre-instruction	-.56	<.01
Concurrent Instruction	.48	<.05
Post-instruction	-.22	
Questioning	.28	
Hustle	.15	
Praise	-.19	
Scold	-.09	
Management	-.44	<.05
Silence	-.38	
Uncodable	-.12	

Discussion

Research indicated that students spend anywhere from 18-77% of their time engaged in motor activity (Lacy, LaMaster, & Tommaney, 1996; Cousineau & Luke, 1990; Silverman, Deviller, & Ramierz, 1991). Students observed in this study spent an average of 30.6% (interval recording) of their time engaged in ALTPE, which was at an appropriate level of learning. However, as Silverman and Zotos (1987) pointed out, interval recording should be expected to yield higher percentages of ALTPE than duration recording in most settings. Therefore, researchers must be very sensitive in comparing ALTPE studies when different recording techniques are used in different settings. Lacy et al. (1996) further discussed that the amount of ALTPE time may also be affected by the size of class, class structure, the type of activities and organization. In the present study, the average number of class size was forty-five in separated classes where female teachers teach girls and male teachers teach boys. Activities taught were basketball, handball, and soccer. Most classes included the traditional routine of warm-up, a drill of some sort and the playing of a game.

The dominant teacher behaviors in this study were pre-instruction, management, concurrent instruction and silence. The fact that the percent-

age of pre-instruction time (30.45%) occupied almost one third of the total instructional time indicates that physical educators are excessive in explaining a skill prior to students' practice. Such results imply that physical educators are not as effective as they are when explaining and demonstrating a skill to their students. According to Rink (1998), short and precise description of a skill is the key to effective learning. Lengthy explanation might cause students to lose their attention span. What is recommended is that teachers should distribute their time in concurrent instruction rather than on pre-instruction (Lacy et al., 1996). However, the total amount of time spent on concurrent instruction in this study was 13.57% which should be appropriately raised whenever necessary.

Management time used in this study was 13.34% , which implies that subjects in this study were quite effective in managing their students' organization as suggested by Luke (1989). One recent study showed that teachers spent too much time (31.1%) on class management and this highly affected students' academic learning time in physical education (Lacy et al., 1996). Harrison (1987) emphasised that "effective classroom management is to minimize off-task and deviant behaviors through presenting appropriate learning activities, motivating a good pace, monitoring student responses, and providing instruction and practice in classroom procedures and routines" (p.41). In the present study, even though the average class size was forty-five, teachers seemed to be effectively and made good use of their management skills. Therefore, large class size is not necessarily a concern to teachers particularly if adequate teaching routines and effective management skills are well developed. Another dominant teacher behavior was silence which obtained a percentage of 9.16. This is quite exceptional when compared with other studies (Lacy et al., 1996; Avant, 1990). Teachers in this study tended to be actively monitoring the class which resulted in a low rate of silence. However, the low amounts of praise, scold, hustle, use of name, and post-instruction reflect a lack of individualized teaching and a lack of interactive and evaluative teaching/learning process. Such findings are consistent with previous studies which show that physical educators

spent significantly less time on praising and criticizing students during instructions (Ha, 1996).

In this study, the teacher behaviors of pre-instruction and management had the strongest negative relationship with ALTPE. This indicates the lesser the time spent on pre-instruction and management, the higher the percentage of student learning. Such findings support the notion that teachers with good management technique and clear presentation skills will increase student learning (Harrison, Blakemore, Buck, & Pellett, 1996; Rink, 1998). During the pre-instruction time, teachers usually present motor tasks to learners in group instructional settings. To be effective in task presentation with the goal of increasing students learning, teachers must (a) communicate the meaning and importance of the objectives or learning objectives to the learner, (b) organize people, space, equipment, and time for practice, and (c) communicate the focus or intent of the practice (Rink, 1994). With these three criteria in mind, teachers must also keep presentation "short and precise" and in concordance with different students' attention spans. In regard of management technique, physical educators must develop a wide variety of managerial skills for different teaching situations. Ultimately, concurrent instruction had the positive relationship with ALTPE. Such findings are consistent with other studies that students must be motor engaged for a concurrent instruction to occur (Lacy et al., 1996; Avant, 1990).

Conclusions

Although the subjects of this study can manage the class effectively, time spent on pre-instruction and concurrent instruction needs to be re-adjusted in order to create more opportunities for students to engage in skill practice at an appropriate level. Furthermore, physical education teachers also need to play a dynamic role in using different techniques such as praise, use of name, hustle as well as post-instruction to provide a more interactive, supportive and evaluative learning environment for their students. To fulfil these, physical education teachers should systematically and/or regularly re-examine their instructional processes with the purpose to retain effective teaching behaviors and eliminate ineffective behaviors.

Future studies focusing on the effects of type of unit, time allocation, class size, and class structure on academic learning time could also aid researchers and teachers to better understand what constitutes an effective teaching-learning environment.

