

## An Examination of Teaching Behaviors and Learning Activities in Physical Education Class Settings Taught by Three Different Levels of Teachers

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**Abstract: Problem statement:** To be an accredited teacher education program, physical education teacher education (PETE) programs must fulfill the national standards established by the National Association for Sport and Physical Education (NASPE). In order to meet the standards, a PETE program needs to have the cooperation of the following three levels of instructors: Specialist Teachers (STs), Inservice Teachers (ITs) and Preservice Teachers (PTs). The STs are those who teach at colleges or universities, possess advanced degrees with full/associate/assistant professor titles and teach theoretical and skill courses. They participate in the academic activities of the PETE program; for instance, they serve as academic advisors and instructors of the PTs. The ITs are those who possess teacher certificates, bachelor or higher degrees and currently teach physical education/activity classes at middle/high schools. They also participate in the academic activities; for example, they serve as cooperating teachers providing guidelines and supports for the PTs. The PTs were college students who were studying in a PETE program. They intended to become PE teachers at K-12 school levels. They must complete the student teaching requirements at primary and secondary school class settings in order to graduate from colleges or universities. **Approach:** The purpose of this study was to examine the differences and similarities of Teaching Behaviors (TB) and Learning Activities (LA) in Physical Education (PE) class settings taught by the three different levels of teachers. Participants were 45 PE teachers from the three levels and their students from a university and three high schools in an urban city of the United States. A total of 90 lessons taught by the three levels of teachers were videotaped and coded using the Direct Instruction Behavior Analysis (DIBA) system. **Results:** Findings of the one-way independent group ANOVA revealed that eight out of 13 variables were significantly different ( $p < 0.05$ ) among the three levels of teachers with respect to the TB and LA exhibited by the participants as: Informing,  $F = 3.541$ , Preservice Teachers (PTs) > Inservice Teachers (ITs) > Specialist Teachers (STs); Praise/Encouragement,  $F = 14.422$ , PTs > STs > ITs; Feedback,  $F = 15.036$ , STs > ITs > PTs; Controlling,  $F = 8.997$ , PTs > ITs > STs; None of the Above,  $F = 17.313$ , ITs > STs > PTs; Motor-Engaged,  $F = 5.043$ , ITs > PTs > STs; Cognitive-Engaged,  $F = 6.049$ , STs > PTs > ITs; and Waiting for a Turn,  $F = 4.890$ , ITs > PTs > STs. No significant ( $p > 0.05$ ) differences were found on the following five variables among the three levels of teachers: Observing, structuring, questioning, preparing and get equipment/relocation. **Conclusion:** In conclusion, the STs appear to use more Feedback TB than the ITs and PTs and the students taught by the STs tend to engage more cognitive activities. The PTs appear to utilize more informing, praise/encouragement and controlling TB than the ITs and STs. Students taught by the ITs tend to have more Motor-Engaged and Waiting for a Turn activities than students taught by the STs and PTs. The ITs appear to utilize more None of the Above behaviors than the STs and PTs. The teachers of the three levels tend to use the behaviors of observing, structuring and questioning in a similar manner. The results of the present study facilitate the establishment of a new set of data in TB and LA for collegiate, high school and preservice teachers to modify and improve their instructions in PE class settings.

**Key words:** Instructing, managing, class time, motor engaged

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### INTRODUCTION

Research on Teaching in Physical Education (RT-PE) has accomplished remarkable achievements in

regard to how teaching behaviors are related to students' learning activities in physical education class settings over the last three decades (Graham, 2008; James and Cruz, 2005; Keating *et al.*, 1999; Martin and

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Kulinna, 2004; McKenzie *et al.*, 1984). With those abundant findings from the studies in Physical Education (PE) at various school levels, researchers have summarized that the characteristics of effective teaching and learning environments in physical education were: (a) clear objectives and contents covered; (b) well-organized and appropriate expectations; (c) meaningful task and high success rate; (d) smooth transition and low in management time; (e) appropriate guidance and active supervision; (f) high percentage in student-engaged time and low percentage in student-waiting time and (g) teacher's enthusiasm and equitable support (Brophy and Good, 1986; Pangrazi, 2007; Graham, 2008; Parker, 1995; Siedentop and Tannehill, 2000). The characteristics stated above became essential guidelines and strategies for training novice teachers to become effective teachers (Graham, 2008; Graham and Heimerer, 1981; Pangrazi, 2007; Siedentop and Tannehill, 2000).

Meanwhile, many previous studies in RT-PE focused on how teacher and student behaviors were associated with The Direct Instruction Model (DIM) in physical education (Anderson *et al.*, 1979; Rosenshine and Stevens, 1986; Sweeting and Rink, 1999; Graber, 2001). Rosenshine (1979) illustrated that the DIM in physical education possesses clear learning goals, adequate time for instruction and practice. Moreover, this model is characterized by: (a) appropriate subject matters for learning abilities of students and (b) lower level cognitive engagement but meaningful tasks and easy maintain high success rate on skill attempts of students through monitoring performance of student and providing immediate feedback (Brophy and Good, 1986; Graham, 2008; Pangrazi, 2007).

On the other hand, numerous studies from the field of teaching physical education concentrated on the idea of Academic/activity Learning Time Physical Education (ALT-PE) as a means of assessing effective teaching and learning outcomes of students (Godbout *et al.*, 1983; Parker, 1989; Placek and Randall, 1986; Shute *et al.*, 1998; Silverman *et al.*, 1988). In 2000, the US Department of Health and Human Services (USDHHS) and US Department of Education (USDE) have established guidelines for quality K-12 physical education programs. The national goal for K-12 school physical education emphasized that 50% or more of class time should be spent with students being physically active (US Department of Health and Human Services, 2001). In order to meet the national goal, Martin and Kulinna (2005) suggested that teachers should provide physically active classes that maximize student opportunities for various physical activities with at least 50% of class time. Graham (2008) and

Kulinna *et al.* (2006) also urgently pointed out that skillful physical education teachers should possess the skills to minimize off-task behaviors and maximize learning activities in stead of spending their class time having children listening, standing and sitting.

Researchers in the field of physical education have used different systematic observation instruments to investigate, describe and compare the differences and similarities of teaching behaviors and students' activity levels in physical education classes (Banville and Rikard, 2001; Keating *et al.*, 1999; Martin and Kulinna, 2005; Mitcell *et al.*, 2003). Significant linear correlations (rs) between teaching behaviors and learning activities with rs ranging from 0.26-0.42 have been found (Martin and Kulinna, 2005). For example, Martin and Kulinna (2005) examined whether teachers' intentions to teach lessons more active physically were related to teaching behaviors (e.g., demonstrating and promoting fitness) and investigated whether teachers' behaviors were associated with the time their students spent on various activities in 43 physical education teachers (20 from elementary schools, 11 from middle schools and 12 from high schools). They found that general instruction and management teaching behaviors were negatively related to students' moderate to vigorous physical activities; but those instructional behaviors were positively associated with students' standing, sitting or even lying behaviors.

To be recognized as accredited teacher education programs, Physical Education Teacher Education (PETE) programs in the US must fulfill the standards established by the National Association for Sport and Physical Education (NASPE) for Beginning Teachers (National Association for Sport and Physical Education, 2003) in association with the criteria of the National Council for Accreditation of Teacher Education (NCATE) (Banville and Rikard, 2001; National Association for Sport and Physical Education, 2003; National Council for Accreditation of Teacher Education, 2002; Mozen, 2005; Banville, 2006). In order to align and achieve the standards and criteria, PETE programs must involve the coordinating works of the three levels of educators: Specialists Teachers (STs), Inservice Teachers (ITs) and Preservice Teachers (PTs). The STs are those who teach courses at the university/college level, possess advanced degrees with full/associate/assistant professor titles and teach theoretical and skill/activity courses in PETE programs. They regularly participate in the academic activities in a teacher education programs. For example, they serve as academic advisors and instructors of student teachers (also called PTs). The ITs are instructors who possess teacher certificates and master degrees, currently

teaching physical education classes at the high school level. They are also involved in the academic activities in PETE programs. For example, they serve as co-operating teachers to guide PTs' teaching internship in their schools. The PTs are college students who are currently studying in PETE programs. They intend to become physical education teachers at K-12 school levels. They must complete the student teaching requirements at K-12 school levels in order to graduate from a university/college.

Theoretically, the STs are the skillful teachers and the role models of the PTs. The ITs are the teachers who have sufficient knowledge and skills to teach in the field/gyms of physical education; they are the most valuable resource that has positive influences in the instructional skills during the internship period for the PTs. Meanwhile, the PTs learn and develop the essential pedagogical knowledge and skills from the STs and ITs. Hence, it would be imperative to conduct a study to identify and compare the features and differences in teaching behaviors and learning activities in physical education class settings taught by the teachers of the three levels. The problems are: What are the features of the teaching behaviors among these three levels of teachers? Do the same teaching behaviors work in different physical education class settings? If the answer is no, what are those differences? Are there any differences in regard to students' learning activity levels taught by the three levels of teachers? If the answer is yes, what would be the differences? Regrettably, little information is available to answer these questions.

According to Silverman (1991), although research studies on teaching physical education have accomplished abundantly, the majority of the studies were conducted at the K-8 school levels. In addition, to the knowledge of the investigators, no studies have been conducted to examine the three levels of educators in a PETE program. A lack of information and understanding in answering the questions stated above might have contributed to the limited success in the PETE programs. The purposes of this study, therefore, were to identify and compare the features and differences of teaching behaviors and learning activities in physical education class settings taught by the teachers of the three levels and to provide insights and recommendations for further improvements of the PETE programs.