References

- Avant, F. (1990). Comparison of female teaching and coaching behaviors in junior high schools through systematic observation. *Abstracts: Research papers, AAHPERD National Convention*. Reston, VA:AAHPERD Press.
- Beauchamp, L., Darst, P., & Thompson, L. (1990). Academic learning time as an indication of quality high school physical education. *Journal of Physical Education, Recreation, and Dance*, 61(1), 92-95.
- Berkey, D. (1986). *Effects of specified teacher behaviors on student ALT-PE*. Paper presented at the national convention of the American Alliance for Health, Physical Education, Recreation and Dance, Cincinnati, OH.
- Cousineau, W., & Luke, M. (1990). Relationship between teacher exceptions and academic learning time in sixth grade physical education basketball classes. *Journal of Teaching in Physical Education*, 9(4), 262-271.
- Darst, P., Zakrajsek, Mancini, V. (1989). *Analyzing Physical Education and Sport Instruction*. (2nd ed). Champaign, IL: Human Kinetics Publishers.
- Fisher, C., Filby, N., Marliave, R., Chaen, L., Dishaw, M., Moore, J., & Berliner, D. (1978). *Teaching Behaviors, academic learning time, and student achievement: Final report of phase III-B, beginning teacher evaluation study*. San Francisco: Far West Regional Laboratory for Educational Research and Development.
- Godbout, P., Brunelle, J., & Tousignant, M. (1983). Academic learning time in elementary and secondary physical classes. *Research Quarterly for Exercise and Sport*, 54(1), 11-19.
- Ha, A.S. (1996). A descriptive study of pre-service and in-service physical educators' teaching behaviors in Hong Kong. *Education Journal*, 24(2), 45-56.
- Harrison, J.N., Blakemore, C.L., Buck, M.M., & Pellett, T.L. (1996) *Instructional strategies for secondary school physical education*. Dubuque, IA: Brown & Benchmark.
- Harrison, J. (1987). A review of the research on teacher effectiveness and its implications for current practice. *Quest*, 39, 36-55.

- Lacy, A.C., LaMaster, K.J., & Tommaney, W.J. (1996). Teacher Behaviors and Student Academic Learning Time in Elementary Physical Education. *Physical Educator*, 56(1), 44-50.
- Lacy, A.C., & Darst, P.W. (1989). The Arizona State University Observation Instrument (ASUOI). In P. Darst, D. Zakrajsek, & V. Mancini (Eds.), *Analyzing physical education and sport instruction* (pp. 369-378). Champaign, IL: Human Kinetics.
- Lacy, A., & Claxton, D. (1990). Descriptive analysis of student ALT-PE and teacher behaviors in college aerobic dance classes. *Abstracts: Research papers — 1990 AAHPERD National Convention*. Reston, VA: AAHPERD Press.
- Lacy, A., & Lollar, J. (1987). The effects of three systematic observation data collection procedures on teaching behaviors of college physical education instructors. *Abstracts: Research papers, AAHPERD National Convention*. Reston, VA: AAHPERD Press.
- Luke, M.D. (1989). Research on class management and organization: Review with implications for current practice. *Quest*, 41, 55-67.
- Metzler, M. (1989). A review of research on time in sport pedagogy. *Journal of Teaching in Physical Education*, 8(2), 87-103.
- Parker, M. (1989). Academic Learning Time-Physical Education (ALT-PE), 1982 revision. In P. Darst, D. Zakrajsek, & V. Mancini (Eds.), *Analyzing physical education and sport instruction* (pp. 195-205). Champaign, IL: Human Kinetics.
- Phillips, D.A., & Carlisle, C. (1983). A comparison of physical education teachers categorized as most and least effective. *Journal of Teaching in Physical Education*, 2(3), 55-67.
- Randall, L.E., & Imwold, C.H. (1989). The effect of an intervention on academic learning time provided by preservice physical education teachers. *Journal of Teaching in Physical Education*, 8, 271-279.
- Rink, J.E. (1998). *Teaching Physical Education for Learning* (3rd ed.). Dubuque, Iowa: McGraw-Hill Book Company.
- Rink, J. (1994). Task presentation in pedagogy. *Quest*, 46, 270-280.
- Siedentop, D. (1991). *Developing Teaching Skills in Physical Education* (3rd ed.). Palo Alto: Mayfield Publishing Company.
- Siedentop, D., Birdwell, D., & Metzler, M. (1979). A process approach to measuring teaching effectiveness in physical education. *Abstracts: Research papers — AAHPERD National Convention*. New Orleans, LA: AAHPERD Press.

- Siedentop, D., Tousignant, M., & Parker, M. (1982). *Academic learning time — Physical education coding manual (Rev. ed.)*. Unpublished manual, The Ohio State University.
- Silverman, S., Deviller, R., & Ramirez, T. (1991). The validity of academic learning time - physical education (ALTPE) as a process measure of achievement. *Research Quarterly for Exercise and Sport*, 62(3), 319-325.
- Silverman, S., & Zotos, C. (1987). Validity of interval and time sampling methods for measuring student engaged time in physical education. *Educational and Psychological Measurement*, 47, 1005-1012.
- Van der Mars, H. (1989). Observer reliability: issues and procedures. In P. Darst, D. Zakrajsek, & V. Mancini (Eds.), *Analyzing physical education and sport instruction* (pp. 53-80). Champaign, IL: Human Kinetics.