## **MATERIALS AND METHODS**

**Participants:** Participants (N = 45) included 15 STs (11 males and 4 females), 15 ITs (9 males and 6 females) and 15 PTs (10 males and 5 females) and their students from an urban university and three urban high

schools located in the East Coast of the US. After obtaining the permission to conduct this study from the Institutional Review Board of the university and the administration of the high schools, the informed consent forms were delivered to the teachers and their students. The research design and the videotaping procedures were explained to the teachers. Both the teachers and the students gave informed consent before the videotaping process began.

The STs (aged 38-61 years) had 5-30 years of teaching experiences and taught 2-4 physical education skill/activity classes and 1-2 theoretical courses a week. The ITs (aged 28-52 years), possessed 5-20 years of teaching experiences and taught physical skill/activity/fitness classes five days a week, 3-4 classes a day. The PTs (aged 21-23 years) were senior college students studying in a PETE program. The PTs had about seven months of teaching experiences and taught physical skill/activity/fitness classes 3-4 days a week, 1-3 classes a day. The subject matters involved in the physical skill/activity/fitness classes in the current study were team sports (e.g., basketball, soccer, football, volleyball and baseball), individual sports (e.g., track and field, swimming and gymnastics), individual activities (e.g., aerobics, dance and yoga) and fitness (e.g., weight lifting and circuit physical fitness exercises).

In addition, the curricular requirements and the standards as outlined by the state, school districts and the three high schools were: (a) basic motor and manipulative skills, Cardiorespiratory endurance, flexibility, muscular strength, endurance and body composition; (b) to participate in physical activities that develop physical fitness skills, demonstrate fundamental motor, non-locomotor and manipulative skills, understand the effects of activity on the body and the risks associated with inactivity, understand the relationship between physical activity and individual well-being; (c) students will have the necessary knowledge and skills to establish and maintain physical fitness, participate in physical activity and maintain personal health (New York State Education Department, 2007).

The class sizes for the STs, ITs and PTs were 15-26, 20-65 and 20-32 students, respectively. Since the subject matters involved in this study related to more than 10 physical activities or sport skills, it was important to note that the major concern of the "Learning Activity" would be reflected by the time that the students actually spent on the Motor Engaged and Cognitive Engaged tasks.

**Instrumentation:** To collect data that served to address the purpose of the present study, the Direct Instruction

Behavior Analysis (DIBA) (Zakrajasek and Tannehill, 1989) system was employed. The DIBA system was a previously validated systematic observation instrument designed to collect data on teacher and student behaviors and could be used for teaching performance analysis (Zakrajasek and Tannehill, 1989). The DIBA system was characterized by those behaviors identified by the researchers of the DIM (Fielding *et al.*, 1983; Graham and Heimerer, 1981; Rosenshine, 1979; Zakrajasek and Tannehill, 1989). Additionally, there was a "Comments" section on the 'DIBA Recording Sheet', which allowed the recorder to write down his/her notes about the lesson. These notes would be useful when the researchers explained and illustrated what were the reasons behind the quantitative data. The DIBA was composed of 14 categories in which eight categories were used to determine teaching behaviors of the teachers and six categories were used to decide learning activities of the students (Zakrajasek and Tannehill, 1989). The following were the eight teacher's behaviors and six student's activities:

- Teacher Informing (I): Teacher tells, explains, demonstrates, reviews, or summarizes
- Teacher Observing (O): Teacher silently observes, watches, or monitors student performance
- Teacher Structuring (S): Teacher stresses objectives and important points, directs performance, or signals transitions
- Teacher Questioning (Q): Teacher asks questions that are intended to evoke a verbal or motor response
- Teacher Praise/Encouragement (P): Teacher praises, commends, accepts, or encourages student performance or attempts
- Teacher Feedback (F): Teacher gives feedback that is immediate, specific and task relevant
- Teacher Controlling (C): Teacher uses disciplinary comments or actions to criticize or to justify authority
- None of the Above (N): Teaching behaviors are not related to the instructional process
- Motor engaged (M): Student is actively engaged in an appropriate motor task/activity
- Cognitive Engaged (CE): Student listens to or reads about subject matter and gains information
- Response Preparing (R). Student gets ready to respond to a learning task
- Gets Equipment/Relocates (GR): Student is following teacher's direction or information to get the equipment or move to a different location
- Waits for a Turn (W): Student is waiting in a line for his or her turn to practice a task

- Off-Task (O): Student is not engaged in an appropriate motor or cognitive task

**Procedures:** During the investigation, each participant was videotaped twice while they were teaching and the entire lesson was recorded; therefore, a total of 90 lessons (45 participants, two lessons per participant) were videotaped. Prior to actual videotaping, six practice sessions were conducted to allow the research assistants to become familiarized with the videotaping process. Digital video camcorders (Sony DCR TRV 350 NTSC, Japan) were utilized to perform the videotaping tasks, the selected physical activity or skill lessons were videotaped from the moment when the teachers officially started the lesson until the teachers dismissed the class. During each videotaping session, the camcorder was placed in a non-obtrusive location to minimize any reactive effects.

**Data collection:** The data were collected using interval recording and event recording techniques. The interval recording reflected the percentage of class time that the teachers and their students exhibited/spent on the teaching behaviors/student activities that were defined by the DIBA; whereas the event recording reflected the occurrence frequency that the teachers and their students utilized/showed on the teaching behaviors/student activities that were defined by the DIBA; Siedentop and Tannehill (2000) described that event recording involved placing a tally marked on the coding form each time one of the predefined behaviors/activities categories was observed. This procedure resulted in a cumulative record of discrete events that had occurred during the observation period. The measurement unit of Rate Per Minute (RPM) was utilized if the duration of the observation was measured in minutes because the RPM data could produce a more appropriate illustration of what occurred during the observed episodes (Siedentop and Tannehill, 2000).

Two observers were trained for coding the 14 behavioral categories of the DIBA (Zakrajasek and Tannehill, 1989). Prior to actual coding, two practice sessions (120 min session<sup>-1</sup>) were conducted, so that they became familiarized with the coding process. Furthermore, the observers were required to reach an Inter-Observer Agreement (IOA) of 0.85 regarding the reliability of the data collected. The IOA for the current study was calculated as suggested by the general formula for computing reliability of interobserver (Siedentop and Tannehill, 2000). The IOA were checked on each coding day.

After all the lessons were recorded, the following procedures were executed. Interval recording technique

was used to code the videotaped lessons, producing percentage of time that the participants and their students spent on the predefined behaviors categories. Event recording was also used to code the videotaped lessons, resulting in a frequency of the behavioral categories exhibited by the participants and their students. The RPM was used as the measurement unit with the event recording to describe and compare the frequencies among the behavioral categories (Siedentop and Tannehill, 2000). The “Recording Procedures” in the DIBA (Zakrajasek and Tannehill, 1989) were followed throughout the entire coding process.

**Data analyses:** First, the percentage (for interval data) and the descriptive statistics (for RPM data) were computed on the 14 behavioral categories of the DIBA. Second, one-way independent group Analysis Of Variance (ANOVA) was utilized for the RPM data analysis. The independent variable was the three levels of teachers (STs, ITs and PTs) whereas the dependent variables were the 14 behavioral categories of the DIBA system. It was important to note that the 14th category (i.e., Student Off-Task) was not able to be included in the current analyses because of no occurrence or very low occurrence frequency. According to the design of the DIBA, the recorder needed to write down his/her notes on the “Comments” section of the ‘DIBA Recording Sheet’ at the end of coding for each lesson. These comments and notes were important and useful because they could help the researchers better understand and analyze the observation results.

## RESULTS

The purposes of this study were to examine and compare the features and differences of teaching behaviors and learning activities in physical education class settings taught by the STs, ITs and PTs. Thirteen out of 14 behavioral categories of the DIBA were analyzed; wherein eight categories determined how the teachers performed and five categories determined how the students learned. The IOA values over the 13 behavioral categories for the STs, ITs and PTs were 0.89, 0.90 and 0.85 respectively, thus meeting the criteria for systematic observation research (Siedentop and Tannehill, 2000).

A total of 90 lessons were videotaped and coded. The measurement units were percentage and RPM. The mean scores in percentages of time that the three levels of teachers spent in the PE classes for the 13 behavioral categories using the DIBA system are presented in Table 1.

Table 1: Mean scores in percentages of class time that the participants spent in 90 physical education classes for the thirteen behaviors using the DIBA system (N = 45)

Variables	Specialist (%)	SD	Inservice (%)	SD	Preservice (%)	SD
<b>TB:</b>						
Informing	25.50	11.86	28.80	13.73	46.18	13.13
Observing	11.40	8.86	17.00	7.51	14.93	7.83
Structuring	36.00	14.56	25.40	14.09	22.83	12.58
Questioning	5.50	3.67	3.20	1.69	4.84	8.78
Praise/Enc.	0.30	0.23	1.90	0.85	6.75	3.46
Feedback	12.90	5.79	9.20	4.82	2.99	1.85
Controlling	0.00	0.00	0.30	0.20	0.56	0.18
None above	3.30	0.12	14.10	5.89	1.67	0.68
<b>LA:</b>						
Motor-engaged	46.90	1.58	56.20	16.77	43.34	15.73
Cogn.-engaged	31.20	9.86	20.74	9.79	32.00	10.08
Resp-prepare	6.80	2.65	5.60	1.48	3.37	1.62
Equipment/relo	13.50	8.79	6.40	3.59	7.58	4.17
Waiting	2.90	1.07	9.70	4.27	13.73	5.32

**Note:** TB: Teaching Behaviors; LA: Learning Activities. Praise/Enc: Praise/Encouragement, None Above: None of the Above, Cogn.-Engaged: Cognitive-Engaged, Resp-prepare: Respond-preparing, Equipment/Relo: Equipment/Relocation and Waiting: Waiting for a Turn

The percentage data reflected the features of the three levels of teachers and their students spent their class time on the 13 behavioral categories. Results revealed that, in the teacher Informing category, the PTs spent 46% of class time which was 17 and 20% more than those of the ITs and STs, respectively, spent on the same category. In the teacher Observing category, the ITs spent 17% of class time that was 2 and 6% more than those of the PTs and STs, respectively, spent on this category. In the teacher Structuring category, the STs spent 36% of class time which was 11 and 13% more than those of the ITs and PTs, respectively, spent on the same category. In the teacher Praise/Encouragement category, the PTs spent 7% of class time which was 5 and 7% more than those of the ITs and STs, respectively, spent on this category. In the teacher Feedback category, the STs spent 13% of class time which was 4 and 10% more than those of the ITs and PTs, respectively, spent on the same category.

On the other hand, in the Motor Engaged category, students taught by the ITs gained 56% of class time that was 9 and 13% more than those of the students taught by STs and PTs, respectively, on the same category. In the cognitive engaged category, students taught by the PTs gained 32% of class time that was 1 and 11% more than those of the students taught by STs and ITs, respectively, on that category. In the Waiting for a Turn category, students taught by the PTs had 14% of waiting time that was 4 and 11% more than those of the students taught by ITs and STs, respectively, on the same category.

The descriptive statistics of the 13 behavioral categories of the DIBA in RPM data for the teachers and the students are presented in Table 2.

Table 2: Descriptive statistics of 13 variables from DIBA system using Rate Per Minute (RPM) for 90 lessons taught by specialist, inservice and preservice teachers

Variables	Levels	M	SD	Min.	Max.
<b>Teacher behaviors</b>					
Informing	1	2.617	1.014	0.823	4.179
	2	3.349	2.271	0.419	8.928
	3	3.613	0.761	1.793	5.210
Observing	1	1.149	1.126	0.000	4.167
	2	1.129	0.810	0.148	3.182
	3	1.224	0.722	0.277	3.250
Structuring	1	2.622	1.504	0.894	7.400
	2	2.479	1.426	0.559	6.290
	3	2.007	0.948	0.640	4.241
Questioning	1	0.529	0.362	0.040	1.432
	2	0.365	0.807	0.000	0.500
	3	0.349	0.234	0.000	1.033
Prai/Encou	1	0.248	0.164	0.000	0.659
	2	0.138	0.245	0.000	1.028
	3	0.525	0.402	0.000	1.725
Feedback	1	0.946	0.601	0.106	2.965
	2	0.693	0.537	0.000	2.067
	3	0.274	0.204	0.000	0.912
Controlling	1	0.000	0.000	0.000	0.000
	2	0.010	0.027	0.000	0.111
	3	0.091	0.156	0.000	0.577
None-above	1	0.362	0.294	0.000	1.444
	2	1.284	1.366	0.000	7.333
	3	0.116	0.138	0.000	0.520
<b>Student activities</b>					
Motor-engaged	1	3.596	1.758	0.250	8.400
	2	5.215	2.612	0.000	10.758
	3	4.348	1.339	2.444	7.414
Cogn-engaged	1	2.755	1.084	0.736	4.891
	2	1.880	1.109	0.000	4.210
	3	2.432	0.710	1.138	3.867
Preparing	1	0.205	0.205	0.000	1.059
	2	0.278	0.249	0.000	1.000
	3	0.304	0.217	0.000	0.880
Equip/relocat.	1	0.791	0.311	0.261	1.788
	2	0.665	0.469	0.000	1.594
	3	0.688	0.359	0.182	1.445
Waiting	1	0.383	0.304	0.000	1.000
	2	0.873	0.915	0.000	2.500
	3	0.963	0.929	0.000	3.810

**Note:** The measurement unit was RPM; M: Mean; SD: Standard Deviation; Min: Minimum and Max: Maximum. Waiting: Wait for a turn; Equip/Relocat: Gets equipment or relocates; Cogn-engaged: Cognitive engaged. Level 1: Specialist teachers, Level 2: Inservice teachers and Level 3: Preservice teachers. The 14th variable, Off-Task, in the original DIBA system was not included in the analysis due to no occurrence or very low occurrence during the investigation

The one-way independent group ANOVA evaluating the 13 variables of the DIBA for the 90 lessons taught by the STs, ITs and PTs are presented in Table 3.

The analysis conducted on the one-way independent group ANOVA revealed that the mean RPM scores were significantly ( $p < 0.05$ ) different among the three levels of teachers with respect to the following eight teaching behaviors: Informing  $F = 3.541$ ,  $p = 0.033$ ,  $PTs > ITs > STs$ ; Feedback  $F = 15.036$ ,  $p = 0.000$ ,  $STs > ITs > PTs$ ;

Table 3: One-way independent group ANOVA comparing 13 variables from 90 lessons taught by specialist, inservice and preservice teachers

Variables	F (2, 89) <sup>a</sup>	p <sub>≤</sub>
<b>Teacher behaviors</b>		
Informing	3.541	0.033
Observing	0.091	0.913
Structuring	1.021	0.365
Questioning	1.070	0.347
Prai/encou.	14.422	0.000
Feedback	15.036	0.000
Controlling	8.997	0.000
None above	17.313	0.000
<b>Student activities</b>		
Motor-engaged	5.043	0.008
Cogn-engaged	6.049	0.003
Preparing	1.555	0.217
Equip/Relocat.	0.905	0.408
Waiting	4.890	0.010

**Note:** <sup>a</sup>: Table  $F_{(0.01)(2, 89)} = 2.39$ . Praise/Enc: Praise/Encouragement; None above: None of the above, Cogn-engaged: Cognitive-engaged; Resp-prepare: Respond-preparing; Equipment/relo.: Equipment/relocation and Waiting: Waiting for a turn

Controlling  $F = 8.997$ ,  $p = 0.000$ ,  $PTs > ITs > STs$ ; None of the above  $F = 17.313$ ,  $p = 0.000$ ,  $ITs > STs > PTs$ ; Motor Engaged  $F = 5.043$ ,  $p = 0.008$ ,  $ITs > STs > PTs$ ; Cognitive engaged  $F = 6.049$ ,  $p = 0.003$ ,  $STs > PTs > ITs$  and Waiting for a Turn,  $F = 4.890$ ,  $p = .010$ ,  $PTs > ITs > STs$ . Results of the one-way independent group ANOVA provided further evidences regarding the differences in the teaching behaviors and learning activities in physical education class settings taught by the three levels of teachers.

## DISCUSSION

According to previous researchers in the field of teaching in physical education, the theoretical and methodological theme most frequently utilized in teaching effectiveness in physical education over the past several decades was the percentage of class time that teachers and their students spent in their lessons (Faucette and Patterson, 1990; Martin and Kulinna, 2005; Mitchell *et al.*, 2003; Silverman *et al.*, 1988). Silverman (1991) indicated that recently researchers in the field of education have given much attention to how time is spent in physical education class settings. To further this “Class Time Utilization Rate” theme, the current study examined the class time features in 90 lessons. These features reflected not only the percentage of class time that teachers and students spent on teaching behaviors and learning activities but also the relationships between various teaching behaviors and learning activities. The findings were interesting and somewhat surprising because the percentage of class time that the participants spent on a number of

teaching behaviors and learning activities in this study were much higher than those of the previous studies.

First, the teachers of the three levels in the current study spent their class time on several teaching behaviors in different ways when compared with the results in previous studies. For example, teachers in the current study spent their class times on the Informing category were 26% by STs, 29% by ITs and 46% by PTs and on the Structuring category were 36% by STs, 25% by ITs and 23% by PTs. According to a comprehensive review of literature by Silverman (1991), he summarized that the majority of the physical education teachers spent about 25% of their class time on informing, explanation and demonstration.

Second, the students in the present study spent high percentages of class time on the motor engaged category (e.g., 56% taught by ITs, 47% taught by STs and 43% taught by PTs) and the cognitive engaged category (e.g., 21% taught by ITs, 31% taught by STs and 32% taught by PTs). These two learning activities were regarded as instructional products by previous researchers (Pangrazi, 2007; Shute *et al.*, 1998; Silverman *et al.*, 1988). Silverman (1991) summarized that the majority of the students were physically active less than 30% of the time and less than 15% of that time was spent practicing at the appropriate level. Although the findings of the current study might sound somewhat surprising to the researchers in the field of teaching physical education, it appears to be a new trend and is consistent with the requirement recently recommended by the US Department of Health and Human Services (2001), in which the national goal for school physical education programs emphasizes that 50% or more of class time should be spent with students being physically active (US Department of Health and Human Services, 2001).

Third, in contrast to the previous studies (Faucette and Patterson, 1990; Keating *et al.*, 1999; Martin and Kulinna, 2005), we would like to discuss how and why the participants in the current study exhibited teaching behaviors and learning activities differently. Faucette and Patterson (1990) found that specialist physical education teachers employed informing, structuring, questioning, feedback and reward teaching behaviors whereas non-specialist physical education teachers utilized silent monitoring and attending teaching behaviors. In general, the teaching behaviors employed by the teachers in the current study were consistent with the findings of Faucette and Patterson (1990). In particular, the STs in the current study exhibited more question and feedback teaching behaviors than those of the ITs and PTs. The STs, however, exhibited less Informing, Structuring and rewarding teaching

behaviors than those of the ITs and PTs (Table 3). Regarding the students' activity levels, the findings of the current study were inconsistent with the findings of Faucette and Patterson (1990), whereby they reported that the rates of students' activity levels were 35.0 and 16.5% taught by specialist and non-specialist teachers respectively. The rate of students' activity levels found in the current study were 47,56 and 43% for the STs, ITs and PTs respectively, which were higher than those of Faucette and Patterson (1990).

To aim at investigating the status and effect of teaching processes related to physical activity and fitness levels in school physical education programs, Keating *et al.* (1999) examined 15 physical education teachers' teaching behaviors and the learning activities exhibited by their students using a Computer System for Observing Fitness Instruction Time (C-SOFIT) instrument. Keating *et al.* (1999) found that all 15 teachers spent their class time on instructing, managing and observing their students with no time spent on promoting and demonstrating physical activities and fitness. While their students only obtained 8% of class time on Motor Engaged activities and 29% of class time on walking, 63% of class time was spent on standing, sitting, or lying down. Obviously, the findings of the current study were quite different from the findings of Keating *et al.* (1999), in which the students of the present study spent nearly half of the class time on Motor Engaged learning activities (i.e., 47% of the class time taught by STs, 56% of the class time taught by ITs and 43% of the class time taught by PTs).

Martin and Kulinna (2005) found that middle and high school physical education teachers spent 72% of their class time on general instruction and management behaviors while their students spent over 60% of class time on non motor-related activities, such as, standing, sitting, or lying down. What the students really did in the rest (40%) of the class time, according to Martin and Kulinna (2005), were walking or engaging in motor activities. In contrast, the current investigation found that the students taught by the three levels of teachers spent slightly more than 50% of class time engaged in motor-related learning activities; thereby implying that the teachers in the current study spent nearly half of the class time on motivation, instructing and managing their students.

Some possible reasons for the high percentage of class time on Motor Engaged activities as compared with those previous studies might have some things to do with the following two factors: Subject matters of the lessons involved in the current study. The subject matters of the classes included in this study were basketball/fitness (18 lessons), volleyball/fitness (18

lessons), yoga (6 lessons), dance (4 lessons), soccer/fitness (4 lessons), baseball/fitness (6 lessons), gymnastics (6 lessons), aerobic (6 lessons), tennis (4 lessons), weight lifting/fitness (4 lessons), swimming (2 lessons) and jump rope/fitness (2 lessons). Among the 90 physical education lessons, 55 lessons were individualized activities and 25 lessons were characterized by using small group format. Researchers indicated that teaching individualized activities, such as circuit fitness exercises, aerobic exercises, dance, martial-arts and yoga, demanded more instructional behaviors (e.g., informing, structuring, questioning and reward); therefore, students' ALT-PE could significantly increase because teachers' teaching behaviors and students' learning activities occurred almost at the same time (Faucette and Patterson, 1990; Martin and Kulinna, 2005; Pangrazi, 2007; Rink, 2003; Rosenshine, 1976). When applying the pattern of teacher-learner in individualized activities to teach general physical fitness for team sports, the activities turned out to be individualized activities. Rink (2003) indicated that effective teaching requires good managerial skills and classes can be managed for students' success in physical education by maximizing time on task, opportunities for practice and using individual or small group exercises. Hence, the findings of this study suggested that, to increase student Motor Engaged time, teachers should carefully select the subject matters, such as, various fitness exercises and individualized activities.

The impact of national healthy and physical education objectives. The Healthy People 2010 objectives for school physical education might have a significant impact on how the three high schools taught and the subject matters they selected. As mentioned above, since the national objectives were promoted by the US Department of Health and Human Services (2001), the physical education standards as outlined by the state, school districts and the three high schools have paid high attention to providing moderate to vigorous physical activities in physical education programs. Moreover, providing 50% or more of class time in physical activity along with maximizing student opportunities for appropriate practice have become an essential criterion for determining whether a lesson is effective and successful (Graham, 2008; Martin and Kulinna, 2005; Pangrazi, 2007; Rink, 2003). If all levels of physical education teachers could provide 50% or more of class time for their students to engage in various moderate to vigorous physical activities, children in our schools would become physically fitter and healthier through our physical education programs, thus accomplishing the goal of the healthy people 2010.

As the three levels of teachers and their students scored differently in the 14 categories of the DIBA (US Department of Health and Human Services, 2001) over the 90 lessons, we would like to have further discuss as follows: The STs scored higher on Cognitive Engaged and Feedback than the ITs and PTs, since the physical education activity courses in this study were composed of a high percentage of students in the PETE major and cognitive learning was an integral part of the curriculum. The STs provided more corrective and specific movement oriented feedback for students. The foundation for higher performance in providing various Feedback and involving students in "Cognitive Learning Activity" might be attributed to the in-depth and comprehensive knowledge on subject matters and solid teaching experience of the STs.

The ITs scored higher on Motor Engaged and Waiting for a Turn categories than those of the STs and PTs. Thereby demonstrating that the ITs were the practitioners who knew how to maximize students' ALT-PE. They had the skills to motivate their students to participate in the activities they offered. The Waiting for a Turn and Motor Engaged behaviors might be attributed to the 'class oversize' (over 80 students per class), which was an overwhelming factor in urban high school physical education class settings. Obviously, maintaining a high level of motor activity might be a solution of dealing with the discipline and control issues inherent in oversized classes.

The PTs scored higher on the Informing, Praise/Encouragement and Controlling categories than those of the STs and ITs. According to our observation, the PTs tended to be the "hands-on" educators who enjoyed demonstrating the motor skills/techniques by themselves. They demonstrated with enthusiasm, using a great deal of praise and encouragement to their students. Despite their enthusiasm, they might not be proficient in delivering appropriate quantities of demonstration/explanation and praise/encouragement to students, thus possibly explaining the high scores on Informing, Praise/Encouragement obtained by the PTs. However, when Informing and Praise/Encouragement did not work as expected, the PTs turned to use Controlling.

In addition, the reasons for the similar scores among the three levels of teachers (Table 2) on the Questioning, Observing, Structuring, Preparing and Get-equipment/Relocation categories might be explained as follow. Questioning is the favorite teaching behavior used by all three groups for motivation and for checking students' understanding. A similar amount of behaviors shown by the three groups in the Questioning category is the physical education

lesson instructional pattern, which implies that no matter you are STs, ITs, or PTs, you have to use a certain amount of questioning teaching behaviors to stimulate students' learning activities and deliver your teaching objectives. Observing teaching behaviors occurred during students' practice. Observing behavior is essential for effective teaching, because by observing, teacher can make decisions on whether the students need more help or feedback, or whether further instructions are needed. The three levels of teachers in the current study demonstrated a similar pattern using the Observing behavioral category.

Preparing and Get-equipment/Relocation behavioral categories are dependent on how teachers manage and organize their lessons. This is highly related to how they apply the Structuring behaviors. The reasons for why the three levels of teachers scored so closely in these behavioral categories might be attributed to the assumption of the PETE program, in which the PTs learn from the STs and ITs; the ITs learn from their real experiences and the documentations of the state, city and school district and the STs learn from studying the educational theories, the guidelines and recommendations of the professional organization (e.g., NCATE and NASPE) and their teaching experiences. It implies that, in the profession of teaching physical education, an individual might have formed some common patterns along with the structure of the PETE program.

## CONCLUSION

The present study examined and compared the features of teaching behaviors and learning activities in physical education class settings taught by three different levels of teachers using the 13 behavioral categories from the DIBA (Table 1). With respect to the percentage of class time that the participants exhibited over the 90 classes, the findings appear to show that: (a) the three levels of teachers spend nearly half of the class time on Informing and Structuring (management); (b) the students gain 47% (taught by STs), 56% (taught by ITS) and 43% (taught by PTs) of class time on Motor Engaged learning activities; (c) the STs utilize more Feedback behaviors and their students gain more Cognitive Engaged learning activities than those of the ITs and PTs; (d) the ITs show more None of the Above behaviors than those of the STs and PTs; (e) the PTs utilize more Informing, Praise/Encouragement and Controlling behaviors than those of the STs and ITs and (f) the teachers of the three levels use Observing, structuring, questioning, preparing and get-equipment/relocation behaviors in a similar manner.

**Recommendations and implications:** The current study was initially designed to investigate the current status of a PETE program and all data were collected within that program. To the knowledge of the investigators, this was the first study involving three levels of physical educators in a PETE program. The findings of this investigation have the following implications to PETE programs and future studies on teaching in physical education: (a) systematic observation techniques are useful for evaluating teachers at all levels in PETE programs and meaningful for helping them develop certain specific teaching behaviors; (b) teachers involved in PETE programs at both the high school and college/university levels can learn from each other; (c) providing 50% or more of class time for students to engage in various moderate to vigorous physical activities is a key criterion for assessing whether a lesson is successful or not in teaching physical education; (d) multiple teaching strategies, such as the Spectrum Teaching Styles (Mosston and Ashworth, 2002) and DIM (Graham, 2008), should be taught and reinforced in PETE programs because this is crucial for the PTs to obtain the essential knowledge and skills to meet the needs of diverse learners and (e) strengthening the cooperation of the three levels of teachers within a PETE program is vital. Specifically, the new Initial Physical Education Teacher Education Standards (National Association for Sport and Physical Education, 2007) must be shared with the ITs or cooperating teachers, because the ITs are the major resource for the PTs to develop teaching skills during the field experience and internship in actual school settings. Since a PETE program is to prepare physical education teachers, the PTs should be trained and tested in an environment where they grow the knowledge and skills so that they will eventually become successful physical educators.

